Dharampeth Education Society's
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NAAC ACCREDITED - A GRADE (3.01)

DR. AKHILESH V. PESHWE
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Letter No: DSC/SR/JR/ _____ 2022-23 Date: 31st March, 2023

CERTIFICATE

This is to certify that, the Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated during last five years under Criterion II (2.6.1) given as follows:

Sr. No.	Name of Programmes	2021-22	2020-21	2019-20	2018-2019	2017-2018
1.	B. Sc. (Science)	✓	✓	✓	✓	✓
2.	B. Sc. (Home Science)	✓	✓	✓	✓	✓
3.	M. Sc (Mathematics)	✓	✓	✓	-	-
4.	M. Sc. (Chemistry)	-	-	-	-	-
5.	Diploma in Bioinformatics	✓	-	-	-	-
6.	Number of Certificate Courses	19	22	8	5	2

AKHILESH VASANTRAO PESHWE
Digitally signed by AKHILESH VASANTRAO PESHWE
Date: 2023.04.30 19:08:48 +05'30'

Dr. Akhilesh Peshwe
Principal

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE,
North Ambazari Road, Near Ambazari Lake, Nagpur

NAAC ACCREDITED GRADE 'A' WITH CGPA 3.01 (Third Cycle)

CRITERION-II

Teaching- Learning and Evaluation

YEAR-1

2021-22

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

SSR: 2023 FOR NAAC FOURTH CYCLE

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

List of Documents(2021-22)

Sr. No.	Name of Document
1.	Link of Core Courses Subject Syllabi in UG and PG Programme. i. B.Sc. (Science) ii. B. Sc. (Home Science) iii. M. Sc. (Mathematics)
2.	List of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
3.	Syllabi of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
4.	Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution

Prof. Pitambar Humane
IQAC Coordinator

CO ORDINATOR
INTERNAL QUALITY ASSURANCE CELL
DHARAMPETH, M. P. DEO MEMORIAL &
SCIENCE COLLEGE, NAGPUR

Dr. Akhilesh Peshwe
Principal

Principal
Dharampeth M.P. Deo Memorial
Science College, Nagpur.

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

Link for RTMNU syllabus for UG and PG

Graduation (UG)

Compulsory English
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Comp_Eng.pdf
Supp. Eng
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Supp_Eng.pdf
Hindi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Hindi_Syllabus.pdf
Marathi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/marathi_syllabus.pdf
Statistics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.A_%20B.Sc_Statistics_Semester_Pattern2013.pdf
Botany
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Botany_Semester_Pattern.pdf
Zoology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Zoology_semester_Pattern_2013.pdf
Microbiology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Microbiology_revised_syllabus_23092020.pdf
Physics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Physics_Semester_Pattern2013.pdf
Chemistry
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Chemistry_Semester_Pattern2013.pdf
B.Sc. Chemistry

B.Sc. Chemistry I Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry I Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_II_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSC_Chem_sem_II_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_II_paper_II_revised_syllabus_080920.pdf
Revised Complete U.G. Chemistry Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Revised_Complete_U.G.ChemistryRYSyllabus2018-19.pdf
Electronics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Electronics_Semester_Pattern2013.pdf
Mathematics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Mathematics_Semester_Pattern2013.pdf
Computer Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Computer_Science_Semester_Pattern2013.pdf
Home Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_home_science_syllabus_scheme_29092020.pdf

Post-Graduation (PG)

Mathematics
https://nagpuruniversity.ac.in/writereaddata/fckimagefile/MSc_Mathematics_Revised_Syllabus__CBCS____22nd_October_2021.pdf

Chemistry

https://www.nagpuruniversity.ac.in/links/Syllabus/Faculty_of_Science/006_CBCS_Syllabus_M.Sc.Chemistry.pdf

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

2021-22

LIST OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

Sr. No.	Course Name
1.	Introduction to Computers
2	C and CPP
3.	Arduino
4.	Libreoffice Suite[Base]
5.	Php and Mysql
6.	Inkscape
7.	RDBMS

LIST OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

Sr. No.	Course Name
1.	Certificate Course in Bioinformatics
2.	Diploma in Bioinformatics

LIST OF CERTIFICATE COURSES DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN

Sr. No.	Course Name
1.	Certificate Course in Communication Skill and Personality Development
2	Certificate Course in Skill Development in Competitive Exam
3.	Certificate Course in Vedic Mathematics
4..	Certificate Course in Latex

5.	Certificate Course Water Fish Culture
6.	Certificate Course in Vermiculturing and Vermicomposting
7.	Certificate Course in Developing Computation Skills Using Software Packages and Online Google Tools
8.	Certificate Course in Pattern Making & Embellishment
9.	Certificate Course in 'IoT Devices".
10.	Certificate Course in Excel for Banking and Accounts

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2.6.1

2021-22

Syllabi of Diploma / Certificate Courses

SYLLABUS OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

1. Certificate Course in Introduction To Computers

Sr. No.	Topic Name	Contents
1.	Printer Connection	How To Connect A Printer to Computer
2	Getting To Know Computer	Various Components of Computer How To Connect to the Various Components
3	Introductrion To Gmail	How to ● Create A Google Account ● Login to Gmail ● Write an Email ● Send an Email ● View an Email ● Logout Gmail
4	Compose Options For Eamil	How to Format the Email Text Attach Files to Email Share Files Via Google Drive Insert a Photo or Link to an Email About the Compose Window Options.
5	Google Drive Option	Creating a Document ,a Spreadsheet And a Presentation Uploading Files Sharing Options

2. Certificate Course in C and CPP

Sr. No.	Topic Name	Contents
1	First C program	How to ● Write a simple C program. ● Compile it. ● Execute it. Some common errors and their solutions.
2.	First CPP program	How to ● Write a CPP program. ● Compile it. ● Execute it. Some common errors and their solutions.
3.	Tokens	How to define and use tokens. With the help of an example. Some common errors and their solutions.
4.	Functions in **C and CPP**	What is Functions? Syntax of function Significance of return statements. Examples on functions Some common errors and their solutions.
5	Scope of Variables in C and C++	Scope of Variables. Types of variables Global Variables. Local Variables. Example. Some common errors and their solutions.
6	Conditional Statements in **C and CPP**	How to execute a single statement? And a group of statements. Examples on it Some common errors and their solutions.
7.	Nested if and switch statement	Nested if statement Switch statement Some example on it
8.	Increment and Decrement Operators	Increment and Decrement Operators Some examples. Typecasting.
9.	Arithmetic Operators	Arithmetic Operators its types ● Additions. ● Subtraction. ● Division. ● Multiplication. ● Modulus.
10.	Relational Operators	Relational Operators ● Less Than < ● Greater Than> ● Less Than or equal to<= ● Greater Than or equal to >= ● Equal to==

		• Not equal to !=
11.	Logical Operators	Logical AND. Logical OR. Logical MOT.
12.	Loops in **C and CPP**	For loop While loop Do….. while loop Through examples Some common errors and their solutions.
13	Array in **C and CPP**	Array. Declaration of an array. Initialization of an array. Through examples Some common errors and their solutions.
14.	2- Dimensional Array	What is a 2D array Through examples Some common errors and their solutions.
15.	String in **C and CPP**	What is string? Declaration of string. Initialization of a string. Through examples Some common errors and their solutions
16.	String Library Functions	String Library Functions. Some Examples.
17.	Structures in C	What is a structures? Declaration of structures. Through examples.
18.	Pointers in **C and CPP**	Pointers. To create pointers. And operations on pointers. Through examples.
19.	Functions call in **C and CPP**	Call by value. Call by reference. Through examples.
20.	Files in C	How • To open a file. • To read data from a file. • To write data into a file. Through examples.

3. Certificate Course in ARDUINO

Sr. No.	Topic Name	Contents
1.	Introduction To Arduino	What is the Arduino Device? Features Of Arduino Componenets Of Arduino Board Microcontrollers Installation Of Arduino IDE On Ubuntu Linux OS

2	Ardunio Components And Ide	Set Up Physical Connection Between Arduino and a Computer Ardunio Hardware Ardunio Programming Language
3	First Arduino Program	How to Write an Arduino Program Compile The Program Upload The Program Blink An LED
4	Arduino With Tricolor Led And Push Button	How to connect a Tricolor Led to Arduino Board Write A Program to Blink a Tricolor Led Use Push Button To Control The Blinking.
5	Arduino With Lcd	Connect an LCD to Arduino Board. Write a Program to Display A text Message On The LCD.
6	Display Counter Using Arduino	Connect an LCD And a Push Button To Arduino Board. Write A Program to Increase the Count Whenever The Push button is Pressed.
7.	Seven Segment Display	Connect a Seven Segment Display to Arduino Board. Write A Program to Display Digits From 0 to 4 On Seven Segment Display.
8.	Assembly Programming Through Board	Interface a Seven Segment Display To Arduino Board. Write An Assembly Program To Display aDigit On Seven Segment Display. Display a Digit On the Seven Segment Display. Implement and Verify the and,Or,Xor Operations in Assembly. Implement and Verify Simple Combinational Logic.
9.	Digital Logic Design With Ardunio	Implement and Verify the and,Or,Xor Operations In Assembly. Implement and Verify Simple Combinational Logic.
10.	Avr Gcc Programming Through Arduino	Interface A Seven Segment Display Though Arduino Board. Write A AVR-GCC Program To Display On Seven Segment Display. Display Digits 0To 9 On Seven Segment.
11.	Interfacing Lcd Through Avr – Gcc Programming	Interface LCD Through Arduino Board Write An AVR-GCC Program to Display a Digit On LCD
12	Electronic Component And Connection	Bread Board and its Internal Connection Led On Bread Board Push Button Seven Segment Display On Bread Board
13	Overview Of Arduino	Various Electronic Components and their Connections Contents Related to Other Series

14	Mixing Assembly And C Programming	Write a Function in Assembly Routine to Perform Initialization Call that Assembly Routine In AVR-GCC Program to Blink The Dot Led of Seven Segment Display .

4. Certificate course in Libre office Suite [base]

Sr No	Topic Name	Contents
1.	Introduction	What is Lireoffice Suite? Prerequisites For Using Base What Can You Do With Base? Relational Data Base Basics Create New Database Create A Table
2	Table And Relationship	Adding Data To A Table Define And Create Relationship Data Base
3	Modify A Simple Form	How to ● Enter Data Into A Form ● Modify Data In Form
4	Create A Simple Form	What is a Form? How to Create a Form Using the Wizard ?
5	Build A Complex Form With Form Control	Building a Complex Form Modify the Form
6	Add A List Box Form Control To A Form	How to Add a List Box Form Control ?
7.	Add Push Button To A Form	How to Add Push Button To A Form?
8.	Create Queries Using Query Wizard	How to ● Create Queries Using Query Wizard ● Select Field ● Set The Soring Order Of Fields ● Provide Search Criteria Or Conditions
9.	Enter And Update Data In Form	How to Enter And Update Data in a Form? How to Add Form Control in a Form?
10.	Create Queries In Design View	Create A Query By Using a Design View Add Table to the Query Design Window Select Field.
11.	Modify A Report	How to Modify a Report by Customizing the Layout and Look and Fill of the Report
12	Create Tables	How To Create A Table By Creating Views Using The Copy Method
13	Create Subform	How To Create A Subform With Example
14	Create Simple Queries In Sql View	How to ● Create Simple Queries In Sql View. ● Write Simple Sql

		• Use Select and From And Where Clause.
15	Access Data Source	How to • Access Other Data Sources • Register .Odb Databases • View Data Sources.
16	Database Maintenance	How to • Maintain A Data Base • Modify Data Base Structure • Defragment A Database • Take Backups
17	Indexes Table Filter And Sql Command Window	How To Indexes Table Filter And Sql Command Window
18	Database Design Purpose	What is Database Design ? Determining the Purpose of our Database Finding and Organizing information required Dividing the Information Into Table.
19	Database Design – Primary Key And Relationships	Database Design Turn Information Into Column Specify The Primary Key Set Up Database Relationship
20	Define –Refine Database Design And Normalization Rules	Refine The Database Design Apply The Normalization Rule And Test The Databases
21	Create Report	How To Create A Report Select ,Lable And Sort The Report Fields Select Report Layout Choose Report Type : Static Or Dynamic

5. Certificate Course in Php And Mysql

Sr No	Topic Name	Contents
1.	Echo Function	How To Use Echo Function and Tags in Php Using Program
2	Variables In Php	What Are Variables? How To Define Variables. Rules To Declare Variables In Php Program Like : Special Characters Are Not Allowed. Not Started With Number. Use Of $ To Declare a Variable.
3	If Statement	Use Of Conditional Statements (If---Else) in Php Program to Check Condition True/False Compare Two Values /Constant. Demonstration Of Multiple Program Like Compare And Print Message.

4	Switch Statement	What is Switch Case And Example. Program To Demonstrate The Use Of Switch Case Statement Example
5	Arithmatics Operators	Use Of Arithmatic Operator With Example
6	Comparision Opertaor	What Are Comparison, Arithmetic And Logical Operators? How To Use All These Operators in Php. Example To Demonstrate The Use of Operators Like Check Vowels and Consonants.
7.	Logical Operators	Definition Use Of Logical Operator S Example Of Logical Operators in Php
8.	Arrays	What Is Array ? Definition Of Array With Its Syntax And Declaration in Php Use of Array and its Types Details About Single Dimensional Array With Example. Ways Of Declaring Array In Php
9.	Multidimetional Arrays	What Is Multidimensional Array? Example To Use Multidimensional Array In Php
10.	Loops While Statement	Loop For Statement And Its Use Syntax and Example Of Loop For Statements In Php.
11.	Loops Do …While Statement	What Is Loop Structure? Syntax of Do---While Loop Example of Do--While Loop In Php Practical Demonstration of the Example Using Online Editor For Php
12	Loops For Statement	What is Loops For Statement Example Using Loop For Statement
13	Loops For Each Statement	What is Loop For Each Statement Syntax of Loop For Each Example
14	Functions Basic	What Are Basic Functions in Php? Syntax To Declare Basic Functions in Php Example Of Basic Functions In Detail Using Online Editor.
15	Functions Advanced	What Are Advance Functions in Php? Syntax To Declare Advance Functions in Php Example Of Advance Functions In Detail Using Online Editor.
16	Get Variable	What is Get Variable ? Use of Get Variable Along With Its Scope. Example of Using Get Variable In Php.
17	Post Variable	Use of Post Variable Example of Using Post Variable

		Example of Get Variable In Embedding
18	Embedding Php	Concept of Embedding in Php How to Use Embedding in Php Program.
19	Common Way To Display Html	How to Display HTML inside Php With Example
20	Common Errors Part -1 , Part -2 And Part -3	Types of Error and Identification of Errors In Php Program. Parse Error : What Is Expecting And Not Expecting In The Program How To Delete The Unnecessary Code/Syntax From The Program. Hedaer Function How To Fix The Error
21	File Upload Part-1 And Part 2	How To Upload File –Part 1 And Part 2 Properties Of Uploaded Files
22	Cookies With Part 1 And 2	What Are Cookies ? How To Create Cookies In Php With Example And Syntax Practical Use Of Cookies Using Online Editor.
23	Sessions	What Are Sessions And Its Definition How Sessions Are Different From Cookies Syntax And Example Of Sessions Practical Demo Of Creating Sessions.
24	Md5 Function	What Is Md5 Function In Php Use Of The Function Syntax And Example Of The Function. Example And Illustration of Raw Variable In Php. Practical Demonstration of Md5 Function In Php.
25	Sending Email Part 1,2 And 3	How to Send an Email Using Php Script Example on It. Practical Demonstration Of Sending An Email Using Php Script
26	Simple Visitor Counter	What is Simple Visitor Counter In Php And Its Use With Example
27	Php String Function Part 1 And 2	What Are Php Strings Function? Types of String Functions Like Strlower,Echo,Fprint Etc
28	Display Images In A Directory	Listing Files And Manupulating Directory Setup Directory Structure Listing of Images With Different Format Example
29	User Login Part 1 , Part 2 And Part 3	How To Use/Create User Login Form Create User Login Page Using HTML and Php Example How To ● Edit Login Page

		• Update Login Page Create Session and User Can Enter in the Page Use of Start Session Function Identification of Error and Fix the Error Example
30	User Password Change Part 1 ,2 And 3	Create Form and Set User Password. Create New Password To Login The Page How To • Change User Password • Compare Old Password With New Password • Upadte Database And Make Changes In It. Practical Demo Of Changing Password For Registration Form In Php
31	User Registration Part 1 To Part 6	Creating Registration Form With Various Tags Like tr,td,Form Style Etc…. Practical Demo Of Creating Form Using Online Editor Use Strlen Function To Count The Length Of The String. Insert Record Or Data In The Table Of Your Mysql Data Base Compare Username And Password With The User Name And Password Stored In The Db.
32	Xampp In Windows And Linux	Xampp Definition Installation Of Xampp In Windows And Linux OS Example Of Php In Xampp
33	Mysql Part 1 To 8	What Is Mysql Database Connect With Mysql Db With Php Use Of Mysql Database How To Create Db Insert Data Into Table Of Db Update Data From Table Select Data From Table Of Db. How To Delete Data From Table of Mysql Data Base How to Write Code In Php to Access The Data From Mysql

6. Certificate Course in INKSCAPE

Sr. No.	Topic Name	Contents
1	Create and edit Shapes	Inkscape interfaces How to create basic shapes How to Fill color in the shape . Modify shapes using handles.
2.	Fill color and stroke	How to Fill color in objects. Give objects an outline. Various type of gradient. Stroke paint and stroke style.
3.	Create and edit multiple shapes.	How to Copy and paste objects. Duplicate and clone objects. Group and order various objects. Multiple selection and invert selection.
4.	Layers and Boolean operations	What are ● Layers. ● Filters. ● Boolean operations.
5	Align and Distribute Objects	How Align and Distribute Various Objects? Arrange objects in rows and columns. Set spacing between Objects. Create a tile pattern.
6	Create and format text	Inserting text. Formatting and aligning text. Spacing and bullet. Create a simple flyer at the end.
7.	Text tool features	Manual Kerning. Spell checking. Super script. Sub script.
8.	Basics of Bezier tool	Draw straight line and closed shapes. Draw curve line. Add, edit and delete node.
9.	Text Manipulations	Create text on path. Create text on shape. Image inside text. Text on perspective. Cut out text.
10.	Overview of inkscape	Draw an edit various predefined shapes.
11.	Create an A4 Poster	Change the document properties. Create an A4 poster. Save the poster in PDF.
12.	Create a 3 fold Brochure	Using guidelines and set them. Design a 3 fold brochure. Using importance of layers.
13	Design a CD label	Create a CD label Template. Design a CD Label. Save the file as PNG.

14.	Designing a Visiting card	Setting for a visiting Card. Designing a visiting Card. Setting to print multiple copies of Visiting card.
15.	Create pattern in inkscape	Cloning. Pattern along path. Spray tool. Path effect color.
16.	Special effects on text	Reflected text. Labeled text. Change the case of text.
17.	Trace bitmap in inkscape	Difference between raster and vector image. Various raster and vector format. Convert raster PNG image to vector.
18.	Warli art for textile design	Warli art for design for borders. Repeat pattern using cloning.
19.	Manage pattern for textile design	To create mango pattern. Draw using pattern along path.

7. Certificate Course in RDBMS

Sr. No.	Topic Name	Contents
1.	Installation Of PostgreSQL	Installation Of PostgreSQL Connect To PostgreSQL Database
2	Create Databse Using Pgadmin	How to ● Connect to the Server ● Database and its Objects ● Create a Database ● Table and its Attributes ● Create a Table
3	Table With Primary Keys	How To : ● Insert Data ● Retrieve Data ● Data Redundancy ● Importance Of Primary Keys And ● Create A Table With Primary Keys
4	Select Clause	Basic Select Statement Select With Where Clause Select With Relational Operators Select With Logical Operators Alias For Column Names
5	Select With Aggregate Functions	More Clauses That Can Be Used With Select Statement Distinct Between Like In Is Null Aggregate Functions

6	Foregin Key Constraint	What is ● Foregin Key Constraint ● Alter Table Command How to Add a Foregin Key Check Constraint
7.	Aggregation Facilities In Sql	How to ● Use Group By ● Having ● Order By Clause
8.	Updating Data	Update Statement Delete Statement
9.	Overview Of Rdbms Postgresql	Rdbms Features Of Postgresql Content Available In Various Tutorials Under Various Series

SYLLABUS OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

1. Certificate Course in Bioinformatics

Paper 1 : Computer Aided Bioinformatics.

UNIT	Detail Syllabus of the Unit
1	**Communicating Electronically: Email and Web Sites:** Using Email, Observe the email conventions where you work, Keep your messages brief, Make your messages easy to read on screen, Provide an informative, specific subject line, Take time to revise, Remember that email isn't private, Creating Web Site, Begin by defining your site's objectives, Provide quick and easy access to the information your readers want, Design pages that are easy to read and attractive, Design your site for international and multicultural readers, Enable readers with disabilities to use your site, Help readers find your site on the Internet, Test your site on multiple platforms and browsers before launching it, Keep your site up to date, Ethics Guideline: Respect intellectual property and provide valid information, Exercises **website creation.**
2	Fundamentals of Computing: Introduction to operating Systems: WINDOWS, NT, UNIX/Linux operating systems. Comparative Advantages of Security (hacking9, cracking) Installation. Portability and Programming of these operating systems. Computer Viruses
3	Computer Networking: LAN, WAN, MODEM. Optical Vs. Electronic Networking. Security of the network, Fire-walls. Network Goals, Applications

	Network, Network structure, Network architecture, Hierarchical networks, Ethernet and TCP / IP family of protocols, Transport protocol design
4	Programming Language: what is program, algorithms, introduction to various programming languages like C, C++, Python, cobra java, Bioprogramming languages Perl, Bioperl, biojava, etc, markup languages. XML,HTML

Paper II Basics of Bioinformatics

UNIT	Detail Syllabus of the Unit
1	Basics of Bioinformatics, nature and diversity of biological data, Bioinformatics: emergence and growth, bioinformatics Scenario in India, world. ***International Nucleotide Sequence Database Collaboration***
2	**Browsing Genomic Resources:** Genome Assembly overview Related data resources (EST, STS, GSS, HSS) etc. Genomic databases at EBI and NCBI Genomic databases for human, mouse, yeast and other model organisms Genomic databases for plant, microbial, parasite and viral genomes Challenges in development of genomic databases & resources
3	**Structure visualization:** Factors Affecting Structure of Molecules Principles of Structure: Bonds, bond angles, et. dihedral angles, Anatomy structures: primary, secondary angles, e structural elements (alpha, beta, coil, turns) Tertiary & quaternary structure organization, **visualization tools** for nucleic acid as well as protein.
4	**Use of Bioinformatics:** Agriculture, Pharmacy , Human Health, Biotechnology, Molecular Biology, Drug Discovery.
5	assignments

Paper III Basics of Bioinformatics

UNIT	Detail Syllabus of the Unit
	This paper describes how to acquire information from public domain: biological databases by using computers and internet.
1	What is data? biological data, database classification of biological databases. data base operating system like mysql, oracal. data base management Systems. public domain resources in biology. search engines, Wikipedia. ***In silico LITERATURE MINING/LITERATURE DATABASES Pub Med, Medline, PubMed Central*:** Entrez: search engine to search and retrieve references, concepts in keyword based searches and MeSH terms, other literature databases & Open source journals in the area of Bioinformatic. Searching & retrieval of data: concepts Database search engines: Entrez & SRS Keyword-based search and retrieval, use of wild card characters, narrowing and broadening the search, using history feature, use of Boolean operators, learning use the limits feature, curation and processing of search results, extraction of sequences in various formats, online and batch processing.
2	**NUCLEIC ACID DATABASES**

	Organization of data, Contents and format of entries, sequence format, submission of data in following databases: o GenBank o EMBL o DDBJ 3 Biological databases II:
3	Biological databases II: Protein sequence database Organization of data, Formats and contents of entries, submission of data in following databases: o SwisProt o PIR PSD o UniProtKB
4	Protein 3d structure databases: protein data bank FSSP, DSSP, CATH, SCOP Metabolic pathway database.
5	Assignments

2. Diploma in Bioinformatics

UNITS	Details of the syllabus
1	**SEQUENCE ANAYLSIS** • Basic concepts of sequence similarity identity and homology. • Definition of: Homologues, orthologues, paralogues • Concept of sequence alignment, Needleman and Wunsch, Smith and Waterman. Algorithm, for pair wise alignment. • Scoring matrices: Concept, PAM.
2	**MULTIPALE SEQUENCE ALIGNMENT** • Definition of multiple sequence alignment and application. • Approaches for multiple sequence alignment. • Progressive method. • Hierarchical method. • Clustal W.
3	**PHYLOGENY** • Overview of molecular evolution. • Phylogenetic trees: Understanding tree (Cladistic method) • Computational consideration
4	**PROTEIN STRUCTURE PREDICTION** • Secondary structure prediction: Choufasman method. • Tertiary structure prediction: fundamentals of methods for 3D structure prediction (Homology modelling) • Ab-initio structure prediction method

SYLLABUS OF CERTIFICATE COURSES DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN

1. Certificate Course in Communication Skills and Personality Development

UNIT	Topic
UNIT I	**Introduction to Communication Skills**
1.1	Introduction to Communication Skills
1.2	Types of communication (formal and informal)
1.3	Ways of Communication: Reading and Writing
1.4	Ways of Communication: Speaking
1.5	Why Learn Communication: Career Building
1.6	Why Learn Communication: Personal Communication
1.7	What are Barriers to communication
1.8	Types of Barriers to communication
1.9	How to overcome Barriers in communication
UNIT - II	**Non-Verbal Communication and Listening Skills**
2.1	Introduction to Non-Verbal Communication
2.2	Roles of Non -Verbal Communication
2.3	Advantages and disadvantages of non-verbal communication
2.4	Types of Nonverbal Communications
2.5	How to Improve Nonverbal Communication
2.6	Importance of Listening Skills

2.7	Hearing and listening
2.8	How to Improve Listening Skills
UNIT -III	**Group Discussion and Interview Techniques**
3.1	Introduction to Group Discussion
3.2	Understanding the Psychology of groups
3.3	Dos and Don'ts of Group Discussion
3.4	Group Discussion Language
3.5	Non -verbal communication in Group Discussion
3.6	Group Discussion in Interview
3.7	What are Interview Skills
3.8	Interview techniques
3.9	Online Interview Preparation
UNIT IV	**Online Communication**
4.1	Netiquette
4.2	Email Writing

2. Certificate Course in Skill Development for Competitive Examinations

Units	**Topic**
Unit I	**Quantitative Aptitude**
1.1	Ratio & Proportion
1.2	Average
1.3	LCM HCF
1.4	Number System

1.5	Partnership
1.6	Percentage
1.7	Profit and loss
1.8	Time and work
1.9	Pipes and cistern
1.10	Simplification
1.11	Time and Distance
Unit II	**Logical Reasoning**
2.1	Anology
2.2	Blood relation
2.3	Coding-decoding
2.4	Syllogism
2.5	Input-output
2.6	Missing number in figure
2.7	Direction sense
2.8	Mirror image
2.9	Odd one out
2.10	Missing figure
2.11	Order and ranking
Unit III	**English Language**
3.1	Noun
3.2	Adjective
3.3	One word substitution
3.4	Preposition
3.5	Cloze test
3.6	Article
3.7	Pronoun
3.8	Adverb
3.9	Error detection
3.10	Reading comprehension
3.11	Idioms
3.12	Active and passive voice
Unit IV	**General Knowledge**
4.1	Geography

4.2	Current Affairs
4.3	History
4.4	Polity
4.5	Biology
4.6	Traditional general knowledge
4.7	Economics
4.8	Physics
4.9	Chemistry
	Total

3. Certificate Course in Vedic Mathematics

Unit 1	**Topic**
1.1	Addition - Subtraction - Combined operations - Beejank
1.2	Multiplication methods: Urdhwatiryagbhayam, Nikhilam, Ekanyunen, Ekadhiken, Antyayordashakepi.
1.3	Vinculum - Operations.
1.4	Awareness of 1 to 5 Vedic sutras as per Shankaracharya Bharthikrishan Teerthji Swamiji's book.
Unit 2	
2.1	Division methods : Nikhilam, Paravartya Yojayet, Dhwajank
2.2	GCD and LCM
2.3	Expression of GCD in terms of two numbers.
Unit 3	
3.1	Divisibility tests, Osculation & Reverse osculation.
3.2	Division Algorithm, Quotient & Remainder.
3.3	Duplex method.
Unit 4	
4.1	Squares & Square-roots for 6 digit number.
4.2	Cubes & Cube-roots for 6 digit number, Contribution of Indian Mathematicians in Arithmetic.

4. Certificate Course in Latex

Sr.No.	Topic Name	Contents
1.	Letter writing	How to write letters using Latex with options
2	Mathematical type setting	How to get into and leave from the mathematical mode The role of spaces and how to create them Mathematical symbols Amsmath package and its use in creating matrices
3	Equations in Latex	How to create the equations? Components of equations Details of components in equation.
4	Tables and Figures	How to create a table using tabular environment Ways of inserting information in table.
5	Beamer	How to create presentation in Latex and Beamer?
6	Bibliography	Creating reference using Latex and beaptec in details.
7.	Feedback diagram with Maths	The procedure of creating diagram /figure How to Create a figure (xfig)
8.	Latex on Windows using Text works	Download and install MikTex Write a basic Latex Documents using Texworks Configure MikTex to download missing packages.
9.	Report Writing	How to ● Use report and article class ● Create sections ● Automate the numbering of sections ● Create table of contents ● Create the title page

5. Certificate Course in Freshwater Fish Culture

Sr. No.	**Topic**
1	History of fish culture in India
2	Freshwater fishes of India
3	Classification of fishes
4	Planning and construction of fresh water fish farm
5	Pond soil
6	Preparation of pond: Liming and manuaring

7	Natural reproduction (breeding) in fishes
8	Factors affecting natural reproduction
9	Artificial (induced) reproduction (breeding) in fishes
10	Factors affecting artificial reproduction
11	Hybridization in fishes
12	Transgenic fishes
13	Developmental stages of fishes
14	Transport of live fish seed
15	Prestocking management of Nursery
16	Rearing and stocking ponds for common carps
17	Feeding of fishes
18	Zooplankton as a food for fishes
19	Polyculture of Indian and Exotic carps
20	Advantages and disadvantages polyculture
21	Traditional crafts and gears used in fresh water fish capture
22	Advanced crafts and gears used in fresh water fish capture
23	Integrated Fish farming
24	Poultry and fish culture
25	Duck and fish culture
26	Rice and fish culture
27	Sewage fed fisheries
28	Advantages and disadvantages of integrated fish farming
29	Fisheries co-operative Societies
30	Role of Fisheries co-operative Societies in fish production and marketing
31	Preservation of fish by curing (drying)
32	Preservation of fish by curing(salting and smoking)
33	Fish products and by-products
34	Bacterial Diseases
35	Fungal diseases
36	Parasitic diseases

	Practical
37	Identification of fishes
38	Physicochemical analysis of pond soil to determine its texture
39	Identification of Developmental stages in fishes
40	Qualitative and quantitative study of Zooplankton
41	Crafts and gears used in fresh water fish capture
42	Water parameter
43	Visit to Fish breeding center

6. Certificate Course in Vermiculturing and Vermicomposting

Units	**Topic**
Unit I	Importance of Vermiculture/ Vermicompost
	Introduction to vermiculture/vermicomposting Economic importance of Vermiculture Vermiculture value in maintenance of soil structure Taxonomy of Earthworm
	Anatomy of Earthworm
	Habits and habitat of Earthworm
	Physiology of Earthworm
	Reproduction in Earthworm
	Useful species of earthworms
	Local species of earthworms
	Exotic species of earthworms
Unit II	Earthworm Biology and Rearing
	Biology of local species like Eisenia foetida
	Vital cycle of Eisenia foetida: alimentation
	Vital cycle of Eisenia foetida: fecundity
	Annual reproduction potential of earthworms
	Factors affecting reproduction of earthworms

	Manual Method of Vermiculturing
	Migration Method of Vermiculturing
	Mechanical Method of Vermiculturing
	Introduction to variety of species used for commercial use
Unit III	Methods of vermicomposting technology and its Application
	Small Scale Earthworm farming for home gardens
	Conventional Earthworm composting
	Commercial Earthworm composting
	Earthworm Farming (Vermiculture),
	Earthworm Extraction (harvest)
	Harvesting and packaging of Vermicompost
	Transport and storage of Vermicompost
	Nutritional Composition of Vermicompost for plants
	Vermicompost comparison with other fertilizers
	Vermiwash collection
	Enemies of Earthworms
	Scope of research in vermicomposting
Practical:	
1	Identification of different types of earthworms
2	Study of Sytematic position and External characters of Eisenia fetida Study of Life stages Eisenia foetida
3	Morphology and development of Earthworm.
4	Study of equipment and devices used in vermicomposting Preparation vermibeds
5	Maintenance of vermibeds

7. Certificate Course in Developing Computation Skills Using Software Packages and Online Google Tools

Sr. No	Contents
UNIT I :	**INTRODUCTION TO INTERNET, WWW & WEB BROWSERS**
	1.0 Introduction 1.1 Objectives

	1.2 Basic of Computer Networks 1.2.1 Local Area Network (LAN) 1.2.2 Wide Area Network (WAN)
	1.3 Internet 1.3.1 Concept of Internet 1.3.2 Applications of Internet
	1.3.3 Connecting to the Internet
	1.3.4 Troubleshooting
	1.4 World Wide Web (WWW)
	1.5 Search Engines 1.5.1 Popular Search Engines / Search for content 1.5.2 Accessing Web Browser
	1.5.3 Downloading Web Pages
	1.5.4 Printing Web Pages
	1.6 Understanding URL 1.7 Surfing the web
	Summary
UNIT II :	**COMMUNICATIONS AND COLLABORATION**
	2.0 Introduction 2.1 Objectives 2.2 Basics of E-mail 2.2.1 What is an Electronic Mail 2 .2.2 Email Addressing
	2.3 Using E-mails 2.3.1 Opening Email account 2.3.2 Mailbox: Inbox and Outbox 2.3.3 Creating and Sending a new E-mail
	2.3.4 Replying to an E-mail message 2.3.5 Forwarding an E-mail message 2.3.6 Sorting and Searching emails 2.4 Document Collaboration
	2.5 Instant Messaging and Collaboration 2.5.1 Using instant messaging 2.5.2 Instant messaging providers 2.5.3 Netiquettes
UNIT III :	**MAKING SMALL PRESENTATIONS (USING MS POWERPOINT)**
	3.0 Introduction 3.1 Objectives
	3.2 Basics 3.2.1 Using PowerPoint 3.2.2 Opening A PowerPoint Presentation 3.2.3 Saving A Presentation
	3.3 Creation of Presentation 3.3.1 Creating a Presentation Using a Template 3.3.2 Creating a Blank Presentation
	3.3.3 Entering and Editing Text 3.3.4 Inserting And Deleting Slides in a Presentation

	3.4 Preparation of Slides 3.4.1 Inserting Word Table or An Excel Worksheet 3.4.2 Adding Clip Art Pictures
	3.4.3 Inserting Other Objects 3.5 Presentation of Slides 3.5.1 Viewing A Presentation 3.5.2 Choosing a Set Up for Presentation
	3.5.3 Printing Slides And Handouts 3.6 Slide Show 3.6.1 Running a Slide Show
	3.6.2 Transition and Slide Timings 3.6.3 Automating a Slide Show 3.6.4 Applying Animation
	Summary
UNIT IV:	**GOOGLE TOOLS**
	4.0 Introduction 4.1 Objectives 4.2 Introduction to Google Doc 4.2.1 Create, Edit and Format Google Document
	4.2.2 Create Template for Resume , Letters 4.2.3 Use of different Add-on tools 4.2.4 Introduction to Add- On Tools and its Use.
	4.2.5 Sharing Google Document (Public /Private) 4.2.6 Use Google Docs to write a report (instead of writing with pencil and paper). 4.2.7 Google sheets to prove the concept of shared workspace and live updating.
	4.3 What is Google Class Room? 4.3.1 Introduction 4.3.2 How to Create Google Classroom using Ubiquitous devices 4.3.3 Create assignment/Quiz and Study Material with the students.
	4.3.4 How to Submit assignment to Specific Classroom (Students Perspective) 4.3.5 How Students can interact with Class Room. 4.3.6 Use Google Calendar for due dates, events outside the classroom, and other important “chronological data”.
	4.4 Introduction to Google Slides 4.4.1 Create and arrange slides 4.4.2 Choose a theme and layout 4.4.3 Add and edit content
	4.4.4 Customize your slides 4.4.5 Create and Import Files 4.4.6 Share and Collaborate on files

	4.5 Introduction to Google Drive 4.5.1 How to store files in the cloud (on Google's servers) 4.5.2 Synchronize files across devices, and share files
	4.6 Introduction to Google Calendar and Translate 4.6.1 Interlinking of Google Classroom ,Calendar
	4.7 Google Form 4.7.1 Introduction of Google Form and its Use
	4.7.2 Setting and Sharing of Google Form 4.7.3 Creating Certificates in Google form
	4.8 Introduction to Blogger 4.8.1 What is Blogger? 4.8.2 How to Create Blog using Blogger
	4.9 Introduction to Outlook and its use

8. Certificate Course in Pattern Making & Embellishment

Unit 1	**Topics**
1.1	What is pattern making, definition, advantages, disadvantages, what is commercial pattern
1.2	Body types and measurements
1.3	Pattern making: Essential and symbols of pattern pieces, identification of grain lines, darts, center front and center back, fold lines, helpful marking – cutting line, stitching line
1.4	Pattern layout: definition, importance, principles, types of layout, importance of fabric estimation and its advantages
1.5	Cutting and stitching of baby frock
Unit 2	
2.1	Pattern grading: definition and different methods for grading pattern, grading definition, sizes, principles, types, grading points, importance of manual grading and computerized grading.
2.2	Different methods of pattern designing A. Drafting B. Flat pattern C. Draping
2.3	Darts: Types of darts, dart manipulation, and its different methods slash, spread and pivot method
2.4	Fit: Factors affecting fitting, fitting problem and their remedy
2.5	Pattern envelope: Front and back envelope, garment description and fabric types.
Unit 3	Embroidery (Basic and Regional)
3.1	History and practical, stitches, color, material, threads and stitches
3.2	Introduction to basic stitches (06)
3.3	How to trace design on fabric
3.4	Introduction to regional embroidery 1. Kantha of Bengal 2. Chamba of Himachal

	3. Phulkari of Punjab 4. Manipuri from Manipur 5. Kachhi from Gujrat 6. Kasuti of Karnataka 7. Chikankari from UP 8. Kashidakari of Kashmir
Unit 4	**CLAY ART Preparation of Polymer clay**
4.1	Introduction (Warli art) using Polymer clay art
4.2	Historical Background
4.3	Motif: meaning, types, classification
4.4	Jewelry making

9. **Certificate Course in 'IoT Devices".**

UNITS	TOPICS
UNIT I	**How the Internet Works**
1.1	Introduction
1.2	Host Communication
1.3	Protocols, Protocol Stacks, IoT Protocols
1.4	Network Addressing, Addressing Layers, Intra-domain Vs Inter-domain
1.5	**IoT Hardware - Development Boards**
	1 Arduino Uno
	2 Arduino Mega
	3 ESP 8266 WiFi Development Board
	4 ESP32 WiFi+BLE Development Board
	5 Raspberry Pi Zero W (Mini Computer)
	6 Raspberry Pi 3B+ (Mini Computer)
	7 MSP 430 Launch Pad board
	8 STM32F4 Nucleo Board
	9 ARM Development Board
	10 PIC Development Board

Unit II	**IoT Hardware- Sensors**
2.1	Background of Electric circuit design
2.2	1.Digital Temperature and Humidity Sensor DHT 22
	2 BMP 280 - Atmospheric Pressure Sensor .
	3 Soil Moisture Sensor .
	4 LM 35 Temperature Sensor .
	5 Ultrasonic Sensor HC SR-04 .
	6 Light Dependent Resistor (LDR) .
	7 PIR Motion Sensor .
	8 TSOP IR Transmitter and Receiver .
	9 IR Transmitter and Receiver .
	10 Microphone (Sound Sensor) .
	11 Joystick Sensor .
	12 Accelerometer and Gyroscope GY521 MPU 6050 .
	13 Limit Switches .
	14 Reed Switch .
	15 Rotary Encoder .
	16 Vibration Sensor .
	17 Capacitive Touch Sensor .
	18 Transistor Module .
	19 LDR .
	20 Push Button .
	21 RC 522 RFID Readers .
	22 Water Vapour sensor .
	23 Tilt Sensor
	24.DS 18B20 Contact Temperature sensor module .
	25 Water flow sensor .
	26 Touch sensor .
	27 Fingerprint sensor .
	28 Turbidity sensor .

	29 Load Cell weight sensor .
	30 Gas Sensor MQ 135 .
	31 RTC DS1307 .
	32 Flex Sensors .
	33 Dust Sensor .
	34 PN532 NFC Reader .
	35 Rpi Camera 5MP
UNIT III	IOT hardware - **Actuators:**
3.1	1.I2C OLED Display .
	2 Backlight LED .
	3 4 Channel Relay .
	4 RGB LED 9W .
	5 Solid State Relays 25 A .
	6 Arduino Speaker .
	7 RPi Touch Display 3.5' .
	8 E-Ink Display 2.7' .
	9 Buzzer module .
	10 LED .
	11 9W LED .
	12 12V DC Geared Motor 550RPM .
	13 LCD Display 16*2 .
	14 Coin Vibration Motor .
	15 Solenoid Valve 230V AC .
	16 Small DC Motor .
	17 7 Segment Display .
	18 Stepper Motor 5V with Driver .
	19 Micro Servo Motor 9g .
	20 Buzzer module
UNIT IV	**Integrated circuits in practice & IoT platform Design and Programming**

4.1	Microcontrollers 3.1.1 Architecture 3.1.2 Instructions
4.2	Connectivity
	Data processing
	User Interface
4.3	Data Encoding : Challenges and Approaches
4.2	Arduino Programming 1. Based on interfacing the sensors 2. Based on data transfer 3. Based on arithmetic and logical operations

10. Certificate Course in Excel for Banking and Accounts

Unit	Topic
Unit I	**Basic of MS-Excel & Conditional Formatting**
1.1	Introduction & objective, Application and Components of MS-Excel
1.2	Working with Formulas and Functions, operators: How to enter formula and functions in excel?
	Use of different operators in excel
1.3	Conditional Formatting
1.4	Conditional Formatting Rule: - rule, clear rules, manage rules, Top 10 items rule, Bottom 10 items,
	Top 10%, Bottom 10%, Above Average, Below Average
1.5	Sorting and Filtering of data values
Unit II	**Pivot Tables and Pivot Charts**
2.1	How to insert/create Pivot Chart, Change Pivot Chart Type,

	Difference between pivot Charts and Standard Charts
2.2	How to create pivot table and fields
	Adding & rearranging fields in the field list
2.3	Filter data in Pivot Table
	Group or Ungroup data in Pivot Table
2.4	Keyboard Shortcuts
Unit III	**Graphs and Statistical Analysis**
3.1	Function in statistics: - • Median • Mode • Average/Mean
	• Standard deviation • Range • HARMEAN, GEOMEAN, VAR
3.2	How to create and Format Graphs
3.3	How to use Banking Formulas in Excel
3.4	What is Correlation with excel and how to use it
	What is Regression with Excel and how to use it.
Unit IV	**Advanced Excel**
4.1	Role of management accounting
4.2	Linking of worksheet in excel workbook
4.3	Generation of MIS reports
4.4	Linking of excel sheet to database
4.5	Automation in excel through Macros: - Introduction, Record, save and run macro
	Assign macro to an object, check VBA code
	Edit or delete a Macro, Macro security settings
	VLOOKUP function

4.6	HLOOKUP and LOOKUP function
4.7	Concept of Data Massaging

Dharampeth Education Society's
DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE,
North Ambazari Road, Near Ambazari Lake, Nagpur-440033

Program Outcome, Program Specific Outcome & Course Outcome

For B. Sc. (Science & Home Science) and M. Sc. (Mathematics)

Internal Quality Assurance Cell (IQAC)

CONTENTS

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY NAGPUR AFFILIATED UG & PG COURSES

IIT SPOKEN TUTORIAL CERTIFICATE COURSE

UGC SANCTIONED CERTIFICATE AND DIPLOMA COURSES

DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN, RTM NAGPUR UNIVERSITY AFFILIATED CERTIFICATE COURSES

BOTANY

Department of Botany	After successful completion of three years degree program in the subject Botany the students are able to:
Program Outcomes	**PO1:** Students know about different types of lower & higher plants their evolution in from algae to angiosperm &also their economic and ecological importance. **PO2:** Cell biology gives knowledge about cell organelles & their functions. **PO3:** Molecular biology gives knowledge about chemical properties of nucleic acid and their role in living systems. **PO4:** Genetics provides knowledge about laws of inheritance, various genetic interactions, chromosomal abrasions & multiple alleles. **PO5:** Structural changes in chromosomes. **PO6:** Student can describe morphological & reproductive characters of plant and also identified different plant families and classification. **PO7:** They know economic importance of various plant products & artificial methods of plant propagation. **PO8:** Various concepts in ecology and phytogeography. **PO9:** Use modern Botanical techniques and decent equipment. **PO10:** To inculcates the scientific temperament in the students and outside the scientific community.
Program Specific Outcomes	**PSO1:** Students acquire fundamental Botanical knowledge through theory and practical. **PSO2:** To explain basis plant of life, anatomy, reproduction and their survival in nature. **PSO3:** Helped to understand role of living and fossil plants in our life. **PSO4:** Understand good laboratory practices and safety. **PSO5:** To create awareness about cultivation, conservation and sustainable utilization of biodiversity. **PSO6:** To know advance techniques in plant sciences like tissue culture, plant disease management, artificial gene transfer etc. **PSO7:** Students understand about the phytogeography of India, ethnobotanically important plants and their use.
Course Outcomes B. Sc Botany	
Course Outcome for Semester-I	
PAPPER-I: **VIRUSES, PROKARYOTES, ALGAE & BIOFERTILIZERS**	**CO1:** Study of Microbes and algae to understand their Diversity. **CO2:** Know the systematics, morphology and structure of Viruses, bacteria, Mycoplasma and algae. **CO3:** To know life cycle pattern of microbes and their economic importance.

	CO4: To know evolution of microbes and algae. **CO5:** To learn skill of preparation and use of biofertilizers for sustainable development.
PAPPER-II: **FUNGI, LICHEN, PLANT PATHOLOGY, BRYOPHYTA & MUSHROOM CULTIVATION**	**CO1:** Study of Fungi, Lichens, plant pathology and Bryophyta. **CO2:** To know the systematics, morphology and structure of fungi, Lichens, plant pathogens, hosts and Bryophytes **CO3:** To know life cycle pattern of fungi, lichens, plant pathogens and bryophytes. **CO4:** To know economic importance of fungi, lichens and Bryophytes. **CO5:** To know evolution of fungi, lichens and Bryophytes. **CO6:** To learn skill of cultivation and importance of mushrooms for human consumption.
Lab Work:	• To get acquainted with ultrastructure of viruses and bacteria, to study staining method of bacteria • To study structure and reproduction of *Nostoc* • To study the structure and reproduction in Algae, like *Chara, Vaucheria, Ectocarpus* and *Batrachospermum* • To learn the method of identification and characterization of bacteria useful in biofertilizers • To learn staining method of fungi and bryophytes. • To get acquainted with different plant pathogens and lichens • To learn the technique of mushroom cultivation
Course Outcome for Semester-II	
PAPPER-I: **PALAEOBOTANY, PTERIDOPHYTA, GYMNOSPERMS & SOIL ANALYSIS**	**CO1:** Study of Palaeobotany, geological time scale and morphology of angiosperms. **CO2:** To know life cycle pattern of Pteridophyta and Gymnosperms. **CO3:** To know the systematics, morphology and structure of Pteridophyta and Gymnosperms. **CO4:** To know economic importance of Pteridophyta and Gymnosperms. **CO5:** To know evolution of Pteridophyta and Gymnosperms. **CO6:** To learn the skill of soil analysis for cultivation of variety of plants.
PAPPER-II: **MORPHOLOGY OF ANGIOSPERMS & FLORICULTURE**	**CO1:** To study the morphology of angiosperms with respect to evolution of plants. **CO2:** To the evolution of different floral organ for sexual reproduction in angiosperms. **CO3:** To know the variation among the reproductive organs of the angiosperms. **CO4:** To know the systematics, morphology and structure of angiosperms. **CO5:** To know the adaptive pollination and reproductive biology of angiosperms. **CO6:** To learn the skill of floriculture and its tools and techniques.

Lab Work:	• Observation and study of types of fossils • Study of structure and reproduction pteridophytes like, Selaginella & Equisetum and gymnosperms like, Cycas & Pinus • To get acquainted with types, physical and chemical properties of soil • Study of morphology of angiosperms, • Study of identification and commercial aspects of cut flowers
Course Outcome for Semester-III	
PAPPER-I: **ANGIOSPERM SYSTEMATICS, EMBROLOGY & INDOOR GARDENING**	**CO1:** To Study vegetative and floral characters of angiosperms. **CO2:** To know the preparation of floral formulae and floral diagrams of angiosperms. **CO3:** To know economic importance of angiosperms families. **CO4:** To know the pattern of embryogenesis in various angiosperms plants. **CO5:** To learn the skill for development of indoor gardening and its importance.
PAPPER-II: **ANGIOSPERM ANATOMY & HORTICULTURE**	**CO1:** To gain knowledge of different plant tissue and tissue systems. **CO2:** To understand structure and type of cells and tissues in plants, type of vascular bundles and stellar systems. **CO3:** To know the simple and complex tissues and its functions. **CO4:** To know the process of secondary growth and its role in formation of wood and periderm **CO5:** To learn the skill for horticultural practices used.
Lab Work:	• To Study fossil angiosperms • To learn the anatomy of dicot and monocot • To study embryology of angiosperms • To get acquainted with the techniques used in landscaping and indoor gardening • To study various horticultural crops
Course Outcome for Semester-IV	
PAPPER-I: **CELL BIOLOGY, PLANT BREEDING, EVOLUTION & SEED TECHNOLOGY**	**CO1:** Gain knowledge about cell and its function. **CO2:** Learn the scope and importance of Cell and Molecular biology. **CO3:** To understand ultrastructure of cell wall, plasma membrane and cell organelles **CO4:** To understand the morphology and structure of chromosomes. **CO5:** To understand the different techniques used in plant breeding. **CO6:** To know the process of evolution of plants in universe **CO6:** To learn the skill used in seed technology
PAPPER-II: **GENETICS, MOLECULAR**	**CO1:** To study structure, biochemical nature and role of nucleic acids.

BIOLOGY & PLANT NURSERY	**CO2:** To understand the type and applications of mutations. **CO3:** Understand the Mendelian and neo-Mendelian genetics. **CO4:** Know about interaction of genes, multiple alleles and linkage and crossing over. **CO5:** To learn the skill for preparation of plant nurseries and its importance for nature conservation
Lab Work:	• To study ultrastructure of cell organelles • To study cell division, mitosis and meiosis with use nuclear stain • To learn the different biostatistics methods • To study seed dormancy, viability and percentage of germination • To prove Mendel's laws of inheritance with the help of coloured beads • Study of interaction of genes through different genetics problems • To study sterilization for plant nursery and methods of propagation
Course Outcome for Semester-V	
PAPPER-I: **PLANT PHYSIOLOGY, MINERAL NUTRITION & HYDROPONICS**	**CO1:** To know the scope and importance of plant physiology. **CO2:** To understand plant & water relation and mineral nutrition. **CO3:** Understand process of photosynthesis, C_3, C4, CAM pathways. **CO4:** Understand the process of respiration, nitrogen metabolism and plant movement **CO5:** To learn the technique of development of hydroponics.
PAPPER-II: **PLANT ECOLOGY & ORGANIC FARMING**	**CO1:** To study concept of ecology and ecosystems. **CO2:** To understand climatic and edaphic factors. **CO3:** To know physiographic factors and interrelations among the living organisms. **CO4:** To understand the components of ecosystems, autecology, synecology and plant succession. **CO5:** To know the adaptations of plants. **CO6:** To learn the skill and importance of organic farming for healthy life.
Lab Work:	• To study the plant physiology experiments, like photosynthesis, respiration, permeability, RQ, photoperiodism, plant movements, etc. • To get acquainted with mineral nutrition and hydroponics • Study of different qualitative and quantitative methods used in plant ecology • To learn the techniques used in organic farming
Course Outcome for Semester-VI	
PAPPER-I: **BIOCHEMISTRY, BIOTECHNOLOGY &**	**CO1:** To study carbohydrates, lipids, amino acids and enzymology. **CO2:** To know the plant tissue culture techniques and

HERBAL TECHNOLOGY	applications. **CO3:** To understand tools and techniques used in genetic engineering. **CO4:** To know the artificial gene transfer techniques. **CO5:** To learn the skill used in formation of dye and cosmetics from plants. **CO6:** To know the basic concept of herbal technology.
PAPPER-II: **PHYTOGEOGRAPHY, UTILIZATION OF PLANTS, TECHNIQUES & PHARMACOGNOSY**	**CO1:** To know the phytogeography of India and world **CO2:** To know the natural resources and various types of pollutions and its impact on living organism. **CO3:** To study the natural resources and its conservation strategies. **CO4:** To know the economic importance of plants and ethnobotany. **CO5:** To study microscopy, electrophoresis, centrifugation and chromatography. **CO6:** To learn the basics of pharmacognosy and skill for used of plants in pharmacognosy.
Lab Work:	• To study the biochemical experiments • To study the different instruments and equipment used in biotechnology • To study the different techniques used in herbal technology • To learn types of pollution parameters. • To get acquainted with ethnobotany and economic botany with suitable examples • To study the techniques used in pharmacognosy

CHEMISTRY

Department of Chemistry	After successful completion of three years degree program in the subject Chemistry the students are able to:
Program Outcomes	**PO1:** The Programme enables the students to understand basic facts and concepts in Chemistry. **PO2:** To develop the ability to apply the principles of Chemistry, to develop problem solving skills, to become familiar with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies. **PO3:** Students know about importance of Qualitative and Quantitative analysis used for different samples like soil samples, alloys estimation, water analysis. New technological world using nanomaterials, properties of nano materials magnetic properties of materials. **PO4:** Thermodynamic and Thermochemistry useful in our daily life and related with our surrounding atmosphere. **PO5:** Nuclear Magnetic resonance spectroscopy allows the molecular structure of a material to be analyzed by observing the measuring the interaction of nuclear spins when placed in a powerful magnetic field and extensively used in medicine in the form of magnetic resonance imaging and for analysis of chemicals. **PO6:** Bioinorganic chemistry provides knowledge about significant role of metal ions in biological system which is required for the maintenance of life. **PO7:** Student can describe the process It also develops skills in the proper handling of apparatus and chemicals and also gets exposure to the different processes used in industries and their applications. **PO8:** Use modern techniques used in analysis of materials and handling of the new equipment during the practical. **PO9:** To inculcates the scientific temperament in the students during the experiments and how to corelate with outside the scientific community.
Program Specific Outcomes	**PSO1:** The B.Sc. programme enabled the students to enhance their critical thinking, during the three years period of study and the curriculum motivates the mental thoughts and suppositions of the students. This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and validity of the practical knowledge. This Analysis leads to take decisions at intellectual, directorial and personal from different perspectives of life.

	PSO2: Understand the basic principles and concepts underlying the inorganic, organic and physical chemistry. **PSO3:** Comprehend the applications of chemistry in various walks of life. **PSO4:** Students gained functional knowledges of the fundamental theoretical concepts and experimental methods of Chemistry. **PSO5:** The students will be benefited to equip themselves to job requirements in the quality control, analytical laboratory or production wing of any Chemical or Pharmaceutical industry. **PSO6:** Able to use instrumental methods of chemical analyses. Students acquire fundamental Botanical knowledge through theory and practical.
Course Outcomes B. Sc. Chemistry	
Course Outcome for Semester-I	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** Basic knowledge of atomic structure, inorganic fundamental of a periodic property. **CO2:** Conceptualization of Valence bond theory (VBT) and Molecular Orbital theory (MOT), and VSPER theory. **CO3:** Differentiation in ionic and metallic bond, and S-block elements. **CO4:** A study of P-block elements, oxyacids of Sulphur, hydride of Phosphorus, and noble gases. **CO5:** Food adulteration process and detection, test for detection physical adulteration and chemical adulteration and how to identify the food adulterant which are used various food products
PAPPER-II:PHYSICAL CHEMISTRY	**CO1:** Basic knowledge of thermodynamics and calculations of problems related to Thermo-chemistry. **CO2:** Difference between Ideal gas and Real gas and their related equation. **CO3:** Understanding of Liquid State with emphasis on properties of liquid. **CO4:** Concept of adsorption isotherm and principles of catalysis. **CO5:** Types of colloidal, electrophoresis and electro-osmosis, emulsion and gels
Course Outcome for Semester-II	
PAPPER-I: ORGANIC CHEMISTRY	**CO1:** Understand the concept structure, bonding in organic compounds and different types of reaction mechanisms. **CO2:** Understand the concept of stereochemistry in detail. **CO3:** Understand the nomenclature, synthesis, chemical and physical properties of alkanes, cycloalkanes and alkenes **CO4:** Understand the nomenclature, synthesis, chemical and physical properties of dienes, alkynes and also the concept of aromaticity of organic compounds. **CO5:** Fuels and its calorific values properties and uses application of lubricants in industries

PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** CO1: Second law of thermodynamics and free energy work functions. **CO2:** CO2: Understanding of Phase rule and liquid-liquid mixture. **CO3:** Insight into Nuclear Chemistry and Molecular Structure. **CO4:** laws of Chemical kinetics. **CO5:** Types of pollutions and its control measures, types of pollutants, adsorption techniques
Course Outcome for Semester-III	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** Diagrammatic representation of molecules according to MOT, and properties of interhalogen compounds **CO2:** Chemistry of first transition elements and non-aqueous solvents **CO3:** Comparative study of the second and third transition series and error in chemical analysis **CO4:** Chemistry of lanthanides and actinides, and lanthanide contraction
PAPPER-II: ORGANIC CHEMISTRY	**CO1:** Understand nomenclature, synthesis, chemical properties of alkanes in aryl, alkyl halides. **CO2:** Understand nomenclature, synthesis, chemical properties of dihydric, trihydric alcohols and phenols in detail **CO3:** Understand nomenclature, synthesis, chemical properties of aldehydes and ketones and mechanisms of nucleophilic addition **CO4:** Understand nomenclature, synthesis, chemical properties of carboxylic acids and their derivatives along with reactive mechanisms.
Course Outcome for Semester-IV	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** A detail study of coordination compounds and its applications. **CO2:** Isomerism and redox process in inorganic compounds. **CO3:** The concept organometallic and metal carbonyl compounds. **CO4:** Applications of inorganic macromolecules in the biological concept, and acid-bases principles.
PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** Insight into laws of crystallography and Bravais lattices **CO2:** Debye-Huckel theory and concepts related to electrochemistry **CO3:** Introduction to Rotational and Vibration Spectroscopy. **CO4:** Basics of Quantum Chemistry, Operators and Schrodinger wave function
Course Outcome for Semester-V	
PAPPER-I: ORGANIC CHEMISTRY	**CO1:** The students will understand some fundamental aspects of organic chemistry. They will learn mechanism of some organic reactions, classification of polymers, structure and uses of some commercial and natural polymers. **CO2:** To know stereochemistry and various possible conformations of organic compounds and how it affects

	the reaction outcome. **CO3:** To be familiarize with the important photochemical reactions in Organic Chemistry. **CO4:** To understand the functions and applications of bioorganic compounds.
PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** To study the basic postulates of quantum mechanics. **CO2:** To enable the students to solve the simple quantum mechanical models such as simple harmonic oscillator, particle in a 1D- box, rigid rotor, H atom etc. **CO2:** To understand the quantum mechanical aspect of angular momentum and spin. **CO3:** Enable the students to predict the point group of important molecules and to know how they are classified **CO4:** To understand the idea of space groups and to learn the theory of molecular symmetry. **CO5:** To gain skill to apply group theory to vibrational and electronic spectroscopy.
Course Outcome for Semester-VI	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** To know the structure and bonding of important coordination compounds. **CO2:** To understand the magnetic properties of complexes and to know how magnetic moments can be employed for the interpretation of their structure **CO3:** To get an overview about the stereochemistry of coordination compounds **CO4:** To get an idea about the basic coordination chemistry of Lanthanides and Actinides. **CO5:** Ability to prepare inorganic complexes. Ability to prepare inorganic complexes. **CO6:** To know about VBT, CFT and MOT of co-ordination complexes
PAPPER-II: ORGANIC CHEMISTRY	**CO1:** To impart the students a thorough knowledge about the mechanisms of reactions of some selected functional groups in organic compounds **CO2:** To give an outline of applied organic chemistry and the applications of organic chemistry in various spheres of chemical sciences. **CO3:** To give an elementary idea of chemotherapy, organic spectroscopy and photochemistry. **CO4:** To analyze organic compound using UV, IR and NMR spectroscopic techniques, which provides platform for students to work in industries.

COMPUTER SCIENCE

Department of Computer Science	After Successful completion of three year degree program in Computer Science a student should be able to know:
Program Outcomes	**PO1:** To develop problem solving abilities using a computer. **PO2:** To build the necessary skill set and analytical abilities for developing Computer based solutions for real life problems. **PO3:** To implement quality software development practices. **PO4:** To create awareness about process and product standards. **PO5:** To train students in professional skills related to Software Industry. **PO6:** To prepare necessary knowledge base for research and development in Computer Science **PO7:** To help the students to build-up a successful career in Computer Science.
Program Specific Outcomes	**PSO1:** Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems. **PSO2:** Design, implements, test, and evaluate a computer system, Component or algorithm to meet desired needs and to solve a computational problem. **PSO3:** To Enhance skills and adapt new computing technologies for attaining professional excellence and carrying research. **PSO4:** Apply fundamental principles and methods of Computer Science to a wide range of applications. **PSO5:** Impart an understanding of the basics of our discipline. **PSO6:** Practice for continued professional development.
Course Outcomes B. Sc Computer Science	
Course Outcome for Semester-I	
Paper-I: (Programming in C)	**CO1:** To illustrate the flowchart and design an algorithm for a given problem. They understand the basic concept of programming structure. **CO2:** Students learnt the knowledge of fundamentals of writing C program which include data types, keywords, tokens, variables, and operators. Develop conditional and iterative statements to write C programs **CO3:** To solve user defined functions with real time problems. **CO4:** Students developed their concepts to write C program that uses Pointers, Arrays, and Strings. **CO5:** Understand the knowledge of user defined data types that include structure and union to solve problems. **CO6:** Students can write the programs which includes file concept to show input and output of files in C.
Paper-II: (Fundamentals of IT)	**CO1:** Bridge the fundamental concepts of computers with the present level of knowledge of the students. **CO2:** Familiarize operating systems, programming languages, peripheral devices, networking, multimedia and internet **CO3:** Understand binary, hexadecimal and octal number systems and their arithmetic.

	CO4: Understand how logic circuits and Boolean algebra forms as the basics of digital computer **CO5:** Demonstrate the building up of Sequential and combinational logic from basic gate.
Course Outcome for Semester-II	
Paper-I: (Object Oriented Programming Using 'C++')	**CO1:** To understand the object-oriented methodology which involves elements and features of object-oriented programming. **CO2:** Students developed the concept of class, object and structure of class which includes definition of class members and also, they learned how to write the programs using class. **CO3:** Students learnt the basic concept of constructor and destructor. Also, they were able to overload the unary and binary operators using the concept of operator overloading. **CO4:** Understand how to reuse code by implementing the OOPs Inheritance concept in C++. Also, they got knowledge of dynamic objects. **CO5:** Students were able to understand how inheritance and virtual functions implement dynamic binding with polymorphism. **CO6:** Students learnt how to use exceptional handling in C++ programs
Paper-II: (System Analysis and Design)	**CO1:** Identify various types of information systems concepts and terminologies **CO2:** Discuss the initial phase of system Development Life Cycle (SDLC) using analytical tools and quantitative technique used to identify problem **CO3:** Define problem and opportunities that initiate projects **CO4:** Evaluate information systems projects to identify various aspects of feasibility of these projects **CO5:** Apply at least one specific methodology or tool for analyzing business situation by modeling using a formal technique.
Course Outcome for Semester-III	
Paper-I: (Data Structures)	**CO1:** To be able to implement the abstract data type list as a linked list using the node and reference pattern. **CO2**: Select appropriate data structures as applied to specified problem definition. Analyze run-time execution of previous learned sorting methods, including selection, merge sort, heap sort and Quick sort and also calculates the complexity of all sorting and searching methods. **CO3:** To understand the abstract data type stack and notation like prefix infix and postfix expression formats. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures and design applications based on it. **CO4:** Determine and analyze the complexity of given Algorithms. **CO5:** Ability to have knowledge of tree and graph concepts.
Paper-II: (Operating Systems)	**CO1:** Describe and explain the fundamental components of a computer operating system **CO2:** Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems. **CO3:** Describe and extrapolate the interactions among the various

	components of computing systems. **CO4:** Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems.
Course Outcome for Semester-IV	
Paper-I: (Java Programming)	**CO1:** Explain the Use of java programming language Concept and programming technologies in software development. **CO2:** Demonstrate the Concepts of Thread and Applets **CO3:** Identify classes, objects, members of the class and relationships among them needed for a specific problem. **CO4:** Able to understand basic Concepts of java like variables, operators and tokens etc. **CO5:** Design and Develop Applications using AWT controls in Java.
Paper-II: (Linux Operating System)	**CO1:** To understand the basic commands and directory structures use in Linux OS and explain the use of all these commands to make the effective use of the environment to solve problems. **CO2:** Design and develop applications using Vi Editor in Linux OS. **CO3:** Able to identify the differences between processes and shells use in Linux OS. **CO4:** Able to Understand the basic set of Communication utilities commands and other commands use in Linux OS. **CO5:** To learn Graphical user Interfaces like KDE and GNOME.
Course Outcome for Semester-V	
Paper-I: (Visual Basic Programming)	**CO1:** Explain the basic Concepts of Program building block control statements and the basic concepts of function and procedure. **CO2:** Discuss about graphics handling related control and properties and Develop a Graphical User Interface (GUI) based on problem description. **CO3:** Discuss about the fundamental functions and properties of Advanced ActiveXControl. **CO4:** Design and Develop the programs which are based on events that retrieve input from a file as opposed to input only provided by user. **CO5:** Explain the procedure of creating menus and how to use these menus while designing applications in VB. (Menu Editor). **CO6:** Describe the concepts of database handling using DAO, ADO and RDO control with data report concepts.
Paper-II: (Database Management System)	**CO1:** To learnt the fundamental elements of traditional file processing system, objective of database system. **CO2:** Students learnt the basic concept of different data models which includes Hierarchical, Network, and E-R and Relational model. **CO3:** Students are able Design E-R model to represent simple database application **CO4:** Students developed the concept of how to convert E-R model into relational tables and how to perform relational operation on tables through relational algebra. **CO5:** Students developed the concept of functional dependency and improve the database design by the concept of Normalization.
Course Outcome for Semester VI	

Paper-I: (Compiler Construction)	**CO1:** Students learnt the major concept areas of language translation and compiler design **CO2:** Students got an awareness of the function and complexity of compilers. **CO3:** Students were able to understand the role of Lexical analyzer, its design, and implementation. Students got knowledge of context free grammars, Derivation and parse trees. **CO4:** Students are able to identify the similarities and differences among various parsing techniques and grammar transformation techniques
Paper-II: (SQL and PL/SQL)	**CO1:** Able to Understand the basics of SQL with control structure and sublanguages like DDL, DML and DCL/TCL. **CO2:** Able To identify the differences between integrity constraints and value constraints. **CO3:** Explain how functions, triggers, cursors and stored procedure work in PL/SQL**.** **CO4:** Compare SQL with PL/SQL and integrate the concept of procedural language with SQL to build advance applications. **CO5:** Able to understand the basics of PL/SQL Programming: PL/SQL Data Types, Identifiers, Operators and Expressions, Iterative Statements, Conditional Statements,

ELECTRONICS

Department of Electronics	After successful completion of three years degree program in the subject Electronics the students are able to:
Program Outcomes	**PO1:** Ability to design and conduct electronics experiments, as well as to analyze and interpret data. **PO2:** Utilize the basic knowledge of science Electronics and Communication. **PO3:** To provide opportunity to students to learn the latest trends in Electronics. **PO4:** To satisfy the needs of the core Electronics Industry useful for the society in all walks of life. **PO5:** To provide opportunities to the students to formulate, analyze and resolve the problems in Electronics Industry.
Program Specific Outcomes	**PSO1:** After completing the program, interested students can pursue in research field or in development field. **PSO2:** Students can become entrepreneur and can work on multidisciplinary projects.
Course Outcomes for B. Sc. ELECTRONICS	
Course Outcome for Semester-I	
PAPER-I: BASIC CIRCUIT COMPONENTS & NETWORK ANALYSIS	**CO1:** To enrich the students with the basic requirement of electronic circuits. **CO2**: To describe the theorems useful for circuit operation. **CO3:** To explore the use of energy sources for circuit operations. **CO4:** To familiarize about the use of transducers in instrumentation systems
PAPER-II: FUNDAMENTALS OF DIGITAL ELECTRONICS	**CO1:** To enrich the students with the basic requirement of digital electronics. **CO2:** To describe the use of Boolean Algebra for circuit operations. **CO3:** To elaborate the use of flip flops as memory in data processing system. **CO4:** To explore the use of binary circuits in digital system. **CO5:** To familiarize about the basic building blocks required for digital system.
Course Outcome for Semester-II	
PAPER-I: SEMICONDUCTOR DEVICES	**CO1:** To explain about semiconductors used for the fabrication of semiconductor devices. **CO2:** To acquire the knowledge of transistor used in many electronic circuits. **CO3:** To familiarize about the field effect transistor and its operation. **CO4:** To explore the use of power devices required in electronics circuits. **CO5:** To familiarize about the applications of diode, transistor and power devices.
PAPER-II:	**CO1:** To enrich the students with the digital ICS used in

ADVANCED DIGITAL ELECTRONICS	electronics circuits. **CO2:** To enhance the use of Flip-Flops in the construction of counters. **CO3:** To familiarize the use of Counters & Registers in data processing system. **CO4:** To explore the use of binary memory in digital system. **CO5:** To disseminate about the building blocks required for digital system.
Course Outcome for Semester-III	
PAPER-I: ANALOG CIRCUITS	**CO1:** To illustrate applications of diode as clippers, clamper and rectifier. **CO2:** To describe the role of transistor in amplification, signal analysis and two port hybrid circuit for testing amplifier parameters. **CO3:** To elaborate the concept of feedback and construction of feedback amplifier and oscillators. **CO4:** To explore the use of power amplifier in electronics circuits. **CO5:** To familiarize about the applications of diode and transistor.
PAPER-II: LINEAR INTEGRATED CIRCUITS	**CO1:** To study DC & AC characteristics of operational amplifier. **CO2:** To elucidate and design linear and nonlinear circuits of OP-AMP. To study timer IC and its applications. **CO3:** To elaborate the role of filters in electronics circuits. **CO4:** To explore the knowledge of linear integrated circuits and its uses.
Course Outcome for Semester-IV	
PAPER-I: BASIC COMMUNICATION ELECTRONICS	**CO1:** To understand functioning of basic processes in communication systems. **CO2:** To understand analogue modulation & demodulation techniques. **CO3:** To Understand transmission and reception systems. **CO4:** To understand propagation of radio waves in communication systems. **CO5:** To understand the process of analogue signal communication system.
PAPER-II: ANALOGUE AND DIGITAL CIRCUITS	**CO1:** To study DAC and ADC used for data conversions in electronics system. **CO2:** To elucidate and design regulated DC power supply for operating electronic devices. **CO3:** To study PLL IC 565 and its applications. **CO4:** To elaborate the role of transducers in Bioelectronics circuits. **CO5:** To explore the knowledge of Analogue and Digital circuits and its uses.
Course Outcome for Semester-V	
PAPER-I: Modern Communication Systems	**CO1:** To understand the concept optical communication and its operation **CO2:** To understand various digital modulation and

	demodulation techniques. **CO3:** To analyse the performance of digital communication system in terms of error rate and spectral efficiency. **CO4:** To understand the telecommunication traffic, channel and cellular capacity **CO5:** To understand various application of cellular technology.
PAPER-II: INTRODUCTION TO MICROPROCESSOR	**CO1:** To understand importance of Microprocessors as a programmable digital system element in computer system. **CO2:** To understand architecture and features of 8085 Microprocessor. **CO3:** To explore some basic concepts of microprocessors through assembly language programming. **CO4:** To augmented the knowledge of interfacing the peripheral to increase the flexibility of microprocessor. **CO5:** To grown-up the in-depth understanding of the operation of microprocessors and machine language programming & interfacing techniques.
Course Outcome for Semester-VI	
Paper-I: Programming in "C"	**CO1:** After completion of course, Students are able to Develop their programming skills **CO2:** Familiar with elements of C language **CO3:** Understand operators, Expression and Preprocessors **CO4:** Understand different decision making and concept of looping in C **CO5:** Understand Array, Structure, Function and Pointers, their declaration and use
Paper-II: MICROCONTROLLER 8051 AND ITS APPLICATIONS	**CO1:** To understand architecture and features of 8051 Microcontroller. **CO2:** To learn Programming of 8051 microcontroller. **CO3:** To learn interfacing of 8051 Microcontroller with real world input and output devices. **CO4:** To understand the coding and interfacing of 8051 with various IO devices. **CO5:** To understand importance of Microcontrollers in atomization and control system

COMPULSORY ENGLISH
SUPPLEMENTARY ENGLISH
ENGLISH AND COMMUNICATION SKILLS

Department of English	**After successful completion of three years degree program in the subject English the students are able to:**
Program Outcomes	**PO-1:** Students will be able to develop Life skills through the different life lessons incorporated in the prose and characterisation. **PO-2:** Students will be able to make sensible and ethical decisions and inculcate moral values those that are demonstrated in the literature. **PO-3**: Comprehensive skills are developed through reading and writing exercises. **PO-4:** Students will learn effective use of formal and informal use of English language **PO-5:** Students will be able to learn their critical faculties required in personal and professional life. **PO-6:** Students will be able to tap the intrinsic and extrinsic motivational theories through the text prescribed. **PO-7:** Students should be able to write business communication and other formal writings required in their professional life. **PO-8:** Students will be able to understand the concepts and strategies of communication skills with special reference to writing and listening skills. **PO-9:** Students will be able to write and appreciate different types of prose such as essay, paragraph writing, dialogue writing etc. **PO-10:** Students will be able to understand the different state of minds for example humour, struggle, resilience, success, innovation and the strategies to deal in such situations through motivational and inspiring stories.
Program Specific Outcomes	**PSO1:** Students will acquire fundamentals of formal writing skills required in a workplace. **PSO2:** Students will be able to use correct grammar to improve their writing and speaking skills. **PSO3:** Students will review and inculcate moral and ethical values as discussed in the prescribed prose. **PSO4:** Students will improve their analytical power through reading and writing exercises. **PSO5:** Students will learn important business communication through accurate use of language and formats. **PSO6:** Students will be able to demonstrate concepts of creative skills and innovative presentation skills
Course Outcomes B. Sc Compulsory English	
Course Outcome for Semester-I	

UNIT-I: **PROSE** **1. My struggle for an Education: Booker T Washington** **2. Florence Nightingale: Lytton Strachey**	**CO1:** To motivate student to understand the importance of education in one's life. **CO2:** To inspire students through the real-life examples of struggle and success. **CO3:** To inculcate the concept of community service and philanthropy among the youth. **CO4:** To set examples of benevolence and strength through self- worth, self -image and self -identity.
UNIT-II: **PROSE** **1. The Birth of Khadi: Mahatma Gandhi** **2. Go, Kiss the World: Subroto Bagchi**	**CO1:** To integrate and revive the idea of swadeshi moment as a contribution to the development of Indian nationalism. **CO2:** To extend the concept of self-generation and self-reliance and considering clothing as a power changing mechanism in freedom struggle. **CO3:** To introduce the model of Child -Parent Relationship in shaping the life of an individual. **CO4:** To help students identify their role models to learn life skills through them.
UNIT-III: **POETRY** **1. Ulysses: Alfred Tennyson** **2. Yussouf: James Russel Lowell** **3. If: Rudyard Kipling**	**CO1:** To extend the idea of resilience, vigor and self-determination in the youth. **CO2:** To help students understand and incorporate life skills such as bravery, fearlessness, heroism in the times of struggle and hardships. **CO3:** To make students learn the importance of forgiveness and moving ahead in their lives. **CO4:** To help students to evolve as Samaritans and spread the word of fraternity among individuals. **CO5:** To help students to have determination in the face of failure. **CO6:** To provoke students in the direction of sportsmanship in the competitive world.
UNIT-IV: **1. Comprehension of Unseen Passage** **2. Prepositions** **3. Subject-Verb Agreement** **4. Summarizing**	**CO1:** To improvise the comprehension skills through reading and writing. **CO2:** To revise the use of grammar in day-to-day life. **CO3:** To make students explain the idea briefly in their own words.
Course Outcomes B. Sc Compulsory English	
Course Outcome for Semester-II	
UNIT-I: **PROSE** **1.Grassroot innovation and Social Enterprise: Changing Lives** **2. The Two Gentlemen of Verona**	**CO1:** To introduce the students about inventions through innovations. **CO2:** To inspire students towards innovation through real time success stories. **CO3:** To teach students the life-skills such as focus and self-control, facing challenges, making connections etc. **CO4:** To inculcate the habit of hard-work and diligence

	irrespective of their age.
UNIT –II: **PROSE** 1. **The Verger** 2. **Synthesis of Science and Spirituality**	**CO1:** To involve students in understanding the basic principles of value education. **CO2:** To impart reasoning of conventional and non-conventional education in one's life. **CO3:** To institute the concept of science and spirituality in the minds of youth. **CO4:** To foster the young minds with connection between science and spirituality.
UNIT -III: **POETRY** 1. **Richard Cory** 2. **Allow sanity a little space** 3. **Refugee Blues**	**CO1:** To share the idea of resilience in face of adversity. **CO2:** To unveil the learners about the evil and dark forces prevalent in this millennial and how one should deal with it. **CO3:** To bring forth the stories of refuges focusing on their accommodating and tolerant behaviors.
UNIT-IV: **WRITING SKILLS** 1. **Paragraph Writing** 2. **Application and C.V. Writing** 3. **Phrasal Verbs**	**CO1:** To inculcate writing skills through idea development strategies. **CO2:** To teach students the skill of writing applications and C.V. **CO3:** To make appropriate use of phrasal verbs to improve language skills.
Course Outcomes B. Sc Supplementary English	
Course Outcome for Semester-I	
UNIT-I: **PROSE** **Short Stories**	**CO1:** To revise the learners with the concepts of compassion, love and care. **CO2:** To convey the students the purpose of life through enlightenment and wisdom. **CO3:** To promote the importance of humour
UNIT -II: **Short stories**	**CO1:** To revise the concepts of wisdom and knowledge in the constant changing world. **CO2:** To expand and explore on the idea freedom and responsibility. **CO3:** To share the views on duality concept of real and fake.
UNIT-III: **Vocabulary Expansion**	**CO1:** To introduce the varied words used in English Language. **CO2:** To maximize the use of different use of vocabulary in reading and writing.
UNIT -IV: 1. **Essay writing** 2. **Email**	**CO1:** To develop the critical thinking and writing among students on various current issues. **CO2:** To develop email writing skills as a part of formal communication.
Course Outcomes B. Sc Supplementary English	
Course Outcome for Semester-II	
UNIT-I: **Short Stories**	**CO1:** The stories teach how healthy sense of humour can help one deal with tough times. **CO2:** The students learn the pros and cons of having and lacking integrity in one's life. **CO3:** To teach the learners the meaning of 'Luxury' and

	connotations attached to it.
UNIT- II: **Short stories**	**CO1:** To teach the learners how the serious things can also be leant through dark humor. **CO2:** To impart philosophical lessons through the technique of storytelling. **CO3:** To impart that reading can also be an experiential learning process.
UNIT-III: **1. Writing Advertisements** **2. Letter writing**	**CO1:** To make students aware of strategies of Advertisement writing. **CO2:** To guide students how to write different types of formal letters.
UNIT-IV: **1. Story writing based on given outline** **2. Reporting an event**	**CO1:** To develop the creative writing skills through development of story. **CO2:** To develop critical thinking and decision making of the students. **CO3:** To improve report writing skills of the students. **CO4:** To develop comprehension skills of any situation.

HOME SCIENCE

Department of Home Science	After successful completion of three years degree program in the subject Home Science the students are able to:
Program Outcome	**PO1:** Develop sensitivity towards the needs of family and society and cater to them. **PO2:** All round development of the personalities of the members in home & family. **PO3:** Ddevelop in the learner an understanding of the need for healthy environment and skills. **PO4:** Efforts are taken to create and maintain the above attributes amongst students. **PO5:** Develop in them the ability to take care of the nutritional needs of the family members and ensure good, 'Food handling practices **PO6:** Impart in the learner the basic knowledge related to textiles used in the home and develop skills for their optimum utilization **PO7:** Make learners aware of the rights of consumers and instill in them wise purchasing habits **PO8:** Foster understanding of human developmental process and use it to strengthen interpersonal relationships. **PO9:** Orientation with the educational and vocational scope of Home Science and the need to practice/develop entrepreneurship **PO10:** Sensitivity towards some of the major psychological and health problems of the community and the programs of the government to overcome these.
Program Specific Outcomes	**FOOD SCIENCE AND NUTRITION** **PSO1:** Enable to pursue higher education **PSO2:** Understand the role of food and nutrition for the welfare of the community **PSO3:** Excel in the area of personal & public health nutrition **PSO4:** Apply skill-based knowledge in food industry **PSO5:** Acquire entrepreneurial skills in the field of food science & nutrition **PSO6:** Public health nutrition for employment in state & central government **HUMAN DEVELOPMENT** **PSO1:** Describe how individuals change from Womb to Tomb **PSO2:** Relate principles of human development with self, family & society **PSO3:** Apply methods of teaching and training towards administration of early learning centers **PSO4:** Appraise & identify life situations in need to referral services **PSO5:** Manage life crisis at every life span **PSO6:** Demonstrate skills to assess human behavior

	PSO7: Advocate domain specific programs& policies **PSO8:** Become Entrepreneurs in establishing learning center **TEXTILES & LAUNDRY** **PSO1:** Gain knowledge in Textile Production Techniques **PSO2:** Acquire skill in textile dyeing and printing **PSO3:** Equipped with skill as a designer **PSO4:** Acquire dexterity in Surface Design & Apparel Construction **PSO5:** Acquire entrepreneurial skills in textiles & fashion **FAMILY RESOURCE MANAGEMENT** **PSO1:** Students exhibit efficient resource use at home & work as they learn management of resources **PSO2:** Act as proactive agents of change **PSO3:** Career options like Hotel Management, Event Management, Front Office Management, Designing Interiors **PSO4:** Role of able designers **PSO5:** Achieve social advancement through value education and family management concept. **PSO6:** Acquire professional skills in financial management and control, designing of interiors and work places and equipment, institutional management and rendering consumer services. **PSO7:** Develop entrepreneurship skills and self-employment potential. **EXTENSION EDUCATION** **PSO1:** Competency in Rural Development Practices Impart skill training programmes **PSO2:** Get sensitized on issues of society **PSO3:** Acquire skill and attitude to work with communities
Course Outcome for Semester-I	
PAPER-I: FUNDAMENTALS OF FOOD SCIENCE AND NUTRITION-1	**CO1:** To study the introduction of food and nutrition, basic terms used in Food and Nutrition. Definitions-Foods, Nutrition, Optimum nutrition, Nutritional status, Nutrients and Health **CO2:** To know the functions of food-Physiological, psychological and social **CO3:** To learn characteristics of basic food groups and their contribution to the diet **CO4:** To know about nutrients and their type (Macronutrient / Micronutrient) **CO5:** To study thermodynamic effect of food (SDA) and Scope of Nutrition. **CO6:** To study definition, Concept and factors affecting balanced diet **CO7:** To learn Recommended Dietary Allowances (RDAs) of the ICMR for the different food groups for various life stages. **CO8:** To understand the term Energy: Definition and factors affecting BMR. Units of measuring food energy: Calorie, kilo-calorie, joule, kilo-joule and mega- joule **CO9:** To study Energy measurement of food (Bomb calorimeter) **CO10:** To study Carbohydrates – Definition, classifications,

	functions, sources, digestion and absorption and deficiency states. **CO11:** To learn about Fiber- Definition, Types of dietary fiber and sources. Role of fiber in prevention of diseases **CO12:** To study Protein- Definition, classifications, functions, sources, digestion and absorption and deficiency states Protein sparing action of carbohydrates **CO13:** To learn Fats - Definition, classifications, functions, sources, digestion and absorption and deficiency states.
PAPER-II: FUNDAMENTALS OF HUMAN DEVELOPMENT	**CO1:** Students learn basic concepts, meaning and definitions to study the relevance &scope of the subject of Human Development. **CO2:** Acquire the knowledge of Governmental level projects, schemes and centers where the Human Developmentalist can apply and use knowledge. **CO3:** Concept of child and family welfare Schemes. **CO4:** children with special needs **CO5:** Students learn the twin processes namely growth and development to understand how human beings undergo changes. **CO6:** theoretical perspective and biological and environmental aspects responsible for the developmental changes. **CO7:** Students gain the Knowledge of important life span and stages **CO8:** Importance of prenatal stage, imp of prenatal care, factors governing the prenatal Development. **CO9:** Concept of WHO concept of Child friendly hospitals. **CO10:** Students understand the term neonatal Stage of Development. CO11: Concepts like caring the new born, health and well- being are dealt with special emphasis and relevance.
PAPER-III: FUNDAMENTALS OF TEXTILES AND CLOTHING	**CO1:** To study the basic knowledge ofTextiles **CO2:** To know the scope and importance of clothing. **CO3:** To learn more about classification of textiles fiber manufacturing process. **CO4:** To know different factors affecting clothing. **CO5:** To study the various tools required for garment construction and drafting methods **CO6:** To learn different parts, functions and care of sewing machine. **CO7:** To acquire knowledge for preparation of cloth for clothing construction.
PAPER-IV: FUNDAMENTALS OF FAMILY RESOURCE MANAGEMENT	**CO1:** Exercise and demonstrate use and mastery of the elements of design, recognize elements of design in works of art **CO2:** Develop aesthetic sense and to be good art consumer, selecting appropriate concepts and forms of art **CO3:** Understand the significance of management **CO4:** Develop the ability to evaluate the management efficiency and effectiveness in the family and other organizations. **CO5:** Successful integration of the three objectives of aesthetic

	planning which are beauty, expressiveness and functionalism
PAPER-V: FUNDAMENTAL OF HOMES CIENCE EXTENSION	**CO1:** To gain the knowledge regarding types of education **CO2:** To understand the field of extension education& objectives principle, fields & essential links in the chain of Rural Development. **CO3:** To know Philosophy of Home Science & it's scope **CO4:** To understand Home Science Extension Objectives and Characteristics **CO5:** To learn Rural Sociology - Meaning of sociology and Rural Sociology, Scope of Rural Sociology **CO6:** To know Rural Society - Characteristics of Rural Society, rural social groups, Classification of Social groups. **CO7:** To know Social Problems, studying social problems. **CO8:** To understand Social Problems like poverty, Problems of population explosion, Caste tension, Problem of Unemployment, Poor Health & sanitation, Problems of tribal and solutions to the problems faced.
PAPPER-VI: ECOLOGY AND ENVIRONMENT-I	**CO1:** To get acquainted with the physical environment and its components. **CO2:** To know the methods to protect the environment and conserve natural resources **CO3:** To know the ecosystem, ecology, food chain, food web and ecological pyramids. **CO4:** To get acquainted with various biogeochemical cycles, like oxygen cycle, carbon cycle, nitrogen cycle, hydrological cycle, etc. **CO5:** To know the renewable and non-renewable natural resources, national parks and sanctuaries and conservation of wild life. **CO6:** To know the various types of pollutions and its control measures.
Lab Work:	• To understand the determination of hydrogen ion concentration (pH) and DO • To study the estimation of acidity and chlorosis of water • To get acquainted with the lay-out and plan of a garden
PAPER-VII: BASIC CHEMISTRY-I	**CO1:** To know the importance of pure water, impurities present in water, sources of water pollution, ions responsible for hardness of water **CO2:** Methods used for purification of water for domestic purpose and commonly used methods are sterilization: boiling, chlorination **CO3:** To understand the use of Alloy: Classification of alloy (ferrous and Non-ferrous), purpose of making an alloy **CO4:** To gain knowledge of Effect of alloying various elements on properties of steel, composition and uses of stainless steel and brass. **CO5:** To know how to prepared Solutions during practical's: Types of solutions, different ways of expressing concentration of

	solution (equivalent weight, molecular weight, normality and molarity) **CO6:** To understand Physical Properties of Liquids: Surface tension (definition, determination of surface tension by Stalagmometer method). Viscosity (definition, determination by Ostwald‟s Viscometer). **CO7:** To gain knowledge about the Colloids: Definition, types of colloidal systems, Types of colloidal solution, methods of preparation, properties (Tyndall Effect, Brownian Movement, Electrophoresis, Electro-osmosis) and colloids in daily life (applications) **CO8:** To know the Emulsion and gel: definition, types, methods of preparation, properties and its applications.
Lab Work:	• To know the • Types of analysis used in chemistry analysis • A) Volumetric analysis: 1. Single acid base titration, Determine the Normality and weight per litre 2. Determination of total and permanent hardness of water by EDTA titration. B) Physical Experiments 1) Determination of viscosity of given liquid by Ostwald‟s Viscometer. 2) Determination of Surface tension of given liquid by Stalagmometer. 3) Preparation of colloidal solution of starch
Paper –VIII: Applied Physics and Basic Computer-I	**CO1:** Measurements, system for measurements, basic concepts and least count of any instrument, scalar and vector quantities. **CO2:** To know the fundamental and derived quantities and their units. **CO3:** Basic Newtonian mechanics, concept of centripetal and centrifugal forces and their uses. **CO4:** Concept of friction and related applicability. **CO5:** Computer basics and its characteristics. Unit of memory, working of individual computer peripherals and related concepts.
Paper-IX: English and Communication Skills	**CO1:** To prepare the students to communicate effectively and fluently in English. **CO2:** To enable students listening, speaking reading and writing. **CO3:** To strengthen grammatical accuracy **CO4:** To prepare the students to deal with customers, professional, counselors in correct grammatical, idiomatic English. **CO5:** To provide personality development training through situational role play, interview techniques, group discussions, seminar presentation etc.
Course Outcome for Semester-II	
PAPER-I: FUNDAMENTALS OF FOOD SCIENCE AND	**CO1:** To study Vitamins - Classification of Vitamins **CO2:** To learn Fat Soluble Vitamins: Functions, Sources and Deficiency

NUTRITION-II	**CO3:** To learn Water Soluble Vitamins: To study their Functions, Sources and Deficiency **CO4:** To study Minerals, Functions, Sources and Deficiency **CO5:** To learn about Major Mineral and trace elements **CO6:** Learn functions of water in human body, water balance, sources of water, effect of dehydration and its prevention. **CO7:** Methods of Cooking: Objectives of cooking food, advantages of cooking food, different cooking methods and different cooking media and effect of different cooking methods on nutritive value of food
PAPER-II: DEVELOPMENT IN EARLY YEARS	**CO1:** Concept of Early years of child development as important years of life, Infancy stage of development - students understand the terms development tasks &milestones in reference with different developmental aspects. **CO2:** Students gain the knowledge of the growing capacities of infants and the overall developmental changes. **CO3:** Students gain the knowledge of norms and associated changes in physical, social, cognitive, language, emotional, intellectual capacities with change in moral aspects. **CO4:** Students gain the concept of ECCE, objectives and importance cognitive & language growth and conditions facilitating for healthy growth & development.
PAPER-III: SEWING TECHNIQUES	**CO1:** To understand the importance and necessity of various construction techniques for different fabrics. **CO2:** To acquire knowledge the skills to apply those construction techniques in a sample from. **CO3:** To acquire knowledge and skill regarding stitching techniques for various garment components such as plackets, pockets, cuffs, collars and fasteners which are ultimately used for stitching of any garments. **CO4:** To learn different fashion accessories like headgears, footwear, Handbags. **CO5:** To study types and use of jewelry.
PAPER-IV: INTERIOR DECORATION & DESIGN	**CO1:** Develop skill in using colour to create different effects in pace, with the use of various colour schemes. **CO2:** Gain knowledge of flowers / floral decoration and arrangement. **CO3:** Development of efficient and cost-effective room and floor plans that meet the needs of residential and/or commercial clients. **CO4:** Create a space that is stylish and is comfortable. A functional space that ticks off the ergonomic requirements of us and also looks pleasant. **CO5:** Learners will develop skills that will enable them to plan or assist in the planning of their own living space area and décor, or may provide a foundation for a career in this field.
PAPER-V: SOCIALSURVEY AND COMMUNITY	**CO1:** To learn about History of Community Development **CO2:** To understand elements of community development: Role of community development worker **CO3:** To know Community development programmes:

DEVELOPMENT	Shriniketan rural reconstruction Gurgaon experiment & Etawah pilot project b) Indian village service **CO4:** To understand the term Social Survey & its importance **CO5:** To gain knowledge regarding Social Research. **CO6:** To learn Gender and Development meaning of Sex ratio. **CO7:** To understand Poverty Alleviation Programmes: Efforts taken by Government agencies. **CO8:** To understand eradication of poverty-a) National Rural Health Mission b) Integrated Child Development scheme
PAPPER-VI: ECOLOGY AND ENVIRONMENT-II	**CO1:** To know the development of gardens and nurseries, its importance and entrepreneurship. **CO2:** To study the different ornamental plants used in gardens, nurseries and kitchen gardens **CO3:** To study the different plant propagation techniques and garden implements & accessories **CO4:** To know the method of vermiculture and vermicomposting
Lab Work:	• To get acquainted with methods of gardening and methods of plant propagation • To study the technique of mushroom cultivation and vermicomposting.
PAPER-VII: BASIC CHEMISTRY-II	**CO1:** To know which type of Fuels: Definition, classification, characteristics of good fuel, calorific value, preparation of Gober gas. **CO2:** To know the concept, importance, and process of Crude petroleum and its refining by fractional distillation, cracking of petroleum, composition and application of LPG, Precautions while using LPG **CO3:** To Know Acid and base: Concept of acid, base and salt, (Arrhenius theory and Lowry and Bronsted Theory), Conjugate pair, neutralization reaction. **CO4:** To know pH and pH scale, (Numerical on pH scale) Buffer solution and its applications in everyday life. **CO5:** To know Organic Compounds: Definition, saturated and unsaturated hydrocarbon, classification of organic compounds based on their structure and functional groups. Definition of alkane, alkene and alkyne with examples. **CO6:** To Understand Homologous series, IUPAC nomenclature of alkane, Laboratory preparation, chemical properties and uses of methane and ethylene. **CO7**: Corrosion: Definition, atmospheric corrosion (Corrosion by oxidation and by other gases). Factors causing atmospheric corrosion, **CO8:** Methods for protection of metals from corrosion (Galvanizing, tinning and electroplating).
Lab Work:	• To estimate the Haemoglobin percentage. • To understand the life cycles of parasites. (*Entamoeba histolytica*, Roundworm, *Plasmodium vivax* and *Plasmodium falciparum*, *Wuchereria bancrofti*)

Paper-VIII: Applied Physics and Basic Computer - II	**CO1:** Concept of basic electricity, ohm's law, resistance measurements in different combinations, simple calculations therein. **CO2:** Light and electromagnetic wave. Concept of reflection, refraction and absorption, Physical phenomenon related to natural phenomenon such as reflection, transparency, opaqueness etc. **CO3:** Lens and related optics, use of these principles for human eye assistance. **CO4:** X-rays, their principle, generation and applicability. Harmful radiations such as alpha, beta and gamma rays, their characteristics and properties including their applicability. Computer hardware and peripherals of computer system with details of different types of printers.
Course Outcome for Semester-III	
PAPER-I: COMMUNITY NUTRITION	**CO1:** To understand malnutrition, its types, causes, symptoms, prevalence and nutritional problems due to malnutrition. **CO2:** To understand the basic principles of nutritional assessment as applied to the study of community nutrition. **CO3:** To understand the role of National organizations and international organizations (ICAR, ICMR, NIN, CFTRI) and (FAO, WHO, UNICEF, CARE) in community nutrition and health. **CO4:** To understand the importance, objectives and methods of evaluation of nutrition education. To know the problems and develop solutions in organizing nutrition education programme. **CO5:** To become familiar with the ongoing schemes and programmes for combating nutrition-related problems in the country – National Nutrition Programme. **CO6:** To develop an understanding of the principles underlying Food Preservation, Food Fermentation, Leavening Agents and Food Additives.
PAPER-II: DEVELOPMENT IN LATE CHILDHOOD AND ADOLESCENCE	**CO1:** Students learn the significant Developmental Changes & aspects of development in terms of Physical attainments, Motor Skills, Changing CO1: Emotions with importance of Emotional self-regulation, changes in self-concept & importance of Self Esteem, need for attaining basic growth &building self-confidence through their capacities they master during Childhood. **CO2:** Students also learn the media with its influence on child's development. Relationships within family & outside influencing the child & his potentialities **CO3:** Students learn the pattern of cognitive & language growth within the conditions & factors facilitating development & theoretical implications & perspective supportive to it. Students gain the growth in terms of morality & moral reasoning acquired during this phase of life. **CO4:** Students learn the physical changes that occur during the

	Puberty phase of life & the effect of puberty changes. They learn the term & meaning of Adolescence with the growth spurt during this period of life & concepts like attaining Physical maturity Sexual maturity & Adolescent as a transitional Period. Need of Sex Education. **CO5:** Students learn the pattern of changes in respect to intellectual growth, Cognitive abilities, creative accomplishments & factors for developing creative mind. Adolescent and language accomplishments, also the concept of need of identity, search for identity with parental & factors to determine it. Students get to understand the importance of healthy parent adolescent relationships, Peer relations & it's positive advantages & adjustments.
PAPER-III: TEXTILE DESIGN	**CO1:** Study natural dyes and its importance **CO2:** Study synthetic dyes and their uses **CO3:** Study methods of dyeing **CO4:** Study common dyeing defects their remedies **CO5:** Study dye application **CO6:** Study the concept of dyeing and printing, Study different methods of printing, Study common printing defects and remedy **CO7:** Study preparation of cloth for printing, Study after treatment of printing goods. **CO8:** Study paint textile of India &Study traditional print textile of India **CO9:** Study traditional woven textile of India, Study techniques used in woven textile, Study colour, yarn and motif used in a saree & shawls of India. **CO10:** Study costumes of different states of India. **CO11:** Study draping style of traditional costumes of India.
PAPER-IV: **HOUSING AND INTERIOR DECORATION**	**CO1:** Learners understand regarding housing needs, Principles, Planning of house **CO2:** Experimenting with space, Preparing house plans. **CO3:** Develop graphic skills to express ideas in design, forms, and economic use of space. **CO4:** Implement Decision about applicable design principles in Interior Decoration. **CO5:** Implement decisions about Furniture selection and arrangement in available space.
PAPER-V: EXTENSION COMMUNICATION TECHNIQUE	**CO1:** To understand Extension teaching: Definition of extension teaching, principles of extension teaching. **CO2:** To know Extension teaching process: Teaching plan, Role of teacher in different levels, **CO3:** To study Extension learning process: Definition of extension learning, Learning experience, **CO4:** To gain knowledge on Psychology of learning Types of learning. **CO5:** To know Extension teaching methods **CO6:** To gain Approaches in Extension: Meaning, Strong and weak points of interpersonal.

	CO7: To study Interpersonal approach: Home visit, office call, personal letter and telephone. **CO8:** To understand Art of Presentation: Meaning, five basic steps of presentation and equipment ofcampaign work. **CO9:** Devices useful for effective communication: Over Head projector, opaque projector, DVD, LCD.
PAPER-VI: APPLIED PHYSIOLOGY	**CO1:** Students are able to get knowledge of the cell structure and function, histology, gross anatomy, and physiology of several organ systems. **CO2:** Students are able to understand structure and function of various organs and organ systems like nervous system of human body. **CO3:** It provides basic knowledge of first aid.
Lab Work:	• Students are able to know about bones and joints • Application of triangular bandage and roller bandage. • Artificial respiration
PAPER-VII: APPLIED CHEMISTRY	**CO1:** To know Carbohydrates: Definition, classification, open chain structure of glucose and fructose. **CO2:** To know Manufacture of cane sugar, optical isomerism of asymmetric carbon atom, plane polarised light, dextro and leavo rotatory compounds. **CO3:** To know Fermentation: Definition, ideal conditions for fermentation, application of fermentation. **CO4:** To know Preparation of vinegar and ethanol by fermentation process. **CO5:** To know Oils and Fats: Definition, difference between oils and fats, saponification value, iodine value, rancidity and hydrogenation of oils, refining of edible oil, naturally occurring fatty acids (saturated and unsaturated), essential and non-essential fatty acids. Omega names of MUFA and PUFA. **CO6:** To know Soap and Detergents: Definition, types of soap, Industrial method of preparation of soap, cleansing action of soap. **CO7:** To know Difference between soap and detergents, composition of detergent., Liquid detergents.
Lab Work:	• Preparations of cosmetics: i) Shampoo (Simple and herbal) ii) Perfumes • Preparation of dyes and drug: • Methyl salicylate from salicylic acid. • Orange dye from beta naphthol and aniline or p- toluidine compare the cleansing action of detergents/ shampoo by Stalagmometer • To know How to use of physical balance. • Preparation of standard solution for titration. Identification of Carbohydrates: Glucose, fructose, sucrose and starch • Determination of total fatty acid present in given sample of soap. • Determination of total alkali present in given sample of soap

Paper-VIII: APPLIED PHYSICS AND COMPUTER APPLICATIONS-1	**CO1:** To learn about electricity related basic parameters, electrical safety and related devices. **CO2:** Principle of heat, its conduction, Conversion of electricity into heat, heat-based appliances. **CO3:** Computer system and its operating, word processing software (MS WORD) and database creation and management software (MS EXCEL)
Course Outcome for Semester – IV	
PAPER-I: COMMUNITY NUTRITION	**CO1:** To learn principles of meal planning. To plan and calculate balanced diets for family members **CO2:** Concept of RDA, Recommended set- up, Reference persons and RDA **CO3:** Principles and advantages of meal planning Diet planning with reference to special individual requirements **CO4:** Nutrition during adulthood: a) Balanced diet for adult man and women. b) Nutritional requirements c) Dietary guidelines for adults **CO5:** To know Nutrition during pregnancy and lactation a) Physiological changes during pregnancy b) Desirable weight gain c) Nutritional requirements and their importance d) Diet during pregnancy e) Dietary guidelines for pregnancy **CO6:** Nutrition during infancy: a) Growth and development during infancy and Nutritional requirements b) Advantages of breast feeding **CO7:** Importance of Weaning & Supplementary foods **CO8:** Understand Nutrition during: 1. Preschool children 2. School going children, a) Growth and development b) Nutritional requirements c) Dietary guidelines for children **CO9:** Nutrition during Adolescence: a) Growth and Development during adolescence b) Nutritional requirements c) Dietary guidelines for adolescent **CO10:** Geriatric nutrition
PAPER-II: DEVELOPMENT IN ADULTHOOD	**CO1:** Concept of who is an adult? adulthood stage - biological and physiological perspective, diversity in adult lifestyle, cultural variations in roles & expectations **CO2:** Adult life span changes namely physical & cognitive. adult development of self-identity – psycho-social changes within the framework of work, career, parenthood, family marriage. **CO3:** Middle age changes concept of physiology; health. cognitive changes in cognitive skills, middle age as time of crisis students understands the importance of age as age of

	generativity, expertise and experience. concept of aging-approaching retirement, changes and adjustment needed. society and community attachment with an effective social role. **CO4:** Concept of aging, demographic status, sensitizing towards age related issues and adjustments. importance of recreation and wellness in late adulthood. understanding age specific needs: specific problems of elderly concept of retirement homes and dwelling. **CO5:** Governmental policies and welfare schemes for senior citizens
PAPER-III: SURFACE ORNAMENTATION TECHNIQUES	**CO1:** Study natural dyes and their importance, study of synthetic dyes and their uses. **CO2:** Study methods of dyeing **CO3:** Study common dyeing defects their remedies. **CO4:** Study dye application **CO5:** Study the concept of dyeing and printing. **CO6:** Study different styles of printing. study different methods of printing. **CO7:** Study new methods of printing. **CO8:** Study common printing defects and remedy. **CO9:** Study preparation of cloth for printing. **CO10:** Study types of printing used in printing **CO11:** Study after treatment of printing goods. **CO12:** Study painted textile of india. **CO13:** Study traditional printed textile of india. **CO14:** Study traditional woven textile of india. **CO15:** Study techniques used in woven textile. **CO16:** Study colour, yarn and motif used in sarees, shawls of india. **CO17:** Study costumes of different states of india. **CO18:** Study draping style of traditional costumes of india.
PAPER-IV: HOUSING AND HOME FURNISHING	**CO1:** Implement decisions about housing and furnishings. **CO2:** Learner gain knowledge about the role of internal amenities in contributing for satisfying family living. **CO3:** Learn techniques that will help one to construct some furnishing items, relative to their function and decorative purposes. **CO4:** Learn concept of natural and artificial lighting in relation to housing and its plan. **CO5:** Learn concept of waste management and its techniques.
PAPER-V: MEDIA IN EXTENSION	**CO1:** To understand communication techniques **CO2:** To gain knowledge on mass communication andmedia. **CO3:** To know media in extension: meaning of media,electronic media, print media, and folk media. **CO4:** To study electronic media: radio as mass medium, **CO5:** To learn print media - types of print media, impactof print media **CO6:** To gain knowledge on folk media. folk forms as mass media, Indian folk forms.

	CO7: To understand advertisement as mass media. **CO8:** To gain knowledge journalism in extension.
Paper-VI: APPLIED PHYSIOLOGY-II	**CO1**-Students get knowledge about structure and function of heart, valves blood vessels **CO2**-students are able to understand about digestive system, respiratory system and excretory system **CO3**-students also know about endocrine system and reproductive system.
PAPER-VII: APPLIED CHEMISTRY-II	**CO1:** To know Polymers: Definition, addition and condensation polymerization, preparation and uses of polyethylene, PVC, Nylon-6, Nylon-66 and polyester. **CO2:** To know Rubber: Definition, chemical nature and vulcanization, synthetic rubber (Buna-S) and uses. **CO3:** To understand, Textile Chemistry: Definition, Requisite of a true dye, Types of fibres: structure features of fibres (Cotton, wool, silk, cellulose acetate, polyaminde, polyesters), Basic operations in dyeing process (preparation of the fibre, preparation of dye bath, application of dye and finishing), Various methods of dyeing (direct dyeing, vat dyeing, Mordant Dyeing, and disperse dyeing). **CO4:** To know Witts theory of colour and constitution, classification of dyes based on their functional group- i) Nitro ii) Nitroso and iii) Azo, pollution problem due to dye industry **CO5:** To know Cosmetics: Definition, functions and ingredients of shampoo, face powder, cold cream, lipstick, hazards of cosmetics. **CO6:** To Know Drugs: Preparation and uses of following drugs: i) Aspirin ii) Paracetamol and iii) oil of winter green. **CO7:** To know Essential oils: Definition, occurrence and methods of extraction of essential oils. Eucalyptus oil, Rose oil, Lavender essential oil **CO8:** To know Perfumes: Definition, characteristics of perfume, composition of perfumes, formulation of any two perfumes.
Lab Work:	• Titration of strong acid vs strong base (Acid-base double titration) • Determination of pH of different solutions by using pH paper Detection of functional group Acids, Alcohols, Aldehydes and Ketones. • Preparation of acidic and basic buffer solution
Paper-VIII: APPLIED PHYSICS AND COMPUTER APPLICATIONS-II	**CO1:** To learn about electricity, effects of electric current, electromagnetism principle and devices based on it such as transformer and motors, their working. **CO2:** Motor based electrical appliances, chemical effect of electric current, conversion of chemical energy into electric energy, batteries and electrochemical platting. **CO3:** MS power point and internet related knowledge.
Course Out Come for Semester - V	

PAPER-I: DIET THERAPY- I	**CO1:** To provide knowledge about causes And Symptoms Of Various diseases. **CO2:** Understand the role of diet. **CO3:** To plan, calculate and prepare diets for various diseases, to learn principles of diet therapy **CO4:** Diet counselling, role of dietician in health care, dietetic care in hospital patients and its importance, Understanding of therapeutic adaptations of the normal diet: A) Soft Diet B) Clear Liquid Diet C) Liquid Diet D) Bland Diet E) Low Fibre Diet F) High Fibre Diet To understand modes of feeding: A) Enteral B) Parental **CO5:** To know concept of weight management: overweight and obesity causes, symptoms and principles of dietary management of overweight and obesity, concept of underweight **CO6:** Understanding and importance of various gastrointestinal disorders -dietary management of gastro-intestinal disorder, peptic ulcer, diarrhoea, constipation & ulcerative colitis **CO7:** Liver disorders and gall bladder disorders: dietary disorders – viral hepatitis, liver cirrhosis, hepatic coma
PAPER-II: FAMILY DYANAMICS AND DEVELOPMENTAL ASSESSMENT	**CO1:** Students learn the concept of marriage, changing concept of marriage, forms of marriage, eugenics and other considerations in mate selection. Concepts like preparation and readiness for marriage. Pre-marriage Counseling – Need and Importance. **CO2:** Family as a nuclear unit of society. Changing trend, changing concept of family in terms of structure, constitution, roles, demands and responsibilities, students become aware of functions and conceptualize the need of healthy interpersonal relationships, parental techniques, rearing pattern, need of child disciplinary methods. Students are trained to understand the possibilities of crisis situation within a family with a need to crisis resolution. Students learn the expected adjustments within the family stage namely establishing, expanding and contracting stage. **CO3:** Students acquire the knowledge of assessment, need and purpose along with the concept of developmental milestone as benchmarks to development. Acquire the skills to perform certain tests understanding tools techniques of infant testing need of neurological assessment; need for assessing auditory & visual impairment. **CO4:** Students get acquainted with the need of role of early stimulation developmental activities for raising social, cognitive, emotional physical motor skills, language behavior. Home intervention; concept of early intervention in developmental delay. Ngo's and governmental level programmes, policies of early stimulation (birth to six years of age) with its application for normal and children with special needs.

PAPER-III: ADVANCE PATTERN MAKING	**CO1:** Develop skilled pattern making **CO2:** Study commercial pattern envelope **CO3:** Study important marking in pattern making. **CO4:** Study different layouts and their uses. **CO5:** Methods of fabric estimation. **CO6:** Study different methods of pattern designing. **CO7:** Study grading, its principles. **CO8:** Study draping and its importance in designing. **CO9:** Study different layouts and their uses. **CO10:** Study flat pattern and its uses. **CO11:** Study darts and its manipulation and methods. **CO12:** Study types of figures and its defects. **CO13:** Study principles of design and its effect. **CO14:** Study of fitting problems and their remedy. **CO15:** Study of different texture on different type of figure. **CO16:** Study different plackets and its application. **CO17:** Study skirts and waist band its application. **CO18:** Study collars, classification and types. **CO19:** Study different fabric construction techniques. **CO20:** Designing garment by using different types of fabric.
PAPER-IV: ADVANCED RESOURCE MANAGEMENT II	**CO1:** Learners gain knowledge about different types, scope, role and Management of resources in relation to Human Life. **CO2:** Learners recognize the importance of wise use of resources in order to reach personal and family goals. **CO3:** Learners understand the importance of motivating factors in management –values, goals and standards. **CO4:** Develop ability to take rational decisions. **CO5:** Develop the ability to evaluate the management efficiency and effectiveness in the family and other organizations.
PAPER-V: PROGRAMME PLANNING & BUILDING IN EXTENSION	**CO1:** To learn Program planning for extension work. **CO2:** To study Program building in extension **CO3:** To understand Community organization: **CO4:** To gain knowledge about innovations in communication, The SMCRE model, Diffusion, Relation between Communication **CO5:** To learn Innovation Decision Process, Innovativeness, and stages involved in adoption process. **CO6:** To gain knowledge on Information from communication media. **CO7:** To understand Group Mobilization, Definition of social groups, occasions of group association, groups in rural communities. **CO8:** To understand the concept of change agent, Meaning & traits of change agents, role of change agents.
PAPER-VI: NUTRITIONAL BIOCHEMISTRY-I	**CO1:** Develop an understanding of the principals of biochemistry (as applicable to human nutrition) **CO2:** Obtain an insight into the chemistry of major nutrients like carbohydrates, proteins and lipids and physiologically important compounds.

	CO3: Understand the biological processes and systems as applicable to humannutrition. **CO4:** Understanding the basic Sources, structure, physical properties and uses of macro nutrients **CO5:** To know about the importance of nucleic acids, Structure of a mononucleotide. Bases found in nucleic acids. Difference between RNA and DNA and their functions. Structures of DNAs & RNAs and also understanding the concept of Base pairing rule. **CO6:** Apply the knowledge acquired to human nutrition and dietetics **CO7:** To understand the concept of High Energy compounds ATP & ADP **CO8:** To understand the aspects like Inborn errors of metabolism like Sickle cell anemia &Gout.
Lab Work:	• To know the color reactions of carbohydrates and proteins • To understand the procedure of Preparation of Potato Starch andidentify with solubility test and color Reactions • To understand action of Ptyalin (Salivary Amylase) on Starch.
PAPER-VII: HEALTH SCIENCE AND HYGINE	**CO1:** To understand the concepts of Infection, contamination, host, communicable and non-communicable diseases, source of infection, and Incubation period. **CO2:** To know the types of communicable and non-communicable diseases. **CO3:** To understand the modes of transmission of disease- Direct and Indirect. **CO4:** To gain knowledge of measures taken for the prevention and control of diseases. **CO5:** To understand the aims, objectives, principles of Health Education and to know the role of communication in Health Education **CO6:** To understand the concepts of disinfection, sterilization, disinfectant, antiseptic, and deodorant and to know about the types of disinfectants. **CO7:** To gain knowledge about the principles and work of WHO and UNICEF. **CO8:** To understand the implication of drug addiction, Narcotics, Alcoholism, smoking, their control, and prevention. **CO9:** To understand the definition, necessity, advantages, and methods of family planning. **CO10:** To understand the concepts of Birth rate, Death rate, and Census. **CO11:** To understand the various aspects of Geriatrics
Lab Work:	• To know the different commonly used insecticides and disinfectants. • To identify and determine the count of different blood cells.

Course Outcome for Semester - VI	
PAPER-I: DIET THERAPY-II	**CO1:** Dietary management in a) Fever b) Anaemia c) Surgery d) Burns e) Cancer f) Food Allergy **CO2:** Diabetes Mellitus: dietary management of diabetes mellitus a) Role of diet in the management of IDDM and NIDDM b) Complications of diabetes mellitus **CO3:** Food exchange list-use of food exchange list in meal planning of diabetic people, hypertensive people **CO4:** Dietary management of coronary heart diseases **CO5:** Renal Disorders - dietary management in special conditions
PAPER-II: CARE AND WELL BEING IN HUMAN DEVELOPMENT	**CO1:** Students understand the relevance of care & concept of holistic well-being understand the need of care giving for attaining wellness with special attention to vulnerabilities (age specific). How to draw meaning of subjective wellbeing? its implication in understanding quality of life. **CO2:** Students are taught the need to understand Critical Issues in Infancy period, childhood adolescence. concept of wellness with the role & importance of health care, nutritional psychological counseling. **CO3:** Concept of care & well-being in adulthood with understanding the needs of elderly concept of wellness at different stages of work domains in adulthood, health care. **CO4:** Students acquire the need of facilities provisions & amp; policies at community, state and national level for promoting wellbeing. Important need-based health programme for the holistic approach to wellbeing under the broad spectrum of care
PAPER- III: FASHION DESIGING	**CO1:** Study fashion terminology **CO2:** Fashion movement **CO3:** Study theories of fashion adoption, trends in India. **CO4:** Study fashion classification, fashion cycle. **CO5:** Study factors influencing fashion. **CO6:** To learn process of fashion design **CO7:** To know the origin of fashion and clothing theories. **CO8:** To study clothing theories. **CO9:** To study different silhouettes in fashion. **CO10:** To know international fashion centers and fashion categories. **CO11:** To study fashion leaders, followers. **CO12:** To learn role of clothing in social, cultural scenario. **CO13:** To know the clothing and gender differentiation. **CO14:** To study different departments in apparel production and their working **CO15:** To know the marketing and merchandizing of fashion **CO16:** To study fashion forecasting. **CO17:** To learn different style and methods of fashion advertisement.
PAPER-IV: ADVANCED	**CO1:** Learners develop ability to manage various resources. Developing ability to apply management principles in

RESORCE MANAGEMENT-II	experimental house and in day today life experience and various small events. **CO2:** Learn the concept and application of entrepreneurship skills in Management. **CO3:** Learners develop ability to apply work simplification techniques. **CO4:** Creating awareness regarding intelligent choices of consumer goods.
PAPER-V: COMMUNITY DEVELOPMENT AND MANAGEMENT	**CO1:** To understand leadership in extension, motivation for extension work, to study extension training, to understand the concept of coordination in extension work. **CO2:** To gain knowledge regarding community development, Participatory Approach in community development, To understand Extension Administration **CO3:** To gain knowledge on Extension monitoring evaluation Meaning of monitoring evaluation.
PAPER-VI: NUTRITIONAL BIOCHEMISTRY-II	**CO1:** To understand the concept of Anabolism and Catabolism & its relation tonutrition. **CO2:** To know the concept of Carbohydrate, protein and lipid Metabolism**:** Absorption, transport and assimilation. **CO3:** To introduce definition and significance of intermediary metabolism like Glycolysis, Kreb's cycle (Detail process of energy and energetics), Glycogenesis and Gluconeogenesis **CO4:** To understand the concept of blood sugar regulation: hypoglycemia, hyperglycemia and renal threshold andGlucose Tolerance Test **CO5:** To introduce, definition, process and importance of: Transamination, Oxidative Deamination and Urea Formation. **CO6:** To know the classification of Enzymes according to IUB system. Effect of temperature and pH on the activity of enzymes. **CO7:** To understand the concept of Lipidprofile (Cholesterol, Bile acids, Triglycerides) & Health status. **CO8:** To know the definition of: Lipogenesis and Hyperlipidemia. Formation of Ketone bodies in diabetics. Elementary idea of Beta Oxidation.
Lab Work:	• To know the color reactions ofcarbohydrates and proteins • To understand the procedure of Preparation of Potato Starch and identify with solubility test and colorReactions • To understand action of Ptyalin(Salivary Amylase) on Starch.
PAPER-VII: PUBLIC HEALTH	**CO1:** To understand the basic concept, structure, and classification of bacteria and viruses. **CO2:** To know the concept, importance, and process of Gram Staining. **CO3:** To understand aspects like etiology, diagnosis, treatment, and prevention of non-communicable diseases – Diabetes mellitus and Nephrotic Syndrome **CO4:** To know the aspects like the causative agent, mode of transmission, epidemiology, diagnosis, treatment, prevention,

	and control of communicable diseases - Hepatitis, Cholera, Typhoid, Dysentery, Tuberculosis, Poliomyelitis, Measles. **CO5:** To understand the aspects like the causative agent, mode of transmission, epidemiology, life cycle, diagnosis, treatment, prevention, and control of parasitic infections (Amoebiasis & Ascariasis) and diseases spread by insects (Malaria & Filaria). **CO6:** To understand the classification and mechanism of immunity. **CO7:** To understand the concept of vaccines and to know the routine immunization schedule. **CO8:** To understand antibiotics and their classification
Lab Work:	• To understand the morphology and structure of different microorganisms- *Staphylococci, Streptococci, Mycobacterium Tuberculosis, E. coli*, Malarial Parasite, Filarial Parasite. • To know about the physical & chemical examination of Urine. • To estimate the Haemoglobin percentage. • To understand the life cycles of parasites. (*Entamoeba histolytica, Roundworm, Plasmodium vivax* and *Plasmodium falciparum, Wuchereria bancrofti*)

MATHEMATICS

PROGRAM OUTCOME FOR B. SC. MATHEMATICS

Department of Mathematics	After successful completion of three years degree program in the subject Botany the students are able to:
Program Outcomes	**PO1:** To develop creative and critical thinking. **PO2:** To develop effective communication. **PO3:** To build strong leadership qualities and develop team spirit. **PO4:** To learn to become better and effective citizens of the country. **PO5:** To develop moral maturity and ethical behavior. **PO6:** To learn about the environment and sustainability process. **PO7:** To self-direct a life-long learning system. **PO8:** To learn knowledge application. **PO9:** To learn analytical, scientific reasoning and problem solving. **PO10:** To gain Information / Digital Literacy.
Program Specific Outcomes	**PSO1:** Construct mathematical arguments, proofs and develop mathematical as well as analytical thinking **PSO2:** Critically interpret numerical data, graphical data and develop models **PSO3:** Apply mathematical knowledge to a career and research related to mathematical sciences PSO4: Apply critical thinking skills to solve problems which can be modelled mathematically.
Course Outcomes B. Sc . Mathematics	
Course Outcome for Semester-I & II	
Sem. I & II Paper-I: Algebra & trigonometry, Differential and difference equations	**CO1:** Understand the applications of De Moiver's theorem, properties of groups and subgroups **CO2:** Learn basic properties of first order, higher order differential equations and solve them with different methods. **CO3:** Understand to find unknown solution by using known solution, the formation of difference equation, solution of homogeneous and non-homogeneous linear equation. **CO4:** Understand the concepts of rank, Eigen values of matrices, solution of homogeneous and non-homogeneous system of equations.
Sem I & II Paper-II: Calculus, Vector calculus & improper integrals	**CO1:** Understand basic properties of limit, continuity and derivability of functions, expansion of functions in terms of infinite series by using different methods. **CO2:** Find indeterminate forms and partial differentiation of functions with two or more variables **CO3:** Understand basics of directional derivatives, gradient, divergence and curl **CO4:** Evaluation of double and triple integral, improper

	integrals and their convergence.
Course Outcome for Semester-III & IV	
Sem III & IV Paper-I: Advanced calculus, Partial Differential equations & calculus of variations	**CO1:** Understand concept of limit and continuity of functions of two variables, application of Mean value theorems **CO2:** Study of convergence, divergence of sequences and series using various tests. **CO3:** Understand ordinary differential equation in more than two variables and methods of finding solution **CO4:** Study Lagrange's method, Charpit's method, Jacobi's method to solve PDE, homogeneous and non-homogeneous PDE with constant coefficients
Sem III & IV Paper-II: Differential equations & group homomorphism, Mechanics	**CO1:** Understand basic properties of Laplace transforms, inverse Laplace transforms and solution of ordinary differential equation using Laplace transform. **CO2:** Study of group homomorphism, isomorphism in details. **CO3:** Understand kinematics in two dimensions, mathematical exposition and geometrical representation of simple harmonic motion. **CO4:** Study mechanics of system of particles and Lagrange's equations.
Course Outcome for Semester-V & VI	
Sem V & VI Paper-I: Analysis, Abstract algebra	**CO1:** Study Fourier series and it's convergence, existence of Riemann-Stieltjes integral, construction of analytic function, harmonic function etc. **CO2:** Understand conformal mapping, bilinear transformation. **CO3**: Study Group automorphism, inner automorphism, vector spaces and it's properties, subspaces, basis, dimensions etc. **CO4:** Understand algebra of linear transformation and its inverse, matrix associated with linear map and vice versa, properties of inner product space.
Sem V & VI Paper-II: Metric space, complex integration & Algebra, Special theory of relativity	**CO1:** Understand concepts of countable, uncountable sets, completeness, compactness, connectedness of metric space. **CO2:** Calculation of zeros and different types of singularities of analytic function, application of Cauchy's residue theorem to evaluate integral. **CO3:** Study geometrical interpretation, group properties of Lorentz transformations and basics of tensors, metric tensors etc. **CO4:** Understand equivalence of mass and energy, transformation formulae for mass, momentum and energy, relativistic equations of motion, Maxwell's equations etc.

MICROBIOLOGY

PROGRAMME OUTCOME FOR B. SC. MICROBIOLOGY	
DEPARTMENT OF MICROBIOLOGY	**After successful completion of three years degree program in the subject Microbiology the students will be able to:**
PROGRAM OUTCOMES	**PO1:** Demonstrate laboratory skills applicable to Microbiological and Clinical methods including laboratory safety. **PO2:** Acquire skills for accurately reporting observations and findings through oral, written and digital formats. **PO3:** Apply the knowledge of microbiology from multiple fields to critically analyse and evaluate microbiological, environmental and health related issues and to create awareness and impact of microbiology outside the science community. **PO4:** Practice flexible professional skills needed for careers in microbiology & related professional and scientific fields like-Health sector, medical laboratory technology (MLT), Water testing labs, Dairy and food Industry as quality assurance and quality control professional etc, can opt for either post graduate study program, research, or for various competitive exams and professional courses. Exposure provided to the students during the add-on bioinformatics certificate course would help students gain awareness of career options in the software industry too. **PO5:** Students will be able to expand their learning horizons through use of multidimensional learning resources to keep themselves at par with the pace of scientific and research development worldwide.
PROGRAM SPECIFIC OUTCOMES	**PSO1:** The subject helps to gain knowledge about all types of microbial world, living as well as non-living, its harmful & useful interactions with human, animals, plants, bacteria and the environment **PSO2:** Students will be able to recognize structural & functional relationship of all living beings at molecular & cellular level. **PSO3:** They will get acquainted with importance of microorganisms as model systems in Genetics & Molecular Biology. **PSO4:** Students will be able to demonstrate basic microbiological techniques & acquire experimental and quantitative skills encompassing preparation of laboratory reagents, media, conducting experiments, handling different instruments, analysing samples& interpreting results.

COURSE OUTCOME FOR B SC MICROBIOLOGY	
Title of the Paper	**COURSE OUTCOME FOR SEMESTER -I**
Paper-I: FUNDAMENTALS OF MICROBIOLOGY (New Syllabus)	**By the end of this course, the students will be able to:** **CO1:** Get knowledge about basic branches of microbiology, they will understand the contribution of eminent scientists in the development of microbiology. **CO2:** Acquainted with the ultrastructure of bacterial cell, concepts of prokaryotic and eukaryotic cell's, their differences with examples. **CO3:** They will acquire the knowledge about nutritional requirements, classification of bacteria on the basis of nutritional habits. **CO4:** Learn about the growth of microbes, cell cycle and reproduction processes, various environmental parameters affecting their growth & different techniques used for their detection & quantification.
Paper-II: BASIC TECHNIQUES IN MICROBIOLOGY (New Syllabus)	**CO1:** Understand the basic principles and applications of various types of microscopic techniques. **CO2:** The students learn different techniques of Cultivation and preservation of bacteria, yeast and fungi. They are acquainted with various culture collection centres in India and abroad. **CO3:** Understand different staining techniques, role of reagent and dyes principles involved in these staining techniques. **CO4:** Get acquainted with various disinfectants, antiseptic and antimicrobial agents used in microbial control. They come to know about its mode of action and mechanism involved in microbial control.
Lab Work:	**By the end of this semester students will be able to demonstrate:** • Trained for handling various basic as well as advanced instruments used in microbiology laboratory. • Know about preparations of different types of media and methods to cultivate the microbes. • Able to demonstrate different staining procedures, stains & reagents used and microscopic observations of various types of bacteria. • Able to isolate different types of bacteria from samples of milk, water, soil etc. • Able to demonstrate sensitivity of bacteria to antibiotics, and UV radiation effect
COURSE OUTCOME FOR SEMESTER -II	
Paper-I: MICROBIAL	**By the end of this course, the students will be able to:** **CO1:** Know about the Prokaryotic microbial diversity with

DIVERSITY	examples, general characters & their life cycle. **CO2:** Get acquainted with Eukaryotic microbial diversity with examples, general characters & their life cycle. **CO3:** Understand the general characters, morphology and classification of viruses, mode of replication and methods of cultivation. **CO4:** Conceptualize various kind of positive and negative microbial interactions.
Paper-II: FOOD MICROBIOLOGY & MILK MICROBIOLOGY	**CO1:** Get acquainted with various food and milk products, their production techniques, various diseases caused, prevention of spoilage and its preservation. **CO2:** Gain knowledge about food safety and food standards
Lab Work:	**By the end of this semester students will be able to demonstrate:** • Demonstrate Slide culture techniques for the cultivation and study of mould. • Get Acquainted with SPC method to determine quality of food. • Learn to visualize under Microscope different characteristics of Fungi (*Aspergillus, Penicillium* and *Mucor*) Protozoa *(Plasmodium vivax, Trypanosoma* and *Amoeba*) & Algae (*Spirullina, Anabena* and *Euglena*), *Mycoplasma, Rickettsia* and *Chlamydia*. • Know the method of Coliform detection in food as per BIS. • Enumeration of total aerobic viable count from raw and pasteurized milk by serial dilution method. • Can demonstrate MBRT and Phosphatase test. • Know the technique to study the Effect of salt and sugar on microbial growth. • Demonstrate to find out MIC of preservative compound.
COURSE OUTCOME FOR SEMESTER III	
Paper-I: CHEMISTRY OF ORGANIC CONSTITUENTS AND ENZYMOLOGY (Old syllabus)	**By the end of this course, the students will be able to:** **CO1:** Acquire knowledge about classification of organic compounds like Carbohydrates and lipids and get acquainted with their structures and various bonds involved in them. **CO2:** Understand classification & structures of amino acids& proteins. **CO3:** Concept building about classification, structures and functions of enzymes, their mode of action and reaction mechanism. Understand steady state kinetics. **CO4:** Gain knowledge about nucleic acids, structures and their differences. Can describe importance of vitamins to human body and their deficiency syndrome.
Paper-II: INDUSTRIAL	**CO1:** Know the scope of industrial microbiology and

MICROBIOLOGY	screening methods used for isolation of industrially important microbes. **CO2:** Gain knowledge about different Fermenter configurations& designs. **CO3:** Scale up and DSP. **CO4:** Concept building about industrial production of SCP, Baker's yeast, ethanol, penicillin and semisynthetic penicillin, citric acid, Vit B12, beer and wine.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate and Identify carbohydrates and lipids from unknown samples. • Demonstrate enzyme activity by bacteria (amylase, catalase, gelatinase, lipase) • Estimate proteins, DNA and RNA by spectrophotometric method • Get knowledge and hands on training on- production of ethanol and methods of estimation. • Get acquainted with the isolation procedure of amylase producer from soil. • Demonstrate Leavening capacity of yeast and Immobilization of yeast for invertase activity.
COURSE OUTCOME FOR SEMESTER IV	
Paper-I: METABOLISM	**By the end of this course, the students will be able to:** **CO1:** Understand the general strategy of metabolism and conceptualize various metabolic processes operating in living cells. **CO2:** Gain knowledge about methods of DNA replication, models of replication, enzymes involved and Prokaryotic transcription process and mechanism. **CO3:** Acquainted with deamination processes, Urea cycle, glucogenic and ketogenic amino acids Genetic code and Prokaryotic translation **CO4:** Understand the mechanism by which energy is generated.
Paper-II: APPLIED MICROBIOLOGY	**CO1:** Get acquainted with multiple tube dilution technique, IMViC classification and understand the significance of bacteriological analysis of drinking water. **CO2:** Gain knowledge about various methods applied for treatment of water and waste water & understand the importance of disposal of industrial wastes and techniques used in its disposal. **CO3:** Understand the techniques of air analysis, various samplers used & methods involved. Know the role of soil microbes and methods involved in biofertilizer & biopesticide productions. Conceptualize PSB, mycorrhiza & microbial leaching process. **CO4:** Gain knowledge about Food spoilage, pathogens involved and methods of preservations. Food borne diseases and food intoxications.

Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate the techniques to isolate microbes from water and waste water. • Know the techniques to find out MPN, DO, COD, BOD, alkalinity of water and IMViC tests. • Understand the methods of chlorination of water and Chlorine demand. • Hands on Knowledge about MBRT and Phosphatase test
COURSE OUTCOME FOR SEMESTER V	
Paper-I: **MEDICAL MICROBIOLOGY**	**By the end of this course, the students gain knowledge about:** **CO1:** Concept building about various epidemiological concepts and definitions. Various modes by which infections spread in community, portal of entry& exit and their control. **CO2:** Microbial mechanism of Pathogenicity and virulence, exaltation and attenuation methods, MID, MLD, ID 50, LD50. **CO3:** Acquire knowledge about methods used in isolation and identification of various pathogenic organisms, based on their morphology, cultural characteristics, biochemical characteristics, serology and lab diagnosis. **CO4:** Understand the Basic principles of drug designing, the role of these drugs and antimetabolites in disease control.
Paper-II: **MOLECULAR BIOLOGY AND BIOINSTRUMENTATION**	**CO1:** Acquainted with various concepts – related to gene, different types of mutation and its regulation. **CO2:** Concept building about various processes by which gene transfer occurs amongst microbes **CO3:** Understand the principles, methodology and application of various bio instruments like spectrophotometer, electrophoresis, chromatography, centrifuge etc **CO4:** Get acquainted with Isotopic tracer technique and its applications.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate bacterial and plasmid DNA isolation techniques. • Gain knowledge and hands on training on restriction digestion technique. • Demonstrate spectrophotometrically creatinine estimation. • Demonstrate gel filtration, paper chromatography and TLC. • Knowledge and hands on training on isolation and identification of pathogenic bacteria (*E coli, S aureus, Salmonella, Proteus*).

COURSE OUTCOME FOR SEMESTER VI	
Paper-I: IMMUNOLOGY	**By the end of this course, the students will be able to:** **CO1:** Concept building about defensive mechanism of host against diseases, various terminologies used and definitions of epidemic, endemic, pandemic, nosocomial infection, zoonotic infection, vector, types and role of vectors, portal of entry portal of exit of pathogens. **CO2:** Knowledge about Haematopoiesis, Cells of immune system, general characters of B and T cells, cellular and humoral immunity. **CO3:** Understand the structures, properties, types and importance of Antigens and Immunoglobulins, Ag-Ab reactions in Diagnostic immunology. **CO4:** Gain knowledge about ELISA test, its application and various Hypersensitivity reactions and their types.
Paper-II: BIOTECHNOLOGY	**CO1:** Know the tools and techniques of genetic engineering **CO2:** Knowledge about DNA, fingerprinting and its application in forensic science **CO3:** Acquainted with the methods of production of insulin, interferon. Vaccines, monoclonal antibody. Understand the applications of biotechnology in agriculture **CO4:** Acquire knowledge about the advantages /disadvantages of genetic engineering for humans & comprehend the production and importance of genetically modified foods and animals, know about the ethics to be followed.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate VDRL test, Widal test, immunodiffusion technique And Western blot technique. • Perform PCR • Development of spheroplast • Get the knowledge of lab production of biofertilizer and soya sauce

PHYSICS

Department of Physics	After successful completion of three years degree program in the subject Physics the students are able to:
Programme Outcome:	**PO1:** Gain a thorough understanding of the subject. **PO2:** Lay the groundwork for future learning. **PO3:** Learn the fundamentals of research. **PO4:** Instill good moral and ethical ideals in yourself. **PO5:** Recognize your societal and environmental responsibility. **PO6:** Develop communication and professional skills. **PO7:** Acquire the ability to accept a wide range of ideas and points of view. **PO8:** Empower yourself to meet the demands of a changing universe.
Program Specific Outcomes	**PSO1:** Understand the principles of physics, matter characteristics, and electrodynamics, as well as the basic notions of scientific process. **PSO2:** Understanding the theoretical foundations of quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, astrophysics, statistical physics, photonics, and thermodynamics. **PSO3:** Understand and apply electrical ideas in the design of various analogue and digital circuits. **PSO4:** Understand the fundamentals of computer programming and numerical analysis with PSO4. **PSO5:** Use laboratory experiments to test and apply theoretical principles.
Course Outcomes of B.Sc. Physics	
B. Sc. Semester-1	
Paper – I: Properties of Matter and Mechanics: Learning Outcomes:	**CO1:** The curriculum covers general characteristics of matter, which include solid and liquid. Elasticity is a solid property that offers a notion of material strength in three forms, as well as liquid viscosity and its relevance. Surface tension in a liquid's geometrical form. **CO2:** Mechanics covers the fundamentals. Newton's laws of motion and how they're used. Students' imagination is improved by geometrical descriptions of rules, and the study of restrictions leads to the area of physics known as classical mechanics. The relationship between M.I. and body movements is given by rotational motion.
Paper-II: Electrostatics, Time varying fields & Electric Currents:	Students will be able to: **CO1:** State and express Coulomb's law in vector form and apply it to solve for E due to stationary charges, Electric potential due to point charge, owing to dipole, and field due to dipole at any place after finishing this course.

	CO2: Able to establish that potential is force per unit charge and to describe V and its link to energy conceptually. **CO3:** Able to explain the similarities and differences between a conductor and a dielectric, the action of an electric field, dielectric polarisation, polar and non-polar molecules, and the Classius-Mossoti equation. **CO4:** When given epsilon and the free charge on the dielectrics, be able to determine the E field inside the dielectric. **CO5:** Able to grasp the fundamental concepts of parallel plate capacitors, including capacity derivation with or without the use of a calculator. When given epsilon and the free charge on the dielectrics, it is possible to determine the E field inside the dielectric. **CO6:** Able to grasp the fundamental concepts of parallel plate capacitors, including capacity derivation with and without dielectrics, as well as solve numerical issues. **CO7:** Able to articulate and explain Faraday's laws of electromagnetic induction, self and mutual induction, transformers and their operation, transformer losses and applications, and Kirchhoff's laws. **CO8:** Able to study series resonance, frequency derivation, power in an ac circuit, and solve mathematical problems.
B. Sc. Semester- II	
Paper-I: Oscillations, Kinetic theory of gases and Thermodynamics:	**CO1:** Students will be able to grasp linear and angular S.H.M., as well as the S.H.M. differential equation and its solution. Also capable of developing damped oscillation differential equations and energy dissipation via damped oscillations. **CO2:** The basics and applications of forced vibrations, resonance, and its energy and quality factor will be understood by the students. Also included are gas laws and their applications. **CO3:** Students will learn about gas transportation phenomena and the thermodynamics that underpin it. Also, the role of thermodynamic laws in engine efficiency.
Paper-II: Gravitation, Astrophysics, Magnetism and Magneto statics:	**CO1:** The students get an understanding of the fundamental rules of classical mechanics, which improves their understanding of planetary motion and interactions. **CO2:** An introductory course in astrophysics piques students' curiosity in space science. **CO3:** Studying atomic magnets at a microscopic level improves students' intellectual abilities in material research and provides insight into the relationship between electric and magnetic fields as a future key to power consumption.
B. Sc. Semester-III	
Paper-I: Sound waves, Applied acoustic, Ultrasonic and Power supply Learning	**CO1:** Students learn about the many types of waves and their properties. They also learn about harmonics, sound quality, and the human ear's reaction and audibility to sound. Students may learn about sound intensity measurement and the influence of temperature on sound. **CO2:** Students are familiar with various sound measurement

	instruments such as transducers, sound recording, and sound reproduction. **CO3:** Students learn about ultrasonic waves, their characteristics, ultrasonic wave generating methods, and research applications. **CO4:** Students learn about the necessity of voltage, current, and load management, as well as power supply and conversion from alternating current to direct current.
PHYSICS - Paper-II: Physical optics and Electromagnetic waves:	**CO1:** Students are able to explain how light behaves as a wave. **CO2:** Examine how light intensity varies owing to interference and diffraction. • Understand Michelson and Fabry-Parot Interferometer Applications **CO3:** Examine the concept of polarisation and how it is used. **CO4:** Understand electromagnetic waves, Maxwell's field equations, and their transverse nature. **CO5:** Explain Poynting's theorem and its significance.
B. Sc. Semester IV	
PHYSICS - Paper-I: Solid state physics, X-ray and Laser:	**CO1:** Students will have a fundamental understanding of crystal systems and spatial symmetry, Miller indices, and how different diffraction methods are used to study crystalline materials. **CO2:** Be familiar with the notion of a reciprocal space lattice and the meaning of Brillouin zones. **CO3:** Students will be able to identify the different types, characteristics, and uses of X-rays. **CO4:** Students explain the fundamentals of lasers, how they are made, and how they are used.
PHYSICS - Paper-II: Solid state electronics, and Molecular physics:	**CO1:** Students will learn the fundamentals, manufacturing, and applications of LED, Solar Cell, and BJT in everyday life, as well as the concepts, applications, and special characteristics of FET, JFET, and MOSFET. **CO2:** Students will be able to explain and quantify vibrational and rotational energy, kinds of molecules, diatomic molecules as harmonic and anharmonic oscillators, rotational-vibrational spectra, and the Born Oppenheimer approximation. **CO3:** Students who understand the relevance and applicability of Raman spectroscopy in molecular physics are also familiar with the Frank-Condon principle, the fundamentals of NMR and ESR, and their spectroscopic applications.
B. Sc. Semester –V	
Paper-I: Atomic physics, free electron theory and Statistical physics:	**CO1:** Students comprehend the many theories of the atomic model, as well as the various quantum numbers. The student also investigates how the momentums and magnetic moments associated with various electron motions are orientated, as well as their interactions. **CO2:** Students learn about electron conduction, both electrical and thermal. Fermi temperature band, Fermi energy. Free

	electron theory: different theorems, models, and experiments Material classification is also important. **CO3:** The student gains an understanding of - space, Gamma space, probability distribution, and thermodynamic probability, Principle of a priori probability, Boltzmann's entropy relation, different states, Maxwell Boltzmann distribution law, and its application; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann' Students will also study Bose-Einstein statistics, as well as the Fermi Dirac distribution and how to use it.
Paper-II: Quantum mechanics, Nanomaterials and Nanotechnology:	Students will be able to: **CO1:** Understand the major components of quantum mechanics' historical evolution, as well as wave characteristics of matter, after finishing this course. **CO2:** Capable of relating classical mechanics to quantum mechanics. **CO3:** Able to solve Schrodinger equations in one to three dimensions and understand them physically. **CO4:** Familiarity with the fundamentals of nanoscience and nanotechnology, as well as their relevance in everyday life.
B. Sc. Semester VI	
Paper-I: Relativity, Nuclear physics and Bio Physics	**CO1:** Students comprehend frame of reference, special theory of relativity postulates, and relativistic variation in length, time, mass, velocity addition, and mass energy equivalence. **CO2:** They can design radiation detectors, charge accelerators, and nuclear reactions, as well as the many types of nuclear processes and their significance in modern technology. **CO3:** Students are able to describe and grasp the essential ideas of decay particles. **CO4:** Students will be able to understand bio physics and its significance in the medical profession.
Paper-II: Electronics, Fiber optics, Communication and Digital electronics	**CO1:** Students will understand the construction and operation of amplifiers and oscillators, as well as their applications. **CO2:** Students will be able to understand the fundamental principles and operations of fiber optics, as well as the importance of optical fibre, light wave propagation in optical fiber, and its role in communication. **CO3:** They will also be familiar with communication kinds such as AM and FM, as well as their core theory and how television is broadcast using these methods. **CO4:** The students will be able to understand how large amounts of data are kept in current times utilizing technologies such as Number Systems, as well as the theory behind it.

STATISTICS

Department of Statistics	After successful completion of three years degree program in Statistics a student should be able to:
Programme Outcomes	**PO1:** Demonstrate, solve and an understanding of major concepts in all disciplines of statistics **PO2:** Solve the problem and also think methodically, independently and draw a logical conclusion. **PO3:** Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of statistical experiments. **PO4:** Create an awareness of the impact of statistics on the society, and development outside the scientific community. **PO5:** Use modern techniques and different Statistical software
Programme Specific Outcomes	**PSO1:** Make aware and handle the sophisticated data. **PSO2:** Gain the knowledge of Statistics through theory and practical. **PSO3:** To learn about basic principles of design of experiment. **PSO4:** To gain knowledge about official statistics; purpose and functions of CSO, NSSO **PSO5:** Understand basic concepts of Statistical Quality Control and Uses of SQC **PSO6:** To study applications of statistics in the field of industrial statistics, operation research, survey sampling technique etc. **PSO7:** Use modern statistical tools, Models, Charts and Equipment. **PSO8:** Develop research-oriented skills.
Course Outcomes B. Sc I Statistics Semester-I	
Paper-I: Probability Theory	**CO1:** Understand the Theory of Probability. **CO2:** Able to apply additive and multiplicative laws of probability **CO3:** Obtain the various results on theorems in probability CO-4. Distinguish between measures of location and measure of dispersion. **CO4:** Identify Conditional Probability, Bayes theorem, and Chebyshev's inequality **CO5:** Concept of Random variable, pmf, pdf, pgf, distribution function, mgf and its uses
Paper-I**: Descriptive Statistics-I**	**CO1:** Able to plan, execute and analyze a data **CO2:** Use and understand basic concepts of Descriptive statistics **CO3:** Analyze data and understand concept of population census

	CO4: Analysis of categorical data using various techniques and draw conclusions. **CO5:** Apply statistics to draw different types of diagrams and graphs
Course Outcomes B. Sc I Statistics Semester-II	
Paper-I: Probability Distribution	**CO1:** Understand various Discrete and Continuous distributions. **CO2:** Able to have the knowledge of Discrete Distributions such as Bernoulli, Binomial, Poisson, Uniform, Hyper geometric and Geometric, Negative Binomial with their properties and applications **CO3:** Able to have the knowledge of Continuous Distributions such as Uniform, Beta, Gamma, Normal and their properties **CO4:** Distinguish between Bernoulli distribution and Binomial distribution **CO5:** Understand concept of Lack of memory property of Geometric distribution.
Paper-I**: Descriptive Statistics-II**	**CO1:** Able to plan, execute and analyze a data. **CO2:** Use and understand concepts of central tendency and location. **CO3:** Understand different concepts and measures of dispersion **CO4:** Analysis the concept of bivariate data and correlation coefficient as well as regression. **CO5:** Apply different types of partition values and the concepts of skewness and kurtosis The concepts of central tendency and location.
Course Outcomes B. Sc II Statistics Semester-III	
Paper-I: Statistical Methods	**CO1:** Drawing random samples from uniform and normal distribution. **CO2:** Able to find moments and correlation coefficient of bivariate probability distribution. **CO3:** Obtain a joint probability distribution of random variable (one or two dimensional) in the given situation. **CO4:** Distinguish between t- distribution and F- distribution. **CO5:** Identify the type of Statistical situation in which different Transformation of variable technique can be applied.
Paper-II: Economics Statistics	**CO1:** Construction of Price and Quantity index number by simple aggregative method **CO2:** Construction and uses of Wholesale Price Index number. **CO3:** Able to determine concept of purchasing power of money **CO4:** Fitting of Pareto curve to income data. **CO5:** Analyze data pertaining to seasonal Indices and to interpret the results. **CO6:** summarize and analyze the data using Economic time series.

	CO7: Apply statistics in the various fields.
Course Outcomes B. Sc II Statistics Semester-IV	
Paper-I: Statistical Inference	**CO1:** To solve problems on chi-square for testing independence of attributes. **CO2:** To solve problems on t-tests and construction of confidence intervals for single mean and difference of two means, paired t-test. **CO3:** Identify the characteristics properties of good estimator. **CO4:** Identify the type of statistical situation to which central limit theorem can be applied. **CO5:** Understand the construction of confidence interval.
Paper-II: Applied Statistics	**CO1:** Explain the sources of demographic data. **CO2:** Calculation of Percentile scores and T-scores for a given frequency distribution of raw scores. **CO3:** Comparison of raw scores on the basis of (i) Percentile, (ii) Z scaling, (iii) T scaling. **CO4:** Able to solve numerical problems on construction and use of life tables. **CO5:** Can do computation of CDR and Standardized death rates by direct and indirect methods. **CO6:** Be able to compute and interpret Gross Domestic rates
Course Outcomes B. Sc III Statistics Semester-V	
ST-301: Paper-! - Statistical Quality Control and Linear Programming Problem	**CO1:** Use tools of SQC, draw control charts for mean, standard deviation and range **CO2:** Able to draw conclusion about whether process is in statistical quality control or not. **CO3:** Obtain the optimum solution of Linear programming problem. **CO4:** Distinguish between Process and product control **CO5:** Identify the General form of LPP and Standard form of an LPP.
ST-302: Survey Sampling Techniques	**CO1:** Able to plan, execute and analyse a sample survey **CO2:** Use and understand basic concepts of sample survey, sampling and types of sampling and non-sampling errors **CO3:** Analyze data and understand concept of stratified sampling, systematic sampling and cluster sampling and compare various sampling techniques. **CO4:** Analyse data using various sampling techniques and draw conclusions.56 **CO5:** Apply statistics in the various fields of sampling techniques
Course Outcomes B. Sc III Statistics	

Semester-VI	
ST-311: Operations Research	**CO1:** To solve and understand different concepts of Network Analysis and Construct Network Diagram **CO2:** Able to understand concept of Duality in LPP, relationship between primal and dual problem and its economic interpretation **CO3:** Identify the balanced transportation problem and unbalanced transportation problem, **CO4:** Identify two-person zero sum game and solution of game. **CO5:** Understand concept of Duality in LPP, relationship between primal and dual problem and its economic interpretation
ST-312: -Experimental designs	**CO1:** Able to explain factorial experiments, Yates' method to calculate main effects and interaction effects in 2^2 and 2^3 factorial experiments **CO1:** Analyse data using various experimental designs CRD, RBD, LSD and draw conclusions. **CO1:** Comparison of theory of linear estimation, analysis of variance (ANOVA) **CO1:** Able to analyse data using various ANOVA techniques and draw conclusions. **CO1:** Understand basic principles of designs of experiments. **CO1:** Be able to compute and interpret ANOVA for one way and two-way classified data.

ZOOLOGY

Department of Zoology	After successful completion of three years degree program in the subject Zoology the students are able to-
Program Outcome	**PO1:** classification and Identification of organisms according to their characteristic features. **PO2:** Correlates the Morphology, physiology and biology of invertebrate and vertebrates. **PO3:** Gain the knowledge of Micro-technique for preserving tissue and specimens. **PO4:** Analyse interactions among the various organisms of different phylas, their distribution and relationship with the environment. **PO5:** Gain knowledge about economic importance and application of knowledge agro based small industries like sericulture, apiculture, aquaculture, fish breeding, pear-culture. **PO6:** Understand concept of genetics and its importance in human health. **PO7:** Understand the use of biotechnology, biostatistics and bioinformatics.
Program specific Outcome	**PSO1:** Students are able to understand the basic concept of cell biology, environmental biology, genetics, physiology, taxonomy and applied zoology. **PSO2:** Understand the application of biological sciences in aquaculture, sericulture, vermin-culture, pearl-culture and apiculture. **PSO3:** Perform procedures as per laboratory standards in the area of physiology, cell biology, environmental biology, genetics, entomology, Biotechnology fisheries. **PSO4:** Gain knowledge about research methodology i. e. skills of micro technique which consists of preservation of tissue and specimens, their staining techniques
Course Outcome of B.Sc. Zoology	
Zoology SEM I	
Paper-I: Life and Diversity of Animals – Non-chordates (Protozoa to Annelida)	**CO1:** Students get knowledge about unity and diversity of life on the earth. **CO2:** Students will be able to identify and classify non-chordates on the basis of their peculiar characteristics. **CO3:** students will be able to understand phylum wise structural features, morphology, anatomy, physiology, habit and Habitat. **CO4:** Students will be able to explain how organisms' function at different level of grade of Organization like cellular, tissue, organ and organ system. **CO5:** They will be able to give examples of the physiological adaptation, development, behavior of

	different forms of life. **CO6:** Students understand economic importance of non-chordates as well as life cycle of pathogenic organisms.
Paper – II: Environmental Biology	**CO1:** Students get knowledge and understand about different strata of atmosphere. **CO2:** Students able to understand /recognize biological, chemical, physical components of earths system. **CO3:** Students will also understand how natural system human designed system work together and conflict with each other. **CO4:** Students understood about environmental issues like water pollution, Air pollution, soil pollution and noise pollution. **CO5:** Students able to understand and gain knowledge about renewable and non-renewable energy sources.
Lab. Work	• Studied museum specimen (classification and structural features0 • Learn about estimation of Dissolved oxygen and carbon dioxide PH and hardness of water • Studied pond ecosystem • Learn about dissection and perform mounting of biological material
Zoology - SEM II	
Paper – III: Life and Diversity of Animals – Non-chordates (Arthropoda to Hemichordata)	**CO1:** Students understood role of insect vectors in spreading diseases, mode of infection and symptoms. **CO2:** Students also understood economic importance of molluscans. **CO3:** Students understood affinities of hemichordates with different phyla. **CO4:** Students get knowledge about indirect development through various larval stages.
Paper – IV: Cell Biology	**CO1:** Students will be able to understand structure and functions of cell and cell organelles. **CO2:** Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells and cell organelles **CO3:** Students will understand how these cellular components are used to generate and utilize energy in cells **CO4:** Students will understand types of cell division that is mitosis and meiosis **CO5:** Students will apply their knowledge of cell biology to study environmental or physiological responses of cell
Lab Work:	• Studied Museum specimen (classification and structural features) • Studied permanent slides of larva of different animals and sections through different organs

	• Perform cell biology experiments, mounting and studied dissection.
Zoology - SEM III	
Paper-V: Life and diversity of Animals - Chordates (Protochordata to Amphibia	**CO1:** Students are able to understand diversity of earlier chordate from Protochordata to amphibian. **CO2:** Students are also studied about growth and development, evolution of different system of chordates. **CO3:** Students also get knowledge about adaptations, parental care and sexual dimorphism in chordates
Paper – VI: Genetics	**CO1:** Students are able to understand Mendel's laws of inheritance, basic concepts of gene, transmission of hereditary characters. **CO2:** Students also understand about interaction of genes. **CO3:** Students also understand concept of lethal genes, chromosomal disorder and syndrome caused due to abnormal chromosomal no. **CO4:** Students also understand about population genetics and application of genetics
Lab Work:	• Studied museum specimen of chordates (classification and structural features) • Observed and studied permanent slides of developmental biology and sections through different organs • Perform genetic experiments and studied karyotype of genetic traits.
Zoology - SEM IV	
Paper - VII: Life and Diversity of Animals – Chordates(Reptilia, Aves and Mammals)	**CO1:** Students understand about classification of reptiles, Aves and mammals based on structural variation. **CO2:** Get knowledge about Biting mechanism in snakes, adaptations in Aves and mammals. **CO3:** Get information about modern evolution theories, genetic basis of evolution **CO4:** Understand comparative study of development of heart and aortic arches in birds, Aves and mammals. **CO5:** Study different aspects of chick development
Paper - VIII: Molecular Biology and Immunology	**CO1:** Understand detail structure of DNA and RNA as a genetic material, structure of gene. **CO2:** Students are able to understand different processes like replication, transcription, protein synthesis. **CO3:** Able to understand concept of immunity, types of antigen antibody and their interaction **CO4:** Get information about types of immune response and about immune deficiencies.
Lab Work:	• Studied classification and identification of chordates • Studied skeleton of rabbit and fowl • Studied permanent slides of chick embryology and permanent slides. • Perform staining and immunology and molecular biology experiments.

Zoology - SEM V	
Paper-IX: General Mammalian Physiology I	**CO1:** It gives knowledge about structural features and functions of different systems like digestive, respiratory and circulatory. **CO2:** General properties of enzymes, enzyme activity **CO3:** Digestive glands, respiratory pigments, respiration mechanism and in detail circulatory system.
Paper-X: Aquaculture and Economic entomology and	**CO1:** This paper gives knowledge about-application of zoology and economic importance of zoology like fresh water aquaculture, prawn culture, pearl culture, apiculture, sericulture, and lac culture. **CO2:** Gives information about economic entomology and methods of pest control.
Lab Work:	• Perform physiology experiments i.e. estimation of carbohydrates, proteins, fats and vitamins. • Perform counting of red blood cells and white blood cells. • Studied histological slides • Perform mounting, • Collection and identification of local fishes. • Studied different insect pests.
Zoology - SEM VI	
Paper-XI: General Mammalian Physiology II	**CO1:** Get knowledge about nerve and muscle physiology, **CO2:** Studied in detail structure and function of different endocrine glands. **CO3:** Understood reproductive system, causes of infertility in male and female.
Paper-XII: Applied Zoology II (Bio-techniques ,micro techniques, Biotechnology, Bioinformatics and Biostatistics	**CO1:** Students are able to understand methods of separation of biomolecules, micro techniques (different staining methods **CO2:** Understand importance and role of bioinformatics **CO3:** Understand application of statistics in biology and biotechnology.
Lab Work:	• Detection of urea albumin sugar and creatinine in urine • Perform biotechnology experiments and micro-technique methods • Perform and studied application of bioinformatics and biostatistics. • Observed histological slides.

MATHEMATICS

PROGRAMME OUTCOME FOR M. SC. MATHEMATICS

Department of Mathematics	After successful completion of two years post-graduation degree program in the subject Mathematics the students are able to:
Program Outcomes	**PO1:** To acquire the strong foundation of basic concepts, this will benefit them to become good academicians. **PO2:** To apply the concept of mathematical tools to address real life problems. **PO3:** To pursue research in reputed institutions and solve the existing mathematical problems using the knowledge of pure and applied mathematics. **PO4:** To qualify various competitive exams like CSIR-UGC NET, SET, GATE, MPSC, UPSC, etc.
Program Specific Outcomes	**PSO 1:** To imbibe problem-solving and computational skills **PSO 2:** To understand the motivation behind the statements and proofs **PSO 3:** To enhance self-learning and improve own performance. **PSO 4:** To inculcate abstract mathematical thinking.
Course Outcomes M. Sc . Mathematics	
Course Outcome for Semester-I	
1T1 Algebra	**CO1:** To assimilate the concept of automorphism, conjugacy, G-set, etc. **CO2:** To analyse properties of solvable group, alternating group, etc. **CO3:** To study Sylow's theorem and related concepts. **CO4:** To understand maximal and prime ideals. Develop knowledge of R-homomorphism and quotient modules.
1T2 Real Analysis-I	**CO1:** To attain mastery in concept of uniform convergence, continuity, differentiation and integration. **CO2:** To understand theorems on inverse function, implicit function, and Rank theorem. **CO3:** To study Topological manifolds, Differentiable manifolds, Real Projective space, Grassman manifolds. **CO4:** To study in detail about Lie groups.
1T3 Topology-I	**CO1:** To understand basics of cardinality and Topological Spaces. **CO2:** To study open set, closed set, limit point, etc. **CO3:** To assimilate the concept of Connected set, Compact and countably compact spaces. **CO4:** To attain mastery in concept of and -spaces.
1T4 Ordinary Differential Equations	**CO1:** To solve first order linear differential equations. **CO2:** To understand second order equations with regular singular points and work out its applications. **CO3:** To study existence and uniqueness of solutions of first order differential equations.

	CO4: To analyse system of differential equations.
1T5 Integral Equations	**CO1:** To know the relation between differential and integral equations, and how to change from one to another. **CO2:** To understand different kinds of kernels and use techniques for solving problems on each kind. **CO3:** To explain types of Voltera equations and solve linear Volterra and singular integral equations using appropriate methods. **CO4:** To use Hilbert transform a general and finite one for solving a wide range of differential and integral equations.
Course Outcome for Semester-II	
2T1 Algebra -II	**CO1:** To understand the unique factorization domains, principal Ideal domains and Euclidean domains. **CO2:** To analyze properties of algebraically closed fields, splitting fields. **CO3:** To compute Galois groups in simple cases and apply the group-theoretic information to comprehend results about fields. **CO4:** To develop knowledge of Ruler and compass constructions.
2T2 Real Analysis -II	**CO1:** To gain knowledge of measurable sets and measurable functions. **CO2:** To acquire mastery on Lebesgue Integral. **CO3:** To study Convex functions, Lp-spaces. **CO4:** To learn Baire category theorem and its application. **CO5:** To understand Riesz-Fischer theorem and approximation in Lp-spaces.
2T3 Topology-II	**CO1:** To study continuous functions, product topology and metric topology. **CO2:** To gain knowledge of connectedness, compactness. **CO3:** To achieve the zenith in treating Countable Axioms, and Separable, Regular and Normal spaces. **CO4:** To understand theorems like The Urysohn's Lemma, Urysohn's Metrization Theorem.
2T4 Differential Geometry	**CO1:** To study the theory of curves and surfaces in three spaces. **CO2:** To analyse global properties of curves such as the four-vertex theorem. **CO3:** To understand the fundamental quadratic forms of a surface, intrinsic and extrinsic geometry of surfaces, and the Gauss-Bonnet theorem. **CO4:** To understand two dimensional Riemannian manifolds. **CO5:** To analyse problem of metrization and of continuation.
2T5 Classical Mechanics	**CO1:** To learn D-Alemberts principle and formulate Lagranges equation of motion. **CO2:** To understand Legendre transformations and solve different problems. **CO3:** To formulate Hamiltonian equation and understand its physical significance. **CO4:** To gain knowledge of Canonical transformations and solve problems on it.

Course Outcome for Semester-III	
3T1 Complex Analysis	**CO1:** To explain the concepts of Analytic Functions, and Elementary Functions. **CO2:** To understand Mobius Transformation and mappings of regions under some special transformations. **CO3:** To construct the proofs of Cauchy Integral Formula, Liouvellis Theorem, and solve problems related to Taylor and Laurent series. **CO4:** To identify different types of singularities, zeros of analytic function. **CO5:** To study the maximum principle and Schwarz's lemma.
3T2 Functional Analysis	**CO1:** To understand Banach Spaces, The Hahn-Banach Theorem. **CO2:** To study the open Mapping Theorem, Hilbert Spaces. **CO3:** To analyse different operators and their properties **CO4:** To understand Category theorem, uniform boundedness theorem, strong and weak convergence.
3T3 Mathematical Methods	**CO1:** To attain mastery in Fourier integral theorem and its application. **CO2:** To attain mastery in application of Laplace and Fourier transform. **CO3:** To study applications of finite Sturm-Liouville transforms. **CO4:** To study application of finite Hankel transform, finite Legendre transform and finite Mellin transform.
3T4 Core Elective General Relativity	**CO1:** To describe Riemannian geometry in tensor formalism. **CO2:** To define energy momentum tensor of various fluids and understand gravity due to curved spacetime. **CO3:** To obtain Einstein's field equations by different approach and Poisson's equations as an approximation to Einstein field equations. **CO4:** To solve Einstein's field equations for static spherically symmetric Schwarzschild space-time and calculate the advances of perihelion, relativistic frequency shifts for sources moving in a gravitational field, as well as the bending of light passing through a spherical mass distribution.
3T5 - Operational Research-I	**CO1:** To understand basics and formulation of linear programming problems and revised simplex method (with and without artificial variables). **CO2:** To apply simplex method to solve real life problems. **CO3:** To study integer programming and its application. **CO4:** To understand the concept of Bounded variable technique for L.P.P. and unconstrained optimization. **CO5:** To study of Queuing Theory and Poisson queueing models- M/M/1, M/M/C for finite and infinite queue length.
Course Outcome for Semester-IV	
4T1 - Dynamical Systems	**CO1:** To attain mastery in Dynamical systems, vector fields, its fundamental theorem, and Existence & uniqueness of a solution.

	CO2: To study of Stability and Liapunov function of dynamical system. **CO3:** To understand the Poincare Bendixson theorem and its applications. **CO4:** To analyze Autonomous equations and differentiability of flows.
4T2 – Partial Differential Equations	**CO1:** To classify partial differential equations and transform into canonical form. **CO2:** To solve linear partial differential equations of both first and second order. **CO3:** To solve boundary value problems for Laplace's equation, the heat equation, the wave equation by separation of variables, in Cartesian, polar, spherical and cylindrical coordinates.
4T3 – Advanced Numerical Methods	**CO1:** To obtain the solutions of Transcendental and polynomial Equations. **CO2:** To find solutions of system of equations using direct methods and Iteration methods. **CO3:** To attain mastery to solve problems using polynomial interpolation theory. **CO4:** To acquire knowledge of Numerical methods to find solution of integral Equations.
4T4 Core Elective-Cosmology	**CO1:** To study Einstein and de-Sitter static models and their comparison with actual universe. **CO2:** To study Cosmology, master the concepts of Cosmological principle, Hubble law, Weyl's postulate, deceleration parameter, etc. **CO3:** To understand the nature of Robertson-Walker metric in view of closed, open and flat models of the universe. **CO4:** To acquire knowledge about steady state universe and its viability vis-a-vis actual universe.
4T5 - Operations Research–II	**CO1:** To identify and develop operations research model describing a real-life problem. **CO2:** To understand the mathematical tools that are needed to solve various optimization problems. **CO3:** To solve various linear programming, transportation, assignment, queuing, inventory, and game problems related to real life.

CHEMISTRY

PROGRAMME OUTCOME FOR M.Sc. CHEMISTRY

Department of Chemistry	After successful completion of two years degree program in the subject Chemistry the students are able to:
Program Outcomes	PO1: The Programme enables the students to understand basic facts and concepts in Chemistry. PO2: To develop the ability to apply the principles of Chemistry, to develop problem solving skills, to become familiar with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies. PO3**:** Students know about importance of Qualitative and Quantitative analysis used for different samples like soil samples, alloys estimation, water analysis. New technological world using nanomaterial, properties of Nano materials magnetic properties of materials. PO4: Thermodynamic and Thermochemistry useful in our daily life and related with our surrounding atmosphere. PO5: Nuclear Magnetic resonance spectroscopy allows the molecular structure of a material to be analyzed by observing the measuring the interaction of nuclear spins when placed in a powerful magnetic field and extensively used in medicine in the form of magnetic resonance imaging and for analysis of chemicals. PO6: Bioinorganic chemistry provides knowledge about significant role of metal ions in biological system which is required for the maintenance of life. PO7: Student can describe the process It also develops skills in the proper handling of apparatus and chemicals and also gets exposure to the different processes used in industries and their applications. PO8: Use modern techniques used in analysis of materials and handling of the new equipment during the practical. PO9: To inculcates the scientific temperament in the students during the experiments and how to correlate with outside the scientific community.
Program Specific Outcomes	**PSO1:** The M.Sc. programme enabled the students to enhance their critical thinking, during the two years period of study and the curriculum motivates the mental thoughts and suppositions of the students. This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and

	validity of the practical knowledge. This Analysis leads to take decisions at intellectual, directorial and personal from different perspectives of life. PSO2: Understand the basic principles and concepts underlying the inorganic, organic, physical and analytical chemistry. PSO3: Comprehend the applications of chemistry in various walks of life. PSO4: Students gained functional knowledge of the fundamental theoretical concepts and experimental methods of Chemistry. PSO5: The students will be benefited to equip themselves to job requirements in the quality control, analytical laboratory or production wing of any Chemical or Pharmaceutical Industry. PSO6: Able to use instrumental methods of chemical analyses. Students acquire fundamental knowledge through theory and practical.
Course Outcomes M. Sc. CHEMISTRY	
Course Outcome for Semester-I	
PAPER-I: INORGANIC CHEMISTRY (1T1)	1. Predict the nature of bond and its properties through various electronic structural methods; bonding models. 2. Design new coordination compounds based on a fundamental understanding of their electronic properties. 3. Appreciate specialized and advanced topics in inorganic and coordination chemistry 4. Correlate structure and bonding with reactivity of boron clusters. 5. Analyze structures of various binuclear, trinuclear, tetranuclear, pentanuclear & hexa-nuclear compounds with reference to halide, oxide, alkoxide and acetate metal clusters.
PAPER-II: ORGANIC CHEMISTRY (1T2)	1. Implement rules of aromaticity to various organic molecules. 2. Sketch organic molecules in different projection formula and assign its configuration. 3. Apply their understanding about the organic reactions of industrial significance with respect to the chemo- selectivity, regioselectivity and enantioselectivity. 4. Analyze the product distribution and the stereochemistry of various organic products. 5. Evaluate the relationship between structure and reactivity of organic compounds.

PAPER-III: PHYSICAL CHEMISTRY (1T3)	4. Understand, analyze and exercise the principles of classical thermodynamics in various applications 5. Understand the concept of Gibbs free energy or Gibbs function and Phase equilibria. 6. Understand the concept of adsorption and its application in surface chemistry. 7. Analyze and understand the characterization techniques for polymer. 8. Understand the principles of chemical kinetics and their applications in chemical dynamics.
PAPER-III: ANALYTICAL CHEMISTRY (1T4)	3. Select a specific analytical technique based on sample and target analyte 4. Develop analytical ability and critical thinking in selection of statistics and their use in making interpretation meaningful and productive. 5. Understand the principles of chromatographic techniques. 6. Select proper chromatographic technique among the available techniques. 7. Explain the logic behind working of indicator used in each type of titration 8. Apply electro analytical techniques based on conductance and emf measurements.
PRACTICAL-I: INORGANIC CHEMISTRY (1P1)	1. To prepare various complex and carry out characterization of complex. 2. To understand the separation and determination of metal ion from alloy solution by using volumetric gravimetric, spectrophotometric analysis. 3. To understand qualitative analysis of radicals by using semi microanalysis. 4. To understand the micro scale techniques for detection of radicals.
PRACTICAL-II: PHYSICAL CHEMISTRY **(1P3)**	1. Understand various principles involved in small experiments and their interpretations. 2. To handle different apparatus and instruments with care and precision. 3. Interpret the results obtained and access the outcome. 4. Implement and relate the theoretical principles in experiments.

Course Outcome for Semester-II	
PAPER-I: INORGANIC CHEMISTRY (2T1)	1. Recollect the principles of electronic structure, bonding and reactivity of coordination complexes 2. understand the concept of synthesis and stability of transition metal organometallic complexes 3. develop the possible catalytic pathways leading to desired products 4. apply the principles of transition metal coordination complexes to derive reaction mechanisms. 5. identify the structural aspects of metal carbonyls and metal nitrosyls.
PAPER-II: ORGANIC CHEMISTRY (2T2)	1. Predict the orientation and stereochemistry of the product of addition and elimination reaction 2. Apply enolate chemistry to achieve molecular complexity 3. Design organic reactions in order to achieve the required product(s) 4. Formulate green chemistry synthesis to increase atom economy 5. Application of free radicals in functional group transformation
PAPER-III: PHYSICAL CHEMISTRY (2T3)	1. Understand the quantum mechanical applications in actual practice and in spectroscopy 2. Understand the states of solid various crystal structure and pattern in them 3. Understand the concept of ideal and non-ideal solutions 4. Understand the theories of electrolytes 5. Understand the thermodynamics of real processes 6. Understand the distribution laws and their applications 7. Understand the fundamentals of Nuclear sciences
PAPER-IV ANALYTICAL CHEMISTRY (2T4)	1. To understand and execute the techniques of sampling of gases, liquids, solids and particulates. 2. To understand various stoichiometric reactions and calculations. 3. Suggest most suitable modern chromatographic technique for separation of analyte from matrix.

	4. Explain various types of columns and detectors used in chromatography. 5. Discuss molecular absorption and molecular emission spectroscopy principle and applications. 6. Design experiments based on spectrophotometry and polarographic analysis. 7. Formulate experiments based on optical and electro analytical techniques.
PRACTICAL III: ORGANIC CHEMISRTY(2P2)	1. Design the methodologies to develop eco-friendly and green technology for industry and research. 2. Develop methods and remedies for reactions with environmental pollution. 3. Improve scientific practical information orally and in writing. 4. Get awareness about laboratory safety and handling of chemicals. 5. Apply different purification techniques recrystallization, distillation and solvent extraction.
PRACTICAL-IV: ANALYTICAL CHEMISTRY (2P4)	1. Carry out calibration of glassware available in the laboratory. 2. Analyze the data obtained through experiments using statistical analysis parameters. 3. Estimate quantitatively analyte present in different samples using classical and instrumental methods of analysis. 4. Design experiments based on classical and instrumental techniques. 5. Understand the principles involved in visual and instrumental volumetric techniques.
Course Outcome for Semester-III	
PAPER-I: ORGANIC CHEMISTRY (3T1)	1. Identify a pericyclic reaction and categorise it as a cycloaddition, a group transfer reaction, a sigmatropic rearrangement, or an electrocyclic reaction 2. Apply frontier molecular orbital (FMO) theory to rationalise selectivity and reactivity aspects of pericyclic reactions. 3. Understand the reaction mechanism of various common reagents employed in organic synthesis

	4. Understand the reactivity of sulphur, silicon and phosphorous elements. 5. Evolution of cross-coupling reactions in modern organic synthesis
PAPER-II: ORGANIC CHEMISTRY (3T2)	1. Learn the important aspects of steroids and terpenoids. 2. Understand the biosynthesis of natural products. 3. Analyze the enzyme reactions involved in various life processes 4. Illustrate the structure elucidation of unknown naturally occurring organic compound 4. Apply the knowledge of organic reactions for the total synthesis of useful natural products
PAPER-III: POLYMER CHEMISTRY (3T3)	1. Understand the principals involved Polymer design and development. 2. Get an idea about various polymers and their uses. 3. Explain the various methods of polymer preparation. 4. To provide an idea about various utilities and preparation of industrially suitable polymers
PAPER-IV: SPECTROSCOPY I (3T4)	1. Understand interaction between electromagnetic radiation with matter. 2. Calculate the energy of radiation in various units and interconvert them. 3. Discuss various types of sources and detectors used in different spectroscopies. 4. Summarize the principles involved in UV-visible and IR spectroscopy. 5. Apply proper spectral techniques depending on type of sample and required information
PRACTICAL-I: ORGANIC CHEMISTRY I(3P1)	1. Meticulously record physical constants 2. Perform qualitative estimation of functional groups 3. Monitor the progress of reaction 4. Recrystallize /distill the separated compounds 5. Extend these skills to organic synthesis
PRACTICAL-II: POLYMER CHEMISTRY **(3P3)**	1. To perform synthesis and characterization of different Polymers. 2. To monitor Thermal analysis, crystallinity, of Polymer 3. To understand kinetics of polymerization. 4. To understand magnetic and electrical properties of polymer

Course Outcome for Semester-IV	
PAPER-I: ORGANIC CHEMISTRY (4T1)	1. Understand the applications of enolates in C-C bond formation 2. Demonstrate stereochemical description of common organic reactions 3. Understand the use of resolution for separation of racemic mixtures. 4. Recognize the chemical reactions of carbonyl compounds and alkenes under photochemical conditions.
PAPER-II: ORGANIC CHEMISTRY (4T2)	1. Understands the reactivity of heterocyclic compounds in various reaction conditions 2. Understand the electrophilic, nucleophilic reactions and synthesis of various heterocycles. 3. Design the synthesis of drugs and natural products 4. Demonstrate the applications of organometallic reagents in C-C bond formation
PAPER-III: POLYMER CHEMISTRY (4T3)	1. Understand the principles involved in polymerization processes. 2. Classify the need of techniques required for polymerization. 3. To characterize the various polymers 4. Elaborate specific polymers and their utility at various places
PAPER-IV SPECTROSCOPY I (4T4)	1.Interprete the structures of simple molecules using physical methods of analysis 2. Understand and interprete the NMR data 3. Analyse X ray diffraction data 4. Develop the skills of analytical ability 5. Execute out the combined application of spectral method
PRACTICAL III: ORGANIC CHEMISRTY(4P1)	1. Meticulously record physical constants 2. Perform qualitative estimation of functional groups 3. Monitor the progress of reaction 4. Recrystallize /distill the separated compounds 5. Extend these skills to organic synthesis
PROJECT (4S1)	1. Carry out detailed literature survey on selected project topic. 2. Identify the gap in literature to design a project proposal. 3. Carry out experiments to obtain necessary information. 4. Put all the obtained results in systematic

	manner in the form of a project report. 5. Present the project report in front of audience in the form of PowerPoint presentation. 6. Write own research paper based on project

IIT SPOKEN TUTORIAL CERTIFICATE COURSE

Department of Computer Science	Successful completion of IIT Spoken Tutorial certificate Course a student should be able to know:
Program Outcomes	**PO-1** Students will learn different software's in short and simple steps. **PO-2** To build the necessary skills set and analytical abilities for developing Computer based solutions for real life problems. **PO-3** To train students in professional skills related to Software Industry. **PO-4** To help the students to build-up a successful career in Computer Science. **PO-5** To create new opportunities for the students to get better future job opportunities. **PO-6** To train the students in advance programming languages and handling Free open-source software's. **PO-7** Students those who have completed their training of the course will get participation certificate.
Program Specific Outcomes	**PSO1**-Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems. **PSO2-** To Enhance Programming skills, applications and adapt new computing technologies for attaining professional excellence **PSO3**- Practice for continued professional development. **PSO4**- Apply fundamental principles and methods of Computer Science to a wide range of applications. **PSO5**- Impart an understanding of the basics of our discipline.

CERTIFICATE COURSE IN ADVANCED CPP

Course Outcome for Advanced CPP	
Course X I Advanced CPP	**CO1**- After completion of the course students will develop the ability to make their own applications for business and industry using Advance CPP. **CO2-** Students will be able to enhance their reading, listening and programming Skills. They can also understand the Powerful features, simple syntax of these programming languages. **CO3-** Students can enhance their employability skills at the end of the course. **CO4-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN ARDUINO

Course Outcome for Arduino	
Course V Arduino	**CO1:** After completion of the course students will display the ability to write their own programs which help them for building digital devices and interactive objects that can sense and control physical devices. **CO2** - After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students will be able to enhance their reading, listening and programming Skills. **CO4-** Students can enhance their employability skills at the end of the course as hardware professional.

CERTIFICATE COURSE IN C AND CPP

Course Outcome for C and CPP	
Course II C and CPP	**CO1 -** After completion of the course students will be able to develop their own applications for business and industrial by the use of this language. **CO2-** After Completion of online assessment test students will get passing/completion certificate and participation certificate will get them after completion of their training **CO3-** Students will be able to enhance their reading, listening and programming Skills. They can also understand the powerful features, simple syntax of these programming languages. **CO4 -** Students can enhance their employability skills at the end of the course. **CO5-** Students can widely use this in the process of development of operating systems.

CERTIFICATE COURSE IN INKSCAPE

Inkscape	
Course III Inkscape	**CO1:** After completion of the course students can use Inkscape Graphics art and design software application for the editing and creation of original images, icons, graphical

	elements of web pages and art for user interface elements. **CO2:** At the end of this course student can work on desktop publishing like creating banners, posters, brochures, CD cover image, artwork for textiles, etc. **CO3:** Students can enhance their employ-ability skills after concluding the course. **CO4:** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN INTRODUCTION TO COMPUTERS

Course Outcome for Introduction to Computers	
Course I Introduction to Computers	**CO1 -** After the completion of this certificate course students can practically do setup the configuration of output devices like printer with the machine. Along with this they will also get the knowledge about the functioning of basic parts of a computer, connecting the parts using cables. **CO2-** Students will be able to work with the computer environment easily. They can enhance their communication computational skills. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO4 -** Students will be able to enhance their reading, listening Skills. **CO5-** Students can enhance their employability skills at the end of the course.

CERTIFICATE COURSE IN JAVA

Course Outcome for Java	
Course VIII Java	After successful completion of the course, the students are able to **CO1-** Develop reusable programs Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes. **CO2-** Students will be able to Design event driven GUI and web related applications which imitate the real word scenarios. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

	CO4- Enhance their reading, listening and programming Skills. **CO5-** They can also understand the Powerful features, simple syntax of these object oriented programming languages using the concepts of inheritance, polymorphism, interfaces and packages. **CO6-** Students can enhance their employability skills at the end of the course.

CERTIFICATE COURSE IN LATEX

Course Outcome for LaTex	
Course X LaTex	**CO1-** At the end of this course students can prepare reports, letters and presentations especially useful for persons engaged in writing/ publishing documents from science/ arts/ commerce fields. **CO2-** Students can enhance their knowledge about the functionality of typesetting software. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO4-** Students will be able to enhance their reading, listening and programming Skills. **CO5-** Students can enhance their employability skills at the end of the course..

CERTIFICATE COURSE IN LIBREOFFICE SUITE [BASE]

Course Outcome for LibreOffice Suite [Base]	
Course IV LibreOffice Suite [Base]	**CO1-** At the end of this course student trains in computer usage skills in LibreOffice suite base. **CO2-** After the Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3**- Students will be able to enhance their reading, listening and programming Skills. **CO4** - Students can enhance their employ-ability skills at the end of the course. **CO5-** Students will be able to understand full-featured desktop database front end which is designed to meet the needs of a broad array of user's . They can represent and store their information using this in a systematic manner. .

CERTIFICATE COURSE IN LINUX

Course Outcome for Linux	
	CO1- Students will be able to understand the basic commands of Linux operating system and can write shell scripts. **CO2 –** Students will be able to create file systems, directories and understand how to operate them. **CO3-** Students will be able to create processes background and fore ground etc. by fork () system calls . **CO4-** Students can enhance their employability skills at the end of the course. **CO5-** Students can widely use this in the process of development of operating systems. **CO6–** After Completing the course final examination students will get passing certificate if they scored 40%marks and participation certificate to all those who were admitted for the course.

CERTIFICATE COURSE IN PHP AND MYSQL

	Course Outcome for PHP and MYSQL
Course VI PHP and MySQL	**CO1-** After completion of the course students develop their own applications and website. **CO2-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students learn to unleash the true power of dynamic page development with MySQL database integration. **CO4-** Students can enhance their employ-ability skills after concluding the course. **CO5** - Students are also taught how to create database connections and to execute SQL statements directly from PHP scripts

CERTIFICATE COURSE IN PYTHON

Course Outcome for Python	
Course XII Python	**CO1-** This course Explain the basic principles of Python programming language and Implementation of database and GUI applications. **CO2-** It help the students how to implement the concept of

	object oriented in python. . **CO3-** At the end of the course students understood how to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. **CO4-** Students can enhance their employability skills at the end of the course. **CO5-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN RDBMS

Course Outcome for RDBMS	
Course VII RDBMS	**CO1-** After completion of the course students can with all modern database systems like MS SQL Server, IBM DB2, Oracle, MySQL, PostgreSQL and Microsoft Access. **CO2-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students can work with industry database management after the successful execution of this course. **CO4-** Students can enhance their employ-ability skills at the end of the course. **CO5-** Design and Develop Applications using AWT controls in Java.

UGC SANCTIONED CERTIFICATE AND DIPLOMA COURSES
CERTIFICATE COURSE IN BIOINFORMATICS

Department of Computer Science	Successful completion of Certificate Course in Bioinformatics a student should be able to know:
Program Outcomes	**PO-1** This certificate course is targeted towards imparting theoretical as well as practical knowledge and required skills of Bioinformatics to its participants. **PO-2** It provides basic knowledge of fundamentals of computing & networking and various operating systems like WINDOW, LINUX and UNIX. **PO-3** To provide insights to programming languages like

	BioPerl and BioJava in developing Bioinformatics tools. **PO-4** To introduce the students to MarkUp languages like HTML and XML.
Program Specific Outcomes	**PSO1**- To build in candidates a strong foundation in interdisciplinary sciences such as Computer Sciences and Biological Sciences, to develop accelerated and precise technologies for industrial problems, and prepare them for productive careers in fields of biotechnology, pharmaceutical, bioinformatics, Research, and healthcare industries. **PSO2-** Strengthening ongoing university research in the area of bioinformatics, in particular and life science in general. Further it will be helpful in creating an advanced research facility to carry out research in frontier areas of bioinformatics, biotechnology, and molecular modelling.
for Certificate Course in Bioinformatics	
Paper I Computer Aided Bioinformatics	**CO1 –** Students will be able to learn computer networking its architecture and protocol types. **CO2-** Students gain knowledge about MarkUp languages to develop basic web page. **CO3-** Students learn about basics of programming languages like C, CPP, JAVA, Bioperl etc which would help them to develop different tools in bioinformatics. **CO4-** At the end of the certificate course students will be able understand the basic concepts of operating system and its working with applications.
Paper II Basics of Bioinformatics	**CO1 –** After Completion of this course students will be able to understand the basics of Bioinformatics and nucleotide sequence and its collaboration. **CO2-** Students learn about the databases like NCBI and EBI in details and its working. **CO3-**. At the end of this course students will be able to understand visualization tools which are used for nucleic acid as well as protein. **CO4-** Students understood the applications of bioinformatics in details and what are the future job opportunities in the market.
Paper III Public Domain Resources in Biology	**CO1** – Students will be able to understand how to acquire information from public domain biological databases by using computers and internet at the end of this course. **CO2-** Students will be able to understand how to organize

	data and submission of data in the data bases like GenBank , EMBL, DDBJ, Biological databases II: **CO3-.** Students will be able to understand the details of protein sequence databases and its organization. **CO4-** After Completion of this course students will learn protein sequence data structure and they also help to get better opportunities in IT industry.

DIPLOMA IN BIOINFORMATICS

Department of Computer Science	**Successful completion of Diploma in Bioinformatics a student should be able to know :**
Program Outcomes	**PO-1** This certificate course is targeted towards imparting theoretical as well as practical knowledge and required skills of Diploma in Bioinformatics to its participants. **PO-2** It provides basic knowledge of Sequence analysis, prediction methods of proteins, Functional Genomics and its applications. **PO-3** To provide insights to Derived Databases with its Sequence and Structure. **PO-4** To introduce the students to Various Data Models which are used for Data Storage.
Program Specific Outcomes	**PSO1**- To build in candidates a strong foundation in interdisciplinary sciences such as Computer Sciences and Biological Sciences, to develop accelerated and precise technologies for industrial problems, and prepare them for productive careers in fields of biotechnology, pharmaceutical, bioinformatics, Research, and healthcare industries. **PSO2-** Strengthening ongoing university research in the area of bioinformatics, in particular and life science in general. Further it will be helpful in creating an advanced research facility to carry out research in frontier areas of bioinformatics, biotechnology, and molecular modelling.
DIPLOMA IN BIOINFORMATICS	
Paper I Sequence Analysis and Prediction Methods of Protein	**CO1 –** After completion of this course many career opportunities are available for the students as Scientific Curator, Gene Analyst, Protein Analyst, Phylogenetist, Molecular Modeller, Database Programmer and Structural Analyst.

	CO2- Students will be able to understand the concept protein structure prediction. **CO3-** Students learn about basics of Sequence Analysis, Phylogeny, Protein Structure Prediction, Genome Mapping, Data bases used for mapping and its applications in bioinformatics. **CO4-** At the end of this course students understand how multiple sequence alignment has done.
Paper II Functional Genomics and Application	**CO1-** Students will be able to understand about genetic maps and types of maps with genomic mapping. **CO2-** Students understood the concept of prediction of ORF, Genes and Prediction algorithms. **CO3-** After completion of this course students understood genomic databases and it's working. **CO4-** Students will be able to understand what is microarray technology and applications.
Paper III Data Models and Algorithm	**CO1-** After completion of this diploma course in bioinformatics students will be able to understand the basics of DBMS along with definition of data, components, architecture, representation of data, access of data and view. **CO2-** Students will understand the concept related to data, Meta data, Algorithms used for Analysis of the Data and representation of data using different data models. **CO3-** Students understand how to analyze data using different algorithms and brief about data bases like BLAST and FASTA **CO4-**Students understood about derived databases and difference between primary and secondary databases.

CERTIFICATE COURSES DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN, RTM NAGPUR UNIVERSITY, NAGPUR

CERTIFICATE COURSE IN FRESH WATER FISH CULTURE

Department of Zoology	After successful completion of Certificate Course in Freshwater Fish Culture in the subject Zoology the students are able to:
Program Outcomes	**PO1:** Students know about fundamentals of inland fisheries practices so as to increase fish production to meet protein malnutrition as well as providing job opportunities **PO2:** Impart knowledge for developing proficiency and management practices in food fishes **PO3:** It can help for getting self-employment through different farming schemes **PO4:** It provide detail knowledge about tools and techniques in freshwater fish culture **PO5:** Develop organizational capabilities in fisheries workers for assisting fishermen
Program Specific Outcomes	**PSO1:** It help to get Train manpower for the development of inland fisheries **PSO2:** It increase knowledge regarding the fish varieties used for culturing **PSO3:** It help to maintain production and supply demand regularly. **PSO4:** Understand good laboratory practices related to water parameters which must be check regularly. **PSO5:** This sector can help to get commercial valuable by-products.
Course Outcomes of certificate course in vermicomposting and vermiculturing	
PAPER:	**CO1:** Study of Classification, general characteristics of freshwater fishes **CO2:** pond preparation and its maintenance **CO3:** To know Biology and importance of fish seed production **CO4:** To learn method of fish harvesting and other operational techniques **CO5:** Study of various pest and diseases.
Lab Work:	• Identification of fishes • Identification of Developmental stages in fishes • Water parameters • Physicochemical analysis of pond soil to determine its texture • Qualitative and quantitative study of Zooplankton • Crafts and gears used in fresh water fish capture • Visit to Fish breeding center

CERTIFICATE COURSE IN 'IOT DEVICES'

Electronics	After successful completion of 43 Hrs. certificate course in IoT Devices the students are able to:
Program Outcomes	PO1: Students will be able to understand the application areas of IoT · PO2: Students will be able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. PO3: Students will be able to understand the building blocks of Internet of Things and characteristics
Program Specific Outcomes	PSO1: After completing this program, interested students can design and construct automation project . PSO2: Students can become entrepreneur and can work on multidisciplinary projects.
Course Outcomes	
Unit 1	CO1: To enrich the students with the basic requirement of for Internet CO2: To familiarize them about the internet and IoT Protocols and Addressing Layers CO3: To explore them with different development board and their specifications.
Unit 2	CO1: To enrich the students about the basic concept of sensor. CO2: To familiarize with different types of sensors and their uses in different applications.
Unit 3	CO1: To enrich the students about the basic concept of Actuators. CO2: To familiarize with different types of Actuators and their uses in different applications.
Unit 4	CO1: To familiarize the students with interconnection and integration of the physical world and the cyber space. CO2: To learn how to design programs for various IoT application.

CERTIFICATE COURSE IN BASIC SKILLS IN COMPUTER

Course Outcome for Basic Skills in Computer	
Course I Basic Skills in Computer	**CO1 -** Recognize when to use each of the Microsoft Office programs to create professional and academic documents. **CO2-** Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards. **CO3-** Apply skills and concepts for basic use of computer

	hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.

CERTIFICATE COURSE IN BASIC OF JEWELLERY DESIGN AND MAKING

	After successful completion of 43 Hrs Certificate Course in
Program Outcomes	**PO1:**To Produce jewellery designers and creators to the increasing demands and for the better prospects of this industry which is growing jewellery industry, which has transformed itself from a traditional small scale operation to a segment, which has tremendous future potential. **PO2:** .To introduce students of the Nagpur to the vast and promising field of jewellery designing and making. **PO3:** Provide Basic knowledge of jewellery designing and making to generate interest of students for opting this field as their carrier.
Program Specific Outcomes	**PSO 1:** Provide Basic knowledge of jewellery designing and making to generate interest of students for opting this field as their carrier. **PSO 2:**To impart basic entrepreneurship skills and professionalism in the students. **PSO3 :**Exhibit the knowledge and understanding of contemporary jewellery as well as history of jewellery designing. **PSO 4:**Demonstrate aesthetic qualities of jewellery and various jewellery components as well as develop the aesthetic skills of students .
Course Outcomes	
JEWELLRY DESIGNING	**CO1** :Student learn Elements and principles of design Students will be able to create simple manual designs (mini port folio) of their own. Students will have basic knowledge about raw material required for jewellery making as well as finishing.

	CO2: Motif development : Analytical and Methodical approach **CO3** : Rendering Jewellery : Metal finishes, Stone rendering, light, shades, Textures **C04:** Students know theVarious cuts of gemstones with measurements. Students will be able to create simple manual designs (mini portfolio) of their own. Students will have basic knowledge about raw material required for jewellery making as well as finishing.
JEWELLERY MAKING	**CO5:** Students learn the iintroduction To Beading Process **CO6:** Students learn actual process of making articles like Studs, bracelets

CERTIFICATE COURSE IN BASICS OF PUBLIC HEALTH AND NUTRITION

	After successful completion of 43 Hrs Certificate Course in Basics of public Health & Nutrition the students are able to:
Program Outcomes	**PO1:** To define vast and promising field of Nutrition and Public Health to the students of the Dharampeth Science College, Nagpur and also to Recognize current and emerging global concerns in public health nutrition. **PO2:** Provide Basic knowledge of Public Health & Nutrition & generate interest of students for opting this field as their carrier. **PO3:** Exhibit the knowledge and understanding of Public Health and Nutrition. **PO4:** Public health nutrition is the promotion of good health through primary prevention of nutrition-related illness in the population.
BASICS OF NUTRITION	**CO 1**: Students will learn Basic concepts of Nutrition, Macro &micro nutrient, concept of balanced diet **CO2**: Food Nutrition & Health (meaning, functions, concept, status, interrelationship between Nutrition & health) **CO3**: Role in Nutritional & Prevention (Healthcare worker, concept

BUDGETING STORING FOOD PRESERVATION **FOOD &HEALTH** **COMMUNITY HEALTH**	**CO**4: Deficiency in brief- (PEM, Kwashiorkar, marasmus, marasmus & kwashiorkor, nutritional anemia, iodine defi, B-Complex defi, Vit C, Vit D, Flourosis, Lathyrism, Measles, Diarrhoea, CVD, DM, Obesity, Maternal Malnutrition,) brief-overview/nature/clinical features/causes/treatment/prevention/nutri management/imp of healthcare & kitchen Planning. **CO5**:Students learnBudgeting (factors/principles/preparation),Selection (Macro/Micro/Protective foods/Accessories/Beverages/Regulatory foods) &Role of grades/brands/labels/in food purchasing **CO6**:Food spoilage(Factors/classification),storage)along withPreservation(principles/methods/home-scale/at low cost max of nutritional benefits/ prevent nutrient loses/ avoid wastage),contamination,adulteration **CO7**:Consumer protection/standards/quality control agencies/ certification/law's Nutritionalprogrammes/concept/components/organizations/assessments(In Brief-anthropometric/clinical methods/biochem/diet survey/growth monitoring charts/tools/techniques) **CO8**: Students learn Population dynamics & Epidemiology along with Family planning programmes and Personal hygiene/cleanliness/rest/exercise/mental health ,Food borne diseases along with Healthcare concept &organisation responsibility. **CO9:** Students healthcare programmes- intro/types of programmes/ other Income generated programme- special prog/ minimum needs/development prog/employment programmes/anti poverty programmes,Learning working with community/individuals/groups/agencies,Factors influencing community health & nutri(intro/determinants of community health, food behaviour) And Present nutrition prog(intro/concept/nutri prog/feeding prog/MDMP/ICDS/Evaluation) **CO10**: Learning working with community(intro/learning/working with community/identifying/evaluation),Community strategies in nutri and health education(intro, learning, working with community, identifying , evaluation)Factors affecting Community nutrition & health

CERTIFICATE COURSE IN COMMUNICATION SKILL AND PERSONALITY DEVELOPMENT

English	After successful completion of 43 Hrs. certificate course in Communication Skills and Personality Development the students are able to:
Program Outcomes	PO1: To learn about the components of effective communication skills like reading, writing, speaking and listening. PO2: To help the students to learn the barriers of communication and how to overcome them. PO3: To make them aware of the non-verbal communication that will help them to crack Group discussion and personal Interviews.
Program Specific Outcomes	PSO1: To provide knowledge regarding the understanding soft skills related techniques for communication for both personal situation (development) and at work place (for your professional career development). PSO2: To develop more confidence in expressing one's ideas and opinions by building trust in others.
Course Outcomes	
Unit 1	CO1: To introduce students with the methodology and different types of communication. CO2: To familiarize the students with Career Building and inter-personal communication. CO3: To acknowledge students with the barriers of communications and the strategies of overcoming them.
Unit 2	CO1: To provide the students with the concepts of non-verbal communication skills. CO2: To guide them about the techniques to improve non- verbal communication skills. CO3: To acknowledge students with the importance of Listening Skills and the major differences between Hearing and Listening
Unit 3	CO1: To enrich the students about the basic concept of Group Discussions. CO2: To provide the training regarding the Interview techniques of both Offline and Online Mode.
Unit 4	CO1: To familiarize the students about the methods and manners of online communication. CO2: To teach the learners the procedure of e-mail writing.

CERTIFICATE COURSE IN COMMUNICATION SKILLS

English	**After successful completion of 43 Hrs. certificate course in Communication Skills and Personality Development the students are able to:**
Program Outcomes	PO1: To be able to Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment. PO2: To emphasize the essential aspects of effective written communication necessary for professional success. PO3: To develop communicative skills and sustain comprehension of an extended discourse.
Program Specific Outcomes	PSO1: The main emphasis of this course is to enable students to learn the dynamics of social communication and to demonstrate the ability to learn the nuances of informal communication. PSO2: The Course is designed to enhance vocabulary skills and make students fluent, thereby improving receptive and expressive skills.
Course Outcomes	
Unit 1	CO1: Students will understand the process and nature of communication. CO2: Students will become masters of Formal and Informal Communication.
Unit 2	CO1: To develop the writing skills of the students so that they are capable of communicating efficiently. CO2: To be able to write a business communication given a specific audience and purpose
Unit 3	CO1: To identify other common methods of professional communication CO2: To discuss appropriate ways to communicate to an audience outside of the company
Unit 4	CO1: To discuss the different types of reports and their purposes CO2: To compose emails and memos intended for an audience within the same company or team as the writer

CERTIFICATE COURSE IN DEVELOPING COMPUTATION SKILLS USING SOFTWARE PACKAGES AND ONLINE GOOGLE TOOLS

	Course Outcome for Developing Computational Skills Using Software Packages & Online Google Tools
Course IV Developing Computational Skills Using Software Packages & Online Google Tools	Upon completion of the course students will be able to: **CO1-** . Recognize when to use each of the software packages to create professional and academic documents. **CO2-** Develop the computational skills and concepts using software packages and Google tools for the use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards. **CO3**- It helps to enhance their computational Skills. **CO4** - Students can enhance their employ-ability skills at the end of the course.

CERTIFICATE COURSE IN DIGITAL MARKETING

	Course Outcome for Digital Marketing
Course II Digital Marketing	**CO1 –** At the end of the course students can understand the impact of technology on the traditional marketing mix and become familiar with the elements of the digital marketing plan. **CO2-** After completion of the course students can develop their skill which helps to digital marketing to increase sales and grow their business. **CO-3** Students can help to understand how to reach your online target market and develop basic digital marketing objectives. **CO-4** Students can analyze the confluence of marketing, operations, and human resources in real-time delivery and comprehend the importance of conversion and working with digital relationship marketing. **CO-5** Demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs.

CERTIFICATE COURSE IN EXCEL FOR BANKING AND ACCOUNTS

Department of Computer Science	After successful completion of 60 hours. Certificate Course in Excel for Banking and Accounts the students are able to:
	PO1: Organize data in an easy-to-navigate way **PO2:** Do basic and complex mathematical functions **PO3:** Turn piles of data into helpful graphics and charts **PO4:** Analyze data and make forecasting predictions
Program Specific Outcome	**PSO1:** After the program completion, students will be able to work in the field of banking sector, in the CA office etc. **PSO2:** This program provides students to work in any office where Excel is used.
Course Outcomes Certificate Course in Excel for Banking and Accounts	
Unit I: Basic of MS-Excel & Conditional Formatting	**CO1:** Understands the working with Formulas, Functions, Operators **CO2:** Understand Conditional Formatting Rule: -rule, clear rules, manage rules, Top 10 items rule, Bottom 10 items Top 10%, Bottom 10%, Above Average, Below Average **CO3:** Able to sort and filter the huge data in the Excel Sheet. **CO4:** Understand the large and rich set of operators used in the Excel.
Unit II: Pivot Tables and Pivot Charts	**CO1:** Able to understand how to create pivot table and insert data in pivot table **CO2:** Understand to filter, group, ungroup and adding rearranging data in the pivot table **CO3:** Able to create pivot charts and understand difference between standard charts and pivot charts. **CO4:** understands all keyboard shortcuts used in Excel.
Unit III: Graphs and Statistical Analysis	**CO1:** Understands all statistical functions used in Excel Spreadsheet. **CO2:** Able to represents all data in graphical analysis. Understands different types of graphs and also which type of data should be represent in which type of chart. **CO3:** Able to use formulas which are used in Banking sector mainly in loan departments. **CO4:** Understands Correlation and Regression with Excel.
Unit IV: Advanced Excel	**CO1:** Able to understand role of management accounting and generation of MIS reports in Excel. **CO2:** Able to link number of worksheets in a single workbook and also to link number of workbook.

	CO3: Understands Automation in excel through Macros, VBA code, Macro Settings **CO4:** Understands all lookup functions like VLOOKUP, HLOOKUP, LOOKUP

CERTIFICATE COURSE IN FULL STACK DEVELOPER

	Course Outcome for Full Stack Developer
Course III Full Stack Developer	**CO1-** After the completion of the course students can develop /craft a portfolio of websites to apply for junior developer jobs. **CO2-** Students will be able to build ANY website. **CO3-** At the end of the course students can develop a hybrid Mobile APPS (iOS, APK) **CO4-** Students can enhance their employability skills in various areas like Code games & animations with CSS3 and jQuery of technology after the end of the course

CERTIFICATE COURSE IN LATEX

	After successful completion of 43 Hrs Certificate Course in LaTeX the students are able to:
Program Outcomes	**PO1:** Typesetting of journal articles, technical reports, thesis, books, and slide presentations. **PO2:** To control over large documents containing sectioning, cross-references, tables and figures. **PO3:** Typesetting of complex mathematical formulae. **PO4:** Typesetting of mathematics with AMS-LaTeX
Program Specific Outcomes	**PSO 1:** To understand LaTeX, a document preparation system for high - quality typesetting. **PSO 2:** To understand features of LaTeX. **PSO 3:** To have hands on experience to become a user of LaTeX.
Course Outcomes	
LaTeX.	**CO1:** Typesetting of complex mathematical formulae using LaTeX. **CO2:** Use tabular and array environments within LaTeX.

	CO3: Use various methods to either create or import graphics into a LaTeX document. **CO4:** Typesetting of journal articles, technical reports, thesis, books, and slide presentations. **CO5:** Automatic generation of table of contents, bibliographies and indexes.

CERTIFICATE COURSE IN PATTERN MAKING & EMBELLISHMENT

	After successful completion of 43 Hrs Certificate Course in Pattern Making & Embellishment the students are able to:
Program Outcomes	**PO1:** This certificate will teach the enrolled students the Basics of pattern making. PO2: Grading gives commercial value to garment industry. By introducing grading concept, we focus the commercial view point creating professionalism. PO3: It will generate self-employability. Students will learn knowledge of fabric embellishment which can be related to fashion designining
Program Specific Outcomes	**PSO 1:** Students can sell the different patterns of motifs and designs prepared by them. **PSO2**: Students will learn polymer clay art, the purpose of which is also embellishment of fabric. **PSO3**: With polymer clay art they can also design Jewellery (bracelets, earrings). **PSO4:** Traditional art of Maharashtra State i.e., WARLI will be introduced. Student will be able to use Polymer clay art on WARLI. **PSO5:** Students will learn the concept of Basic and Regional embroidery. **PSO6**: With the knowledge gained students can also engaged Hobby Classes and Tailoring.
Course Outcomes	
BASICS OF PATTERN MAKING	**CO1**: Introduction of Pattern making, Definitions, Advantages & Disadvantages, what is Commercial Pattern, Body types & measurements, essential & symbols of pattern pieces,

	Identification of Grain lines, Darts as well as cutting lines, stitching lines
	Pattern Layout with it's types
PATTERN GRADING	**CO2**: Students learn the meaning of Pattern Grading along with Grading Sizes
	CO3: Students gain the concept of Pattern grading in different sizes (concept necessary for starting self-employability & Textile Industry to manage any industry unit.
	CO4: Making of pattern Envelope
EMBROIDERY AND EMBELLISHMENT	**CO5**: Embroidery types: Basic & Regional embroidery (used to embellish the garment) **CO6**: Concept of **Polymer art its** steps in process and making (all together a new concept of embellishment) **CO7**: Concept of Traditional Art & Embroidery Students learnt **WARLI ART** (Concept of traditional & regional importance, can also be used as fabric Embellishment (popularity of that State) **CO8**: Structuring & making Designs Students prepare Portfolio for various Designs & Embroidery

CERTIFICATE COURSE IN R-CONSOLE SOFTWARE

CERTIFICATE COURSE IN SKILL DEVELOPMENT IN COMPETITIVE EXAM

English	**After successful completion of 43 Hrs. certificate course in Skill Development for Competitive examinations the students are able to:**
Program Outcomes	PO1: To develop understanding and problem-solving skills of students for Competitive examination. PO2: To develop their ideas and concepts about Competitive Aptitude. PO3: To develop their time management skill for Competitive examination

Program Specific Outcomes	PSO1: To help them to decide which specific Competitive Examinations can be shortlisted according to their aptitude. PSO2: To give them opportunity to appear for various Competitive Examinations for entry in services.
Course Outcomes	
Unit 1	CO1: To provide them knowledge about different topics covered in quantitative aptitude in various examinations. CO2: To familiarize them with short tricks to solve questions in lesser time. CO3: To introduce the students with the various methods to solve questions.
Unit 2	CO1: To enrich them with the concepts of critical thinking skills. CO2: To provide them knowledge about different topics covered in logical reasoning in various examinations. CO3: To guide them about the techniques to solve verbal and non-verbal reasoning questions.
Unit 3	CO1: To familiarize them with the concepts of English grammar & error detection from competitive examinations point of view. CO2: To provide them the training of reading comprehension and finding the answers of questions on it.
Unit 4	CO1: To introduce them different topics covered in general knowledge. CO2: To enrich them with most important topic current affairs.

CERTIFICATE COURSE IN VEDIC MATHEMATICS

	After successful completion of 43 Hrs Certificate Course in Vedic Mathematics the students are able to:
Program Outcomes	**PO1:** To increases speed and accuracy. **PO2:** To improved academic performance and instant results. **PO3:** To sharpens the mind, increases mental agility and intelligence **PO4:** To Increases visualization and concentration in children Increases speed and accuracy. Become a mental calculator
Program Specific Outcomes	**PSO 1:** To develop Analytical thinking through Vedic maths. **PSO 2:** To enhance computational skills in maths. **PSO 3:** To crack entrance of competitive exams. **PSO 4:** To Promote Vedic culture.

Course Outcomes	
Vedic Mathematics	**CO 1**: Develop the understanding of objectives and features of Vedic Arithmetic. **CO 2**: Recognize the meaning of mathematical sutras of vedic arithmetic in Sanskrit. **CO 3**: Understand the concept of addition using completing the whole Method. **CO 4**: Manage to solve the multiplication using vertically and crosswise and one more than the previous one method and demonstrate multiplication by 11, 12 and 13 by using Vedic sutras of multiplication. **CO 5:** Distinguish between squaring numbers ending in 5 and squaring numbers near the base and subbase and manage to perform squaring by Duplex Method and Cubing by Anurupyen Sutra.

CERTIFICATE COURSE IN VERMICULTURING AND VERMICOMPOSTING

Department of Zoology	After successful completion of Certificate Course in Vermicomposting and Vermiculturingin the subject Zoology the students are able to:
Program Outcomes	**PO1:** It help to protect environment and management of waste in sustainable way. **PO2:** Vermicomposting is eco-friendly activity as it does not contain chemical elements, to develop awareness among the people about vermicomposting and increase use of organic product. **PO3:** It helps to avoid the use of hazardous chemicals and its adverse effect on the environment, soil, and plants. **PO4:** Understanding the role of earthworm in modern farming **PO5:** The potential of vermicompost as an alternative to chemical fertilizers
Program Specific Outcomes	**PSO1:** Students know about of Earthworm and its varieties. **PSO2:** It develops student's interest in research activities. **PSO3:** Vermicomposting is eco-friendly activity and can be easily adopted by everyone. **PSO4:** Students are able to work for oneself or develop business **PSO5:** Students will also turn towards organic farming and also convince local farmers about vermicomposting

	importance.
Course Outcomes of certificate course in vermicomposting and vermiculturing	
PAPER:	**CO1:** Importance of Vermiculture/ Vermicompost **CO2:** Earthworm Biology and Rearing **CO3:** Methods of vermicomposting technology and its Application **CO4:** Vermicompost comparison with other fertilizers
Lab Work:	• Identification of different types of earthworms • Study of Systematic position and External characters of Eisenia foetida • Study of Life stages Eisenia foetida • Morphology and development of Earthworm. • Study of Vermicompost • Study of Vermiwash • Study of equipment and devices used in vermicomposting • Preparation vermibeds • Maintenance of vermibeds • Harvesting, packaging, transport and storage of Vermicompost • Separation of Earthworms from Vermicompost

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE,
North Ambazari Road, Near Ambazari Lake, Nagpur

NAAC ACCREDITED GRADE 'A' WITH CGPA 3.01 (Third Cycle)

CRITERION-II

Teaching- Learning and Evaluation

YEAR-1

2020-21

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

SSR: 2023 FOR NAAC FOURTH CYCLE

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

List of Documents(2020-21)

Sr. No.	Name of Document
1.	Link of Core Courses Subject Syllabi in UG and PG Programme. i. B.Sc. (Science) ii. B. Sc. (Home Science) iii. M. Sc. (Mathematics)
2.	List of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
3.	Syllabi of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
4.	Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution

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Dr. Akhilesh Peshwe
Principal

Principal
Dharampeth M.P. Deo Memorial
Science College, Nagpur,

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

Link for RTMNU syllabus for UG and PG

Graduation (UG)

Compulsory English
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Comp_Eng.pdf
Supp. Eng
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Supp_Eng.pdf
Hindi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Hindi_Syllabus.pdf
Marathi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/marathi_syllabus.pdf
Statistics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.A_%20B.Sc_Statistics_Semester_Pattern2013.pdf
Botany
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Botany_Semester_Pattern.pdf
Zoology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Zoology_semester_Pattern_2013.pdf
Microbiology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Microbiology_revised_syllabus_23092020.pdf
Physics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Physics_Semester_Pattern2013.pdf
Chemistry
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Chemistry_Semester_Pattern2013.pdf
B.Sc. Chemistry

B.Sc. Chemistry I Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry I Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_II_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSC_Chem_sem_II_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_II_paper_II_revised_syllabus_080920.pdf
Revised Complete U.G. Chemistry Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Revised_Complete_U.G.ChemistryRYSyllabus2018-19.pdf
Electronics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Electronics_Semester_Pattern2013.pdf
Mathematics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Mathematics_Semester_Pattern2013.pdf
Computer Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Computer_Science_Semester_Pattern2013.pdf
Home Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_home_science_syllabus_scheme_29092020.pdf

Post-Graduation (PG)

Mathematics
https://nagpuruniversity.ac.in/writereaddata/fckimagefile/MSc_Mathematics_Revised_Syllabus__CBCS____22nd_October_2021.pdf

Chemistry

https://www.nagpuruniversity.ac.in/links/Syllabus/Faculty_of_Science/006_CBCS_Syllabus_M.Sc.Chemistry.pdf

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

2020-21

LIST OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

Sr. No.	Course Name
1.	Introduction to Computers
2	C and CPP
3.	Arduino
4..	Latex
5.	Inkscape
6.	Libreoffice Suite[Base]
7.	RDBMS

LIST OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

Sr. No.	Course Name
1.	Certificate Course in Bioinformatics

LIST OF CERTIFICATE COURSES DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN

Sr. No.	Course Name
1.	Certificate Course in Communication Skills and Personality Development
2	Certificate Course in Vermiculturing and Vermicomposting
3.	Certificate Course in Basic Computer Skills
4..	Certificate Course in Vedic Maths
5.	Certificate Course in Latex

6.	Certificate Course in Basic of Jewellery Design and making
7.	Certificate Course in Fresh water Fish Culture
8.	Certificate Course in Basics of Public Health and Nutrition
9.	Certificate Course in Skill Development in Competitive Exams
10.	Certificate Course in Excel
11.	Certificate Course in R-Console Software
12.	Certificate Course in Digital Marketing /Cyber Security
13.	Certificate Course in Full Stack Developer
14.	Certificate Course in Communication Skills

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2020-21

Syllabi of Diploma / Certificate Courses

SYLLABUS OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

1. Certificate Course in Introduction To Computers

Sr. No.	Topic Name	Contents
1.	Printer Connection	How To Connect A Printer to Computer
2	Getting To Know Computer	Various Components of Computer How To Connect to the Various Components
3	Introduction To Gmail	How to ● Create A Google Account ● Login to Gmail ● Write an Email ● Send an Email ● View an Email ● Logout Gmail
4	Compose Options for Email	How to Format the Email Text Attach Files to Email Share Files Via Google Drive Insert a Photo or Link to an Email About the Compose Window Options.
5	Google Drive Option	Creating a Document ,a Spreadsheet And a Presentation Uploading Files Sharing Options

2. Certificate Course in C and CPP

Sr. No.	Topic Name	Contents
1	First C program	How to ● Write a simple C program. ● Compile it. ● Execute it. Some common errors and their solutions.
2.	First CPP program	How to ● Write a CPP program. ● Compile it. ● Execute it. Some common errors and their solutions.
3.	Tokens	How to define and use tokens. With the help of an example. Some common errors and their solutions.
4.	Functions in **C and CPP**	What is Functions? Syntax of function Significance of return statements. Examples on functions Some common errors and their solutions.
5	Scope of Variables in C and C++	Scope of Variables. Types of variables Global Variables. Local Variables. Example. Some common errors and their solutions.
6	Conditional Statements in **C and CPP**	How to execute a single statement? And a group of statements. Examples on it Some common errors and their solutions.
7.	Nested if and switch statement	Nested if statement Switch statement Some example on it
8.	Increment and Decrement Operators	Increment and Decrement Operators Some examples. Typecasting.
9.	Arithmetic Operators	Arithmetic Operators its types ● Additions. ● Subtraction. ● Division. ● Multiplication. ● Modulus.
10.	Relational Operators	Relational Operators ● Less Than < ● Greater Than> ● Less Than or equal to<= ● Greater Than or equal to >= ● Equal to== ● Not equal to !=

11.	Logical Operators	Logical AND. Logical OR. Logical MOT.
12.	Loops in **C and CPP**	For loop While loop Do….. while loop Through examples Some common errors and their solutions.
13	Array in **C and CPP**	Array. Declaration of an array. Initialization of an array. Through examples Some common errors and their solutions.
14.	2- Dimensional Array	What is a 2D array Through examples Some common errors and their solutions.
15.	String in **C and CPP**	What is string? Declaration of string. Initialization of a string. Through examples Some common errors and their solutions
16.	String Library Functions	String Library Functions. Some Examples.
17.	Structures in C	What is a structures? Declaration of structures. Through examples.
18.	Pointers in **C and CPP**	Pointers. To create pointers. And operations on pointers. Through examples.
19.	Functions call in **C and CPP**	Call by value. Call by reference. Through examples.
20.	Files in C	How ● To open a file. ● To read data from a file. ● To write data into a file. Through examples.

3. Certificate Course in ARDUINO

Sr. No.	Topic Name	Contents
1.	Introduction To Arduino	What is the Arduino Device? Features Of Arduino Componenets Of Arduino Board Microcontrollers Installation Of Arduino IDE On Ubuntu Linux OS

2	Ardunio Components And Ide	Set Up Physical Connection Between Arduino and a Computer Ardunio Hardware Ardunio Programming Language
3	First Arduino Program	How to Write an Arduino Program Compile The Program Upload The Program Blink An LED
4	Arduino With Tricolor Led And Push Button	How to connect a Tricolor Led to Arduino Board Write A Program to Blink a Tricolor Led Use Push Button To Control The Blinking.
5	Arduino With Lcd	Connect an LCD to Arduino Board. Write a Program to Display A text Message On The LCD.
6	Display Counter Using Arduino	Connect an LCD And a Push Button To Arduino Board. Write A Program to Increase the Count Whenever The Push button is Pressed.
7.	Seven Segment Display	Connect a Seven Segment Display to Arduino Board. Write A Program to Display Digits From 0 to 4 On Seven Segment Display.
8.	Assembly Programming Through Board	Interface a Seven Segment Display To Arduino Board. Write An Assembly Program To Display aDigit On Seven Segment Display. Display a Digit On the Seven Segment Display. Implement and Verify the and,Or,Xor Operations in Assembly. Implement and Verify Simple Combinational Logic.
9.	Digital Logic Design With Ardunio	Implement and Verify the and,Or,Xor Operations In Assembly. Implement and Verify Simple Combinational Logic.
10.	Avr Gcc Programming Through Arduino	Interface A Seven Segment Display Though Arduino Board. Write A AVR-GCC Program To Display On Seven Segment Display. Display Digits 0To 9 On Seven Segment.
11.	Interfacing Lcd Through Avr –Gcc Programming	Interface LCD Through Arduino Board Write An AVR-GCC Program to Display a Digit On LCD
12	Electronic Component And Connection	Bread Board and its Internal Connection Led On Bread Board Push Button Seven Segment Display On Bread Board

13	Overview Of Arduino	Various Electronic Components and their Connections Contents Related to Other Series
14	Mixing Assembly And C Programming	Write a Function in Assembly Routine to Perform Initialization Call that Assembly Routine In AVR-GCC Program to Blink The Dot Led of Seven Segment Display .

4. Certificate Course in Latex

Sr. No.	Topic Name	Contents
1.	Letter writing	How to write letters using Latex with options
2	Mathematical type setting	How to get into and leave from the mathematical mode The role of spaces and how to create them Mathematical symbols Amsmath package and its use in creating matrices
3	Equations in Latex	How to create the equations? Components of equations Details of components in equation.
4	Tables and Figures	How to create a table using tabular environment Ways of inserting information in table.
5	Beamer	How to create presentation in Latex and Beamer?
6	Bibliography	Creating reference using Latex and beaptec in details.
7.	Feedback diagram with Maths	The procedure of creating diagram /figure How to Create a figure (xfig)
8.	Latex on Windows using Text works	Download and install MikTex Write a basic Latex Documents using Texworks Configure MikTex to download missing packages.
9.	Report Writing	How to ● Use report and article class ● Create sections ● Automate the numbering of sections ● Create table of contents ● Create the title page

5. Certificate Course in INKSCAPE

Sr. No.	Topic Name	Contents
1.	Create and edit Shapes	Inkscape interfaces How to create basic shapes How to Fill color in the shape . Modify shapes using handles.

2.	Fill color and stroke	How to Fill color in objects. Give objects an outline. Various type of gradient. Stroke paint and stroke style.
3.	Create and edit multiple shapes.	How to Copy and paste objects. Duplicate and clone objects. Group and order various objects. Multiple selection and invert selection.
4.	Layers and Boolean operations	What are ● Layers. ● Filters. ● Boolean operations.
5	Align and Distribute Objects	How Align and Distribute Various Objects? Arrange objects in rows and columns. Set spacing between Objects. Create a tile pattern.
6	Create and format text	Inserting text. Formatting and aligning text. Spacing and bullet. Create a simple flyer at the end.
7.	Text tool features	Manual Kerning. Spell checking. Super script. Sub script.
8.	Basics of Bezier tool	Draw straight line and closed shapes. Draw curve line. Add, edit and delete node.
9.	Text Manipulations	Create text on path. Create text on shape. Image inside text. Text on perspective. Cut out text.
10.	Overview of inkscape	Draw an edit various predefined shapes.
11.	Create an A4 Poster	Change the document properties. Create an A4 poster. Save the poster in PDF.
12.	Create a 3 fold Brochure	Using guidelines and set them. Design a 3 fold brochure. Using importance of layers.
13	Design a CD label	Create a CD label Template. Design a CD Label. Save the file as PNG.
14.	Designing a Visiting card	Setting for a visiting Card. Designing a visiting Card. Setting to print multiple copies of Visiting card.
15.	Create pattern in inkscape	Cloning. Pattern along path. Spray tool.

		Path effect color.
16.	Special effects on text	Reflected text. Labeled text. Change the case of text.
17.	Trace bitmap in inkscape	Difference between raster and vector image. Various raster and vector format. Convert raster PNG image to vector.
18.	Warli art for textile design	Warli art for design for borders. Repeat pattern using cloning.
19.	Manage pattern for textile design	To create mango pattern. Draw using pattern along path.

6. Certificate Course in Libre office Suite

Sr No	Topic Name	Contents
1.	Introduction	What is Lireoffice Suite? Prerequisites For Using Base What Can You Do With Base? Relational Data Base Basics Create New Database Create A Table
2	Table And Relationship	Adding Data To A Table Define And Create Relationship Data Base
3	Modify A Simple Form	How to ● Enter Data Into A Form ● Modify Data In Form
4	Create A Simple Form	What is a Form? How to Create a Form Using the Wizard ?
5	Build A Complex Form With Form Control	Building a Complex Form Modify the Form
6	Add A List Box Form Control To A Form	How to Add a List Box Form Control ?
7.	Add Push Button To A Form	How to Add Push Button To A Form?
8.	Create Queries Using Query Wizard	How to ● Create Queries Using Query Wizard ● Select Field ● Set The Soring Order Of Fields ● Provide Search Criteria Or Conditions
9.	Enter And Update Data In Form	How to Enter And Update Data in a Form? How to Add Form Control in a Form?
10.	Create Queries In Design View	Create A Query By Using a Design View Add Table to the Query Design Window Select Field.
11.	Modify A Report	How to Modify a Report by Customizing the Layout and Look and Fill of the Report

12	Create Tables	How To Create A Table By Creating Views Using The Copy Method
13	Create Subform	How To Create A Subform With Example
14	Create Simple Queries In Sql View	How to ● Create Simple Queries In Sql View. ● Write Simple Sql ● Use Select and From And Where Clause.
15	Access Data Source	How to ● Access Other Data Sources ● Register .Odb Databases ● View Data Sources.
16	Database Maintenance	How to ● Maintain A Data Base ● Modify Data Base Structure ● Defragment A Database ● Take Backups
17	Indexes Table Filter And Sql Command Window	How To Indexes Table Filter And Sql Command Window
18	Database Design Purpose	What is Database Design ? Determining the Purpose of our Database Finding and Organizing information required Dividing the Information Into Table.
19	Database Design – Primary Key And Relationships	Database Design Turn Information Into Column Specify The Primary Key Set Up Database Relationship
20	Define –Refine Database Design And Normalization Rules	Refine The Database Design Apply The Normalization Rule And Test The Databases
21	Create Report	How To Create A Report Select ,Lable And Sort The Report Fields Select Report Layout Choose Report Type : Static Or Dynamic

7. Certificate Course in RDBMS

Sr. No.	Topic Name	Topic
1.	Installation Of PostgreSQL	Installation Of PostgreSQL Connect To PostgreSQL Database
2	Create Database Using Pgadmin	How to ● Connect to the Server ● Data base and its Objects ● Create a Data base ● Table and its Attributes ● Create a Table
3	Table With Primary Keys	How To : ● Insert Data ● Retrieve Data ● Data Redundancy ● Importance Of Primary Keys And ● Create A Table With Primary Keys
4	Select Clause	Basic Select Statement Select With Where Clause Select With Relational Operators Select With Logical Operators Alias For Column Names
5	Select With Aggregate Functions	More Clauses That Can Be Used With Select Statement Distinct Between Like In Is Null Aggregate Functions
6	Foreign Key Constraint	What is ● Foreign Key Constraint ● Alter Table Command How to Add a Foreign Key Check Constraint
7.	Aggregation Facilities In Sql	How to ● Use Group By ● Having ● Order By Clause
8.	Updating Data	Update Statement Delete Statement
9.	Overview Of Rdbms PostgreSQL	Rdbms Features Of PostgreSQL Content Available In Various Tutorials Under Various Series

SYLLABUS OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

1. Certificate Course in Bioinformatics

Paper 1 : Computer Aided Bioinformatics.

UN	Detail Syllabus of the Unit
1	**Communicating Electronically: Email and Web Sites:** Using Email, Observe the email conventions where you work, Keep your messages brief, Make your messages easy to read on screen, Provide an informative, specific subject line, Take time to revise, Remember that email isn't private, Creating Web Site, Begin by defining your site's objectives, Provide quick and easy access to the information your readers want, Design pages that are easy to read and attractive, Design your site for international and multicultural readers, Enable readers with disabilities to use your site, Help readers find your site on the Internet, Test your site on multiple platforms and browsers before launching it, Keep your site up to date, Ethics Guideline: Respect intellectual property and provide valid information, Exercises **website creation.**
2	Fundamentals of Computing: Introduction to operating Systems: WINDOWS, NT, UNIX/Linux operating systems. Comparative Advantages of Security (hacking9, cracking) Installation. Portability and Programming of these operating systems. Computer Viruses
3	Computer Networking: LAN, WAN, MODEM. Optical Vs. Electronic Networking. Security of the network, Fire-walls. Network Goals, Applications Network, Network structure, Network architecture, Hierarchical networks, Ethernet and TCP / IP family of protocols, Transport protocol design
4	Programming Language: what is program, algorithms, introduction to various programming languages like C, C++, Python, cobra java, Bioprogramming languages Perl, Bioperl, biojava, etc, markup languages. XML,HTML

Paper II Basics of Bioinformatics

UN	Detail Syllabus of the Unit
1	Basics of Bioinformatics, nature and diversity of biological data, Bioinformatics: emergence and growth, bioinformatics Scenario in India, world. ***International Nucleotide Sequence Database Collaboration***
2	**Browsing Genomic Resources:** Genome Assembly overview Related data resources (EST, STS, GSS, HSS) etc. Genomic databases at EBI and NCBI Genomic databases for human, mouse, yeast and other model organisms Genomic databases for plant, microbial, parasite and viral genomes Challenges in development of genomic databases & resources
3	**Structure visualization:** Factors Affecting Structure of Molecules Principles of Structure: Bonds, bond angles, et. dihedral angles, Anatomy structures: primary,

	secondary angles, e structural elements (alpha, beta, coil, turns) Tertiary & quaternary structure organization, **visualization tools** for nucleic acid as well as protein.
4	**Use of Bioinformatics:** Agriculture, Pharmacy , Human Health, Biotechnology, Molecular Biology, Drug Discovery.
5	assignments

Paper III Basics of Bioinformatics

UN	**Detail Syllabus of the Unit** This paper describes how to acquire information from public domain: biological databases by using computers and internet.
1	What is data? biological data, database classification of biological databases. data base operating system like mysql, oracal. data base management Systems. public domain resources in biology. search engines, Wikipedia. ***In silico LITERATURE MINING/LITERATURE DATABASES Pub Med, Medline, PubMed Central*:** Entrez: search engine to search and retrieve references, concepts in keyword based searches and MeSH terms, other literature databases & Open source journals in the area of Bioinformatic. Searching & retrieval of data: concepts Database search engines: Entrez & SRS Keyword-based search and retrieval, use of wild card characters, narrowing and broadening the search, using history feature, use of Boolean operators, learning use the limits feature, curation and processing of search results, extraction of sequences in various formats, online and batch processing.
2	**NUCLEIC ACID DATABASES** Organization of data, Contents and format of entries, sequence format, submission of data in following databases: o GenBank o EMBL o DDBJ 3 Biological databases II:
3	Biological databases II: Protein sequence database Organization of data, Formats and contents of entries, submission of data in following databases: o SwisProt o PIR PSD o UniProtKB
4	Protein 3d structure databases: protein data bank FSSP, DSSP, CATH, SCOP Metabolic pathway database.
5	Assignments

SYLLABUS OF CERTIFICATE COURSES DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN

1. Certificate Course in Communication Skills and Personality Development

UNIT	Topic
UNIT I	**Introduction to Communication Skills**
1.1	Introduction to Communication Skills
1.2	Types of communication (formal and informal)
1.3	Ways of Communication: Reading and Writing
1.4	Ways of Communication: Speaking
1.5	Why Learn Communication: Career Building
1.6	Why Learn Communication: Personal Communication
1.7	What are Barriers to communication
1.8	Types of Barriers to communication
1.9	How to overcome Barriers in communication
UNIT - II	**Non-Verbal Communication and Listening Skills**
2.1	Introduction to Non-Verbal Communication
2.2	Roles of Non -Verbal Communication
2.3	Advantages and disadvantages of non-verbal communication
2.4	Types of Nonverbal Communications
2.5	How to Improve Nonverbal Communication
2.6	Importance of Listening Skills

2.7	Hearing and listening
2.8	How to Improve Listening Skills
UNIT -III	**Group Discussion and Interview Techniques**
3.1	Introduction to Group Discussion
3.2	Understanding the Psychology of groups
3.3	Dos and Don'ts of Group Discussion
3.4	Group Discussion Language
3.5	Non -verbal communication in Group Discussion
3.6	Group Discussion in Interview
3.7	What are Interview Skills
3.8	Interview techniques
3.9	Online Interview Preparation
UNIT IV	**Online Communication**
4.1	Netiquette
4.2	Email Writing

2. Certificate Course in Vermi culturing and Vermicomposting

Units	**Topic**
Unit I	Importance of Vermiculture/ Vermicompost
	Introduction to vermiculture/vermicomposting Economic importance of Vermiculture Vermiculture value in maintenance of soil structure Taxonomy of Earthworm

	Anatomy of Earthworm
	Habits and habitat of Earthworm
	Physiology of Earthworm
	Reproduction in Earthworm
	Useful species of earthworms
	Local species of earthworms
	Exotic species of earthworms
Unit II	Earthworm Biology and Rearing
	Biology of local species like Eisenia foetida
	Vital cycle of Eisenia foetida: alimentation
	Vital cycle of Eisenia foetida: fecundity
	Annual reproduction potential of earthworms
	Factors affecting reproduction of earthworms
	Manual Method of Vermiculturing
	Migration Method of Vermiculturing
	Mechanical Method of Vermiculturing
	Introduction to variety of species used for commercial use
Unit III	Methods of vermicomposting technology and its Application
	Small Scale Earthworm farming for home gardens
	Conventional Earthworm composting
	Commercial Earthworm composting
	Earthworm Farming (Vermiculture),
	Earthworm Extraction (harvest)
	Harvesting and packaging of Vermicompost
	Transport and storage of Vermicompost
	Nutritional Composition of Vermicompost for plants
	Vermicompost comparison with other fertilizers
	Vermiwash collection
	Enemies of Earthworms
	Scope of research in vermicomposting

Practical:	
1	Identification of different types of earthworms
2	Study of Sytematic position and External characters of Eisenia fetida Study of Life stages Eisenia foetida
3	Morphology and development of Earthworm.
4	Study of equipment and devices used in vermicomposting Preparation vermibeds
5	Maintenance of vermibeds

3. Certificate Course in Basic Skills in Computer

Sr.No	**Module**
I	MODULE 1: KNOWING COMPUTER
1	❖ Introduction to Computers ❖ 1.1 Objectives of Computers ❖ 1.2 What is Computer? 1.2.1 Basic Applications of Computer (Applications: Where to use and how to use)
2	❖ 1.3 Components of Computer System with its structure 1.3.1 Central Processing Unit 1.3.2 Keyboard, mouse and VDU 1.3.3 Other Input devices in detail 1.3.4 Other Output devices in detail 1.3.5 Basic Computer Memory and its types.
3	❖ 1.4 Concept of Hardware and Software 1.4.1 What is Hardware? 1.4.2 What is Software? 1.4.2.1 Application Software 1.4.2.2 Systems software
4	❖ 1.5 Installation of Software
5	❖ 1.6 Concept of computing, data and information 1.6.1 Entertainment
6	❖ 1.7 Applications of Computer in Real Life 1.7.1 Connecting keyboard, mouse, monitor and printer to CPU 1.7.2 Checking power supply summary
II	MODULE 2: WORKING WITH COMPUTER USING GUI BASED OPERATING SYSTEM
1	Introduction ❖ 2.1 Objectives 2.2 Overview of Basics of Operating System 2.2.1 Functionality of Operating system

	2.2.2 Types of popular operating system (Like LINUX, WINDOWS)
2	2.3 The User Interface 2.3.1 Task Bar 2.3.2 Icons 2.3.3 Menu 2.3.4 Running an Application 2.4 Basic Operations Performed on Computer 2.4.1 How to start a computer 2.4.2 How to Log out computer 2.4.3 Learn to interact with computers 2.4.4 Managing Files and Folder. 2.4.5 Operating System Simple Setting.
3	❖ 2.5 Personalizing Desktop 2.5.1 Changing the Desktop Background 2.5.2 Applying a Screen Saver 2.5.3 Applying Themes 2.5.4 Setting Date and Time 2.5.5 Changing Mouse Properties 2.5.5 Adding and removing Printers
4	❖ 2.6 File and Directory Management 2.6.1 Creating and renaming of files and directories 2.6.2 Common utilities Summary
III	MODULE 3: OPERATING VARIOUS APPLICATIONS
	3.0 Introduction ❖ 3.1 Working on Paint 3.1.1 Creating Picture 3.1.2 Formatting picture and 3.1.3 Working of each Tab in detail
	3.2 Introduction to Text Editor 3.2.1 Create a text using MS Notepad editor 3.2.2 Various operations performed on it.
	3.3 Introduction to MS WordPad 3.3.1 Creating Document 3.3.2 Formatting a document using MS WordPad.
	3.4 Introduction to Windows Media Player 3.4.1 Working with Windows Media Player.
	3.5 Use of Calculator 3.5.1 Functions used in Calculator 3.6 Introduction to Windows Fax and Scanner 3.6.1 Use of Windows Scanner Summary
IV	MODULE 4: UNDERSTANDING WORD PROCESSING

	❖ 4.0 Introduction ❖ 4.1 ❖ 4.2 Word Processing Basics 4.2.1 Opening Word Processing Package 4.2.2 Menu Bar 4.2.3 Using The Help 4.2.4 Using The Icons Below Menu Bar
	❖ 4.3 Opening and closing Documents 4.3.1 Opening Documents 4.3.2 Save and Save as 4.3.3 Page Setup 4.3.4 Print Preview 4.3.5 Printing of Documents 4.4 Text Creation and manipulation 4.4.1 Document Creation 4.4.2 Editing Text 4.4.3 Text Selection 4.4.4 Cut, Copy and Paste 4.4.5 Spell check 4.4.6 Thesaurus
	❖ 4.5 Formatting the Text 4.5.1 Font and Size selection 4.5.2 Alignment of Text 4.5.3 Paragraph Indenting 4.5.4 Bullets and Numbering 4.5.5 Changing case
	❖ 4.6 Table Manipulation 4.6.1 Draw Table 4.6.2 Changing cell width and height 4.6.3 Alignment of Text in cell 4.6.4 Delete / Insertion of row and column 4.6.5 Border and shading ❖ Summary
V	MODULE 5: USING SPREAD SHEET (MS –EXCEL)
	❖ Introduction ❖ 5.1 Objectives ❖ 5.2 Elements of Electronic Spread Sheet 5.2.1 Opening of Spread Sheet 5.2.2 Addressing of Cells 5.2.3Printing of Spread Sheet 5.2.4 Saving Workbooks
	❖ 5.3 Manipulation of Cells 5.3.1 Entering Text, Numbers and Dates 5.3.2 Editing Worksheet Data 5.3.3 Inserting and Deleting Rows, Column 5.3.4 Changing Cell Height and Width 5.4 Formulas and Function 5.4.1 Using Formulas 5.4.2 Function
	5.5 Operations perform on Insert Tab

	5.5.1 Insert Graph & operations performed on graph 5.5.2 Insert Smart Art 5.5.3 Insert Table Summary
6	MODULE 6: INTRODUCTION TO INTERNET, WWW & WEB BROWSERS
	❖ 6.0 Introduction ❖ 6.1 Objectives ❖ 6.2 Basic of Computer Networks 6.2.1 Local Area Network (LAN) 6.2.2 Wide Area Network (WAN)
	❖ 6.3 Internet 6.3.1 Concept of Internet 6.3.2 Applications of Internet 6.3.3 Connecting to the Internet 6.3.4 Troubleshooting
	❖ 6.4 World Wide Web (WWW) ❖ 6.5 Search Engines 6.5.1 Popular Search Engines / Search for content 6.5.2 Accessing Web Browser 6.5.3 Downloading Web Pages 6.5.4 Printing Web Pages
	❖ 6.6 Understanding URL ❖ 6.7 Surfing the web ❖ Summary
7	MODULE 7: COMMUNICATIONS AND COLLABORATION
	❖ 7.0 Introduction ❖ 7.1 Objectives ❖ 7.2 Basics of E-mail 7.2.1 What is an Electronic Mail 7.2.2 Email Addressing
	❖ 7.3 Using E-mails 7.3.1 Opening Email account 7.3.2 Mailbox: Inbox and Outbox 7.3.3 Creating and Sending a new E-mail 7.3.4 Replying to an E-mail message 7.3.5 Forwarding an E-mail message 7.3.6 Sorting and Searching emails
	❖ 7.4 Document collaboration ❖ 7.5 Instant Messaging and Collaboration 7.5.1 Using instant messaging 7.5.2 Instant messaging providers 7.5.3 Netiquettes ❖ Summary
8	MODULE 8: MAKING SMALL PRESENTATIONS (USING
	❖ 8.0 Introduction

	❖ 8.1 Objectives ❖ 8.2 Basics 8.2.1 Using PowerPoint 8.2.2 Opening A PowerPoint Presentation 8.2.3 Saving A Presentation
	❖ 8.3 Creation of Presentation 8.3.1 Creating a Presentation Using a Template 8.3.2 Creating a Blank Presentation 8.3.3 Entering and Editing Text 8.3.4 Inserting And Deleting Slides in a Presentation 8.4 Preparation of Slides 8.4.1 Inserting Word Table or An Excel Worksheet 8.4.2 Adding Clip Art Pictures 8.4.3 Inserting Other Objects
	❖ 8.5 Presentation of Slides 8.5.1 Viewing A Presentation 8.5.2 Choosing a Set Up for Presentation 8.5.3 Printing Slides And Handouts 8.6 Slide Show 8.6.1 Running a Slide Show 8.6.2 Transition and Slide Timings 8.6.3 Automating a Slide Show 8.6.4 Applying Animation Summary
9	MODULE 9: FINANCIAL LITERACY FOR BANKING SCHEME AND APPLICATIONS
	❖ 9.0 Introduction ❖ 9.1 Objectives ❖ 9.2 Why Savings are needed? ❖ 9.3 Drawbacks of keeping Cash at home 9.3.1 Unsafe 9.3.2 Loss of Growth Opportunity 9.3.3 No Credit Eligibility
	❖ 9.4 Why Bank is needed? 9.4.1 Secure Money, Earn Interest, Get Loan 9.4.2 Inculcate habit of saving 9.4.3 Remittances using Cheque Demand Draft 9.4.4 Documents needed for opening a bank account
	❖ 9.5 Banking Products 9.5.1 Types of Accounts and Deposit 9.5.2 Filling up of Cheques, Demand Drafts
	❖ 9.6 Internet Banking ❖ 9.7 National Electronic Fund Transfer (NEFT), Real Time Gross Settlement (RTGS) ❖ 9.8 Various Schemes 9.8.1 National Pension Scheme 9.8.2 Public Provident Fund (PPF) Scheme
	❖ 9.9 Bank on your mobile 9.9.1 Mobile Banking 9.9.2 Mobile Wallets

	9.9.3 Paytm and Google Pay ❖ 9.10 Introduction to Office Productivity applications such as Google Docs or Open Office ❖ Summary

4. Certificate Course in Vedic Mathematics

Unit 1	**Topic**
1.1	Addition - Subtraction - Combined operations - Beejank
1.2	Multiplication methods: Urdhwatiryagbhayam, Nikhilam, Ekanyunen, Ekadhiken, Antyayordashakepi.
1.3	Vinculum - Operations.
1.4	Awareness of 1 to 5 Vedic sutras as per Shankaracharya Bharthikrishan Teerthji Swamiji's book.
Unit 2	
2.1	Division methods : Nikhilam, Paravartya Yojayet, Dhwajank
2.2	GCD and LCM
2.3	Expression of GCD in terms of two numbers.
Unit 3	
3.1	Divisibility tests, Osculation & Reverse osculation.
3.2	Division Algorithm, Quotient & Remainder.
3.3	Duplex method.
Unit 4	
4.1	Squares & Square-roots for 6 digit number.
4.2	Cubes & Cube-roots for 6 digit number, Contribution of Indian Mathematicians in Arithmetic.

5. Certificate Course in Latex

Sr.No.	**Topic Name**	**Contents**
1.	Letter writing	How to write letters using Latex with options
2	Mathematical type setting	How to get into and leave from the mathematical mode The role of spaces and how to create them

		Mathematical symbols Amsmath package and its use in creating matrices
3	Equations in Latex	How to create the equations? Components of equations Details of components in equation.
4	Tables and Figures	How to create a table using tabular environment Ways of inserting information in table.
5	Beamer	How to create presentation in Latex and Beamer?
6	Bibliography	Creating reference using Latex and beaptec in details.
7.	Feedback diagram with Maths	The procedure of creating diagram /figure How to Create a figure (xfig)
8.	Latex on Windows using Text works	Download and install MikTex Write a basic Latex Documents using Texworks Configure MikTex to download missing packages.
9.	Report Writing	How to ● Use report and article class ● Create sections ● Automate the numbering of sections ● Create table of contents ● Create the title page

6. Certificate Course in Basic of Jewelry Design and Making

Unit	**Topic**
Unit 1	
1	Elements and principles of design
2	Hand control exercises
3	Motif development: Analytical and Methodical approach
4	2 D and 3 D object Drawing: Perspective and still life views
5	Rendering Jewellery: Metal finishes, Stone rendering, light, shades, Textures
6	Various cuts of gemstones with measurements
7	Port folio Making: Theme based designs 5, kids jewellery 5, Male jewellery
Unit 2	
1	Introduction to Beading Process
2	Making Thread Jewellery - Single Stranded and Multiple Stranded

3	Different types of earrings: tops, studs, rings, danglers
4	Two types of Bracelets

7. Certificate Course in Fresh water Fish Culture

Sr. No.	Topic
1	History of fish culture in India
2	Freshwater fishes of India
3	Classification of fishes
4	Planning and construction of fresh water fish farm
5	Pond soil
6	Preparation of pond: Liming and manuaring
7	Natural reproduction (breeding) in fishes
8	Factors affecting natural reproduction
9	Artificial (induced) reproduction (breeding) in fishes
10	Factors affecting artificial reproduction
11	Hybridization in fishes
12	Transgenic fishes
13	Developmental stages of fishes
14	Transport of live fish seed
15	Prestocking management of Nursery
16	Rearing and stocking ponds for common carps
17	Feeding of fishes
18	Zooplankton as a food for fishes
19	Polyculture of Indian and Exotic carps
20	Advantages and disadvantages polyculture
21	Traditional crafts and gears used in fresh water fish capture
22	Advanced crafts and gears used in fresh water fish capture
23	Integrated Fish farming

24	Poultry and fish culture
25	Duck and fish culture
26	Rice and fish culture
27	Sewage fed fisheries
28	Advantages and disadvantages of integrated fish farming
29	Fisheries co-operative Societies
30	Role of Fisheries co-operative Societies in fish production and marketing
31	Preservation of fish by curing (drying)
32	Preservation of fish by curing(salting and smoking)
33	Fish products and by-products
34	Bacterial Diseases
35	Fungal diseases
36	Parasitic diseases
	Practical
37	Identification of fishes
38	Physicochemical analysis of pond soil to determine its texture
39	Identification of Developmental stages in fishes
40	Qualitative and quantitative study of Zooplankton
41	Crafts and gears used in fresh water fish capture
42	Water parameter
43	Visit to Fish breeding center

8. Certificate Course in Basics of Public Health and Nutrition

Unit	**Topic**
Unit 1	
1	Certificate Course in Basics of Public Health and Nutrition
2	Macro & Micro Nutrients- concept

3	Balanced Diet Brief (Digestion, absorption, utilization, storage, RDA, planning, concept, guidelines)
4	Food Nutrition & Health (meaning, functions, concept, status , inter-relationship between nutrition& health)
5	Role of health care worker in Nutrition & preventive care
6	Adult /pregnant/lactating/infant/preschooler/school child/adolescent/RDA & meal planning
7	Deficiencies (an overview) - PEMKwashiorkor, marasmus, marasmus & kwashiorkor, nutritional anaemia, iodine deficiency, B-Complex deficiency, Vitamin C, Vitamin D, Flurosis, Lathyrism, Measles, Diarrhoea, CVD, DM, Obesity, Maternal Malnutrition: brief overview/nature/clinical features/causes/treatment/prevention/nutritional management/imp of healthcare
8	Kitchen planning(a brief introduction)
Unit 2	
1	Budgeting (factors/principles/preparation)
2	Selection (Macro/Micro/Protective foods/Accessories/Beverages/Regulatory foods)
3	Food purchasing: Role of grades,brands,labels
4	Food spoilage-Factors,classification
5	Storage – methods of storage, space utilization
6	Preservation–principles, methods,home-scale/at low cost max of nutritional benefits/ prevent nutrient losses& avoid wastage
7	Contamination
8	Adulteration
9	Consumer protection-standards, quality control agencies, certification&its need,law governing.
10	Nutritional programmes-concept,components, organizations Assessment - Introduction to different methods of assessments – anthropometric,clinical method, biochemical synthesis,diet survey, growth monitoring charts, tools, techniques
Unit 3	
1	Population: dynamics & epidemiology(role statistics/sources of data/fertility measures/ morbidity/mortality & determinants/parameters of population)

2	Endemics: Epidemic & Pandemic
3	Contamination-in relation to supply of water and waste disposal
4	Personal hygiene: cleanliness,role of rest &exercise, concept of mental health
5	Food borne diseases: diarrhoea, dysentery, cholera, typhoid, Infections: hep/parasitic infestation- ascariasis,hookworm, amoebiasis,pinworm infection food intoxication-salmonella,botulism,clostridium, Food poisoning – ergotism,aflatoxicosis,lathyrism,argemones,
6	Infections: Tuberculosis, measles, whooping cough, diphtheria, tetanus, poliomyelitis, malaria, skin infections/eye infection/ear infections.
7	Family planning programmes (brief overview)
8	Healthcare concept &organisational responsibility
Unit 4	
1	Healthcare programmes – Introduction, Types of programmes & other components
2	Income generated programme- special programmes, minimum needs based ,development programmes,employment generating programmes, programme to eradicate poverty
3	Learning& working with community as individuals,groups&agencies
4	Factors influencing community health & nutrition Introduction&determinants of community health&concept of food behaviour.
5	Nutrition programmes: Introduction, concept of nutritional programme, different feeding programmes - MDMP, ANP, BNP & ICDS as agency for nutritional supplementation for prenatal care & care for children
6	Learning working with community(intro/learning/working with community/identifying/evaluation)
7	Community strategies in nutrition and health education: Introduction, learning&working with community, identifying, evaluation
8	Factors affecting Community Nutrition & Health

9. Certificate Course in Skill Development in Competitive Exams

	Quantitative Aptitude		**Reasoning ability**
1	Area	1	Analogy
2	Average	2	Blood relation
3	Triangle	3	Coding-decoding
4	LCM HCF	4	Direction sense
5	Number System	5	Input-output
6	Partnership	6	Missing number in figure
7	Percentage	7	Syllogism
8	Pipes and cistern	8	Order and ranking
9	Profit and loss	9	Odd one out
10	Ratio & Proportion	10	Missing figure
11	Simplification	11	Mirror image
12	Time and Distance		**English Language**
13	Time and work	1	Noun
14	Simple interest & Compound interest	2	One word substitution
15	Boat & stream	3	Cloze test
16	Circle	4	Synonyms
	General Awareness	5	Pronoun
1	History	6	Article
2	Current Affairs	7	Preposition
3	Geography	8	Adjective
4	Polity	9	Adverb
5	Traditional general knowledge	10	Antonyms
6	Physics	11	Idioms
7	Biology	12	Active and passive voice
8	Chemistry	13	Error detection
9	Economics	14	Reading comprehension

10. Certificate Course in Excel

Sr.No	Module
I	**MODULE 1: ADVANCED MS-EXCEL**
1	1.0 Introduction to MS-Excel ❖ Objectives of MS-Excel ❖ 1.1 What is MS-Excel? 1.11 Basic Applications of Advanced MS-Excel (Applications: Where to use and how to use) ❖ 1.2 Install Upgrade and more features ❖ 1.3 Numbers of spreadsheet programs ❖ 1.4 Excel apply /uses to including statistics 1.4.1 Finance 1.4.2 Data management 1.4.3 Forecasting 1.4.4 Analysis 1.4.5 Inventory 1.4.6 Billing 1.4.7 Business intelligence
2	❖ 1.5 Three most important components of MS-Excel 1.5.1 Microsoft Excel Window Components 1.5.2 Microsoft Excel Basic Functions 1.5.3 Worksheets operations , Cells, Ranges, Tables ❖ 1.6 Working with Formulas / Functions: 1.6.1 How to enter a Formula 1.6.2 What is a Function? 1.6.3 Functions argument ❖ 1.7 Math operators 1.7.1 Logical operators 1.7.2 Most Important functions 1.7.3 SUM, MAX, MIN, COUNT,COUNTIF, AVAERAGE, TIME, DATE, LEFT, RIGHT, VLOOKUP, IF, NOW 1.7.4 Relative and Absolute references

	1.7.5 More functions etc
3	▪ Summary ▪ Doubt Session
II	**MODULE 2: CONDITIONAL FORMATTING**
1	2.0 Introduction ❖ 2.1 Objectives ❖ 2.2 Conditional Formatting: 2.2.1 Highlight cells Rules 2.2.2 Greater than, Less than, Between, Equal to 2.2.3 Duplicate values, Top/Bottom rules, Data bars, color scales, Icon sets
2	❖ 2.3 Conditional Formatting Rule 2.3.1 New rule, clear rules, Manage rules, Top 10 items rule, Bottom 10 items, Top 10%, Bottom 10%, 2.3.2 Above Average, Below Average. ❖ 2.4 Data sorting and Filtering 2.4.1 Sort Tool – sort in alphabetical order 2.4.2 Smallest to largest 2.4.3 Sort multiple level 2.4.4 Filtering cells
3	▪ Summary ▪ Doubt Session
III	**MODULE 3: PIVOT TABLES AND PIVOT CHARTS**
1	2.0 Introduction ❖ 3.1 Insert / Create a PivotChart ❖ 3.2 Change Pivot Chart Type ❖ 3.3 Differences between Pivot charts & Standard Charts ❖ 3.4 Create a Pivot Table to analyze worksheet data ❖ 3.5 Add & rearrange fields in the field list
2	❖ 3.6 Filter data in a PivotTable ❖ 3.7 Group or ungroup data in a Pivot Table

	❖ 3.8 Advanced Excel Keyboards shortcuts 3.8.1 Keyboards shortcuts for Dialog Box 3.8.2 Entering Data shortcuts 3.8.3 File commands 3.8.4 Other useful shortcut keys
3	▪ Summary ▪ Doubt session
4	**MODULE 4: STATISTICAL ANALYSIS IN ADVANCED MS-EXCEL**
1	4.0 Introduction ❖ 4.1 Objectives ❖ 4.2 Statistical Functions 4.2.1 Median 4.2.2 Mode 4.2.3 Average/Mean 4.2.4 Standard deviation 4.2.5 Range 4.2.6 HARMEAN, GEOMEAN, VAR
2	❖ 4.3 Correlation & Regression ❖ 4.4 Excel Array functions for Statistical Analysis ❖ 4.5 Excel Data Analysis Tools 4.5.1 How to install and start ❖ 4.6 Creating Attractive Charts or Graphs 4.6.1 Create powerful Graphs and Charts in Microsoft Excel 4.6.2 Quick Graph use Outline 4.6.3 Formatting A Line Graph 4.6.4 Formatting A Chart/Bar Chart 4.6.5 Attractive Chart Styles 4.6.6 Axis Formatting , Title and Legend 4.6.7 Creating a charts using the Quick Analysis Tool 4.6.8 Modifying and Moving a Chart

	4.6.9 Different types of Charts/Graphs
3	▪ Summary ▪ Doubt session
4	✓ Online Objective Paper
5	✓ Practical Paper
	Total

11. Certificate Course in R-Console Software

Sr. No.	Topics
1.	Starting R Commander and importing data
1.1	What is R Commander?
1.2	References and additional reading materials
1.3	Installing R Commander
1.4	Starting R commander
1.5	Data Entry 1.5.1 Manual Entry 1.5.2 Import from Text File 1.5.3 Import from Excel
2.	Using R Commander to obtain descriptive
2.1	Checking categorical variables
2.2	Checking continuous variables
3.	Modifying the data set
3.1	Compute a new variable
3.2	Converting numeric variables to categorical variables
3.3	Sub dividing data
4.	Using R Commander to explore data
4.1	Graphically 4.1.1 Histograms 4.1.2 Norm Q-Q plots 4.1.3 Scatterplots 4..1.4 Boxplots
4.2	Shapiro-Wilk test for normality
5.	Using R Commander to apply statistical tests

5.1	Comparing the mean 5.1.1 Student's t-Test 5.1.2 Paired Student's t- Test 5.1.3 Single Sample t-Test 5.1.4 One way ANOVA
5.2	Comparing the Variance 5.2.1 Bartiett's test 5.2.2 Levene's Test 5.2.3 Two Varience F-Test
5.3	Non- Parametric tests 5.3.1 Two Sample Wilcoxon Test 5.3.2 Paired -samples Wilcoxon Test 5.3.3 Kruskal Wallis Test
6	Amending the graphical out put 6.1 Amending the axis labels 6.2 Adding the main title 6.3 Adding the line 6.4 Amending the line appearance 6.5 Amending the plot symbol 6.6 Adding the text label 6.7 Amending the plot colours 6.7.1 On a box plot 6.7.2 On a scatter plot
7	R commander odds and ends

	7.1 Exiting and saying script 7.2 Saving and printing Output 7.2.1 Copying Text 7.2.1 Copying Graphs 7.3 Entering commands directly into the script windows 7.4 Current menu"tree" of the R Commander(version 1.4.10)

12. Certificate Course in Digital Marketing.

Sr.No	Topic
I	**Module – I Introduction to Digital marketing**
1	**Introduction to Digital Marketing** • What is marketing? • What is digital marketing? • Why are people going online? • Key concepts of digital marketing • Benefits of digital marketing • Understand the future of digital marketing • What is a search engine? • Types of search engine • How does the search engine work? • Why is google the world's best search engine? • Ranking factors of google • Tools required in digital marketing • What is advertising? • What is online advertising? • What is AdWords? • Some of the best digital marketing case studies • Carer scope in Digital Marketing
2	**Website Design Guidelines** • What is the Website? • What is www? • What are the different types of websites? • Web page vs website

	• Difference between blog vs website • Components of the website • Purpose of creating websites • How to build a web page? • Web design vs web development • What makes a website user-friendly? • Dynamic vs Static website • What are responsive websites? • Build your own portfolio website
3	**Domain Registration and Hosting** • What is domain & subdomain name? • Parts of domain name • How to choose a domain name? • What is the Protocol? • What is IP address • What is web hosting? • What is Uptime • Types of Web Hosting • How to buy domain and hosting? • Costs of a domain name • Buying and managing domains • Importance of server security • What is SSL certification? • When your site goes down what will happen? • What is the page authority and domain authority?
4	**WordPress website creation** • What is WordPress? • Understanding WordPress and it's functioning? • Features of WordPress • Advantages and disadvantages of WordPress • com vs wordpress.org • Sites built with WordPress • How to Install WordPress? • Editing the page and change the site title • Add and edit a menu • Blog page design

	• Adding a video to your website • Add social sharing buttons • Working with dashboard • What are Plugins and their uses? • What is the widget and how to use it • Creation of Pages and Menus • The importance of homepage • Terms, Privacy, and Disclaimers • Difference between Posts and Pages • Integrating google analytics • Adding a site to webmaster tools
Module – II	**SEO**
1	**Search Engine Optimization Syllabus** • Introduction and Understanding of SEO? • How does Search Engine work? • Basics of SEO • On-Page SEO vs Off-Page SEO • What is the main purpose of using keywords in SEO? • Some important SEO tools • What is link building and why does it matter? • What are backlinks? • What is an outbound link? • Difference between do-follow and no-follow links • What are meta tags • What is an anchor text? • What is robots.txt? • What is the landing page? • Latest updates in Google search algorithm • Panda algorithm vs Penguin algorithm • How to remove toxic links to a site? • What is Sitemap? How is it important? • What is social bookmarking? • What is social networking? • What is RSS feed? • What are google sitelinks?

	• What is google my business? • Popular SEO Blogs to follow • What is Alexa Ranking? • Why we use content marketing for SEO?
2	**Keyword Research and planning** • What are Keywords? • Types of Keywords • Keyword-based on length • History of Keyword Research • Why is keyword research important? • LSI Keywords • What is the keyword research process? • Understanding your target market • What is Keyword Density, and does it matter? • Know what your people want • How to use google keyword planner? • How to do the business analysis?
3	**Content Writing** • What is content writing • Introduction to the different types of Contents • How to improve writing skills? • How to write SEO optimized content? • Use of proper Tags (h1, h2, h3) • Attractive Title and Headings • Anchor Texts • How to count words • Understanding your audience • Write for users, not for google • What makes good content?
Module – III	**Social Media Optimisation**
1	**Social Media Optimisation Syllabus** • What is Social Media Optimization? • What is Social Media Marketing (SMM)? • Search Engine Optimization vs Social Media Optimization • List of social media • Importance of social media

	• How Social Media Affects SEO? • How to promote business through SMO • What is Viral Marketing • Social media success tracking tools? • What type of social media content converts best? • What is the responsibility of a social media manager? • Top social media marketing tools to consider? Some common social media mistakes
2	**Facebook Marketing Syllabus** • Facebook Insights • Facebook Algorithms • Ad Practices for Ad Content • Facebook Targeting Options • Retargeting or Facebook Exchange Facebook Page Management
Module IV	**Marketing**
1	**Twitter Marketing** • Introduction to Twitter Marketing • Do's and Don'ts of Twitter Marketing • Twitter Ads – Content & Targeting • Influencer Marketing • Power of Twitter and use of hashtags Tools and Measurement
2	**LinkedIn Marketing** • Introduction to LinkedIn • How to Market • Personal marketing • Brand Marketing • LinkedIn Ads LinkedIn Campaigns
3	**Instagram Marketing** • Creating a Business Page • Marketing Tools and Ads • Influencer Marketing on Instagram

	• Strategy How to Drive Engagement • Switching Accounts Lead Generation through Instagram
Module V	**Marketing and Algorithm**
1	**YouTube Marketing Syllabus** • YouTube Channel Creation • Video Creation, Uploading and Optimization • Video Content and story line ups • Channel Monetization • How to earn like a Boss • Case Study
2	**Google Algorithms** • Intro to Google Algorithm • Types of Google Algorithms • How Algorithms works • How to adjust Algorithms • Check if you have been hit by any of them • Major Google Algorithm changes and Penalties
3	**Google Search Console** • Understanding of Google Search Console • Using Google Search Console to Increase Traffic • Crawl Stats Vs Crawl Error • Removing Spam Backlinks from Website • Index Pages in Google Search Console
Module VI	**Google Analytics**
1	**Google Analytics** • Introduction of Google Analytics • Data Analysing with Google Analytics • Checking User Behaviour • Tracking Traffic from Different Source • Using Analytics Date for Retargeting

2	**Google AdSense** • Money Making with AdSense • Easy Steps for AdSense • How to Approve AdSense Account • Placing Ads to Website
Module VIII	**Google and Ecommerce Marketing**
1	**Google AdWords Syllabus** • What is AdWords? • Ads Placement • How to get approval for AdWords? • How to get Ads on your Blog/YouTube • Content and traffic strategy • Guidelines and requirements
2	**E-commerce Marketing** • What is Ecommerce Website • E-Commerce Marketing concepts • The online purchasing decision • Top Motivators for Shopping Online • Advantages of eCommerce • Use affiliate marketing for eCommerce strategy
Module VIII:	**Other Marketing**
1	**Email Marketing** • Understanding & Benefits of Email Marketing • How to write Effective content and subject line? • Why Email automation is required? • Designing an effective Email campaign • Tracking Email Marketing Reports • Email Guidelines

2	**SMS Marketing** • Introduction to SMS Marketing • Why SMS Marketing • Kinds of SMS • Promotional SMS • Transactional SMS • How to Integrate SMS on Software's
3	**Affiliate Marketing Syllabus** • An introduction to affiliate Marketing • Types of Affiliate Programmes • When do you use Affiliate Marketing? • Top Affiliate Earners in India • Choose best affiliate networks Grow your Business with Affiliate Marketing?
Module XI :	**Video Marketing and Details**
1	**Lead Generation** • Lead Capture • Lead Magnets • Landing Page Conversion Techniques Lead Scoring
2	**Video Marketing & Editing** • Basic of Video Marketing • Hacks of Video Marketing • Basic of Filmora & Final Cut Pro A-Z Video Editing
3	**Freelance Guidelines** • Freelancing Overview • Types of Freelancing Work • Finding Clients: Freelance Websites How to grab freelancing Projects

13. Certificate Course in Full Stack Developer

Sr.No	Topic
Module – I Front-end	
1	Introduction Full Stack Development
2	**Code at an expert level of proficiency with HTML5** • Introduction to HTML • Browsers and HTML • Editor's Offline and Online • Tags, Attribute and Elements • Doctype element • Comments • Headings, Paragraphs,Formatting text • Lists and Links • Images , Table
2	**Cascading Style Sheets (CSS)** • Introduction CSS • Applying CSS to HTML • Selectors, properties and values • CSS Colors, Backgrounds • CSS Box Model • CSS Margins,Padding,Borders • CSS Text and Font Properties • CSS General Topics
Module – II	
1	**Javascript** • Introduction to JavaScript • Applying JavaScript (internal, external) • Understanding JS Syntax • Introduction to Document and Window Object • Variables,Operators • Data Types,Num Type Conversion • Math,String Manipulation • Objects,Arrays • Date and Time • Conditional Statements • Switch Case • Looping in JS • Functions
2	**Morden website Bootstrap** • What is Bootstrap Framework

	• Why Bootstrap • Advantages of Bootstrap Framework • What is Responsive web page • What is Mobile-First Strategy • Setting up Environment • How to apply Bootstrap to Applications
Module – III **Back-end Database**	
1	Introduction To Back-end & Database
2	how to work browser & server
3	**PHP** Install Syntax Comments Variables Echo / Print Data Types Strings Numbers Math Constants Operators If...Else...Elseif Switch Loops Functions Arrays **Forms**

	Form Handling Form Validation Form Required Form URL/E-mail Form Complete Date and Time Include File Handling File Open/Read File Create/Write File Upload Cookies Sessions Filters Filters Advanced Callback Functions JSON Exceptions OOP What is OOP Classes/Objects Constructor Destructor Access Modifiers Inheritance

	Constants Abstract Classes Interfaces Traits Static Methods Static Properties Namespaces MySQL Database MySQL Database MySQL Connect MySQL Create DB MySQL Create Table MySQL Insert Data MySQL Get Last ID MySQL Insert Multiple MySQL Prepared MySQL Select Data MySQL Where MySQL Order By MySQL Delete Data MySQL Update Data MySQL Limit Data - AJAX AJAX Intro AJAX

	AJAX Database AJAX XML AJAX Live Search AJAX Poll
Module IV	
1	REST API & GIT &Wordpress (CMS) 1. Set up a MySQL database on their server 2. Install WordPress on the MySQL database 3. Plan their website by choosing color schemes, fonts, layouts, and more 4. Search for themes in WordPress 5. Select, install, and activate a theme 6. Add posts to their website 7. Create website pages 8. Add images, photo galleries, and more 8. Create tags for SEO and categories to organize their posts 9. Use WordPress as a content management system (CMS) 10. Use widgets and plugins 11.Create an ecommerce site 12. Integrate WordPress with social media
2	Ruby on Rails: Javascript – Ruby – SQLite –
Module V: Server & SEO	
1	What is Domain hosting
2	Record link A,MX, TXT, CName, Nameserver, connect Domain & Hosting
3	Cpanel& Webmail
4	Google Search Console
5	Site Maps

14. Certificate Course in Communication Skills

Sr.No	Topic
1	Introduction to Communication Skills
2	Barriers to Commination Skills

3.	Non-Verbal Communication
3	Listening Skills
4	Group Discussion
5	Interview Techniques
6	Netiquette
7	Team Building

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2.6.1

2019-20

Syllabi of Diploma / Certificate Courses

SYLLABUS OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

1. Certificate course in Introduction to Computers

Sr. No.	Topic Name	Contents
1.	Printer Connection	How To Connect A Printer to Computer
2	Getting To Know Computer	Various Components of Computer How To Connect to the Various Components
3	Introductrion To Gmail	How to ● Create A Google Account ● Login to Gmail ● Write an Email ● Send an Email ● View an Email ● Logout Gmail
4	Compose Options For Eamil	How to Format the Email Text Attach Files to Email Share Files Via Google Drive Insert a Photo or Link to an Email About the Compose Window Options.
5	Google Drive Option	Creating a Document ,a Spreadsheet And a Presentation Uploading Files Sharing Options

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE,
North Ambazari Road, Near Ambazari Lake, Nagpur

NAAC ACCREDITED GRADE 'A' WITH CGPA 3.01 (Third Cycle)

CRITERION-II

Teaching- Learning and Evaluation

YEAR-1

2019-20

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

SSR: 2023 FOR NAAC FOURTH CYCLE

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

List of Documents(2019-20)

Sr. No.	Name of Document
1.	Link of Core Courses Subject Syllabi in UG and PG Programme. i. B.Sc. (Science) ii. B. Sc. (Home Science) iii. M. Sc. (Mathematics)
2.	List of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
3.	Syllabi of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
4.	Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution

Prof. Pitambar Humane
IQAC Coordinator

CO ORDINATOR
INTERNAL QUALITY ASSURANCE CELL
DHARAMPETH, M. P. DEO MEMORIAL &
SCIENCE COLLEGE, NAGPUR

Dr. Akhilesh Peshwe
Principal

Principal
Dharampeth M.P. Deo Memorial
Science College, Nagpur.

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2.6.1

Link for RTMNU syllabus for UG and PG

Graduation (UG)

Compulsory English
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Comp_Eng.pdf
Supp. Eng
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Supp_Eng.pdf
Hindi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Hindi_Syllabus.pdf
Marathi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/marathi_syllabus.pdf
Statistics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.A_%20B.Sc_Statistics_Semester_Pattern2013.pdf
Botany
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Botany_Semester_Pattern.pdf
Zoology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Zoology_semester_Pattern_2013.pdf
Microbiology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Microbiology_revised_syllabus_23092020.pdf
Physics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Physics_Semester_Pattern2013.pdf
Chemistry
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Chemistry_Semester_Pattern2013.pdf
B.Sc. Chemistry

B.Sc. Chemistry I Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry I Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_II_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSC_Chem_sem_II_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_II_paper_II_revised_syllabus_080920.pdf
Revised Complete U.G. Chemistry Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Revised_Complete_U.G.ChemistryRYSyllabus2018-19.pdf
Electronics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Electronics_Semester_Pattern2013.pdf
Mathematics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Mathematics_Semester_Pattern2013.pdf
Computer Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Computer_Science_Semester_Pattern2013.pdf
Home Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_home_science_syllabus_scheme_29092020.pdf

Post-Graduation (PG)

Mathematics
https://nagpuruniversity.ac.in/writereaddata/fckimagefile/MSc_Mathematics_Revised_Syllabus__CBCS____22nd_October_2021.pdf

Chemistry

https://www.nagpuruniversity.ac.in/links/Syllabus/Faculty_of_Science/006_CBCS_Syllabus_M.Sc.Chemistry.pdf

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2.6.1

2019-20

LIST OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

Sr. No.	Course Name
1.	Introduction to Computers
2	C and CPP
3.	Arduino
4..	Inkscape
5.	Python
6.	Latex
7.	Advanced CPP

LIST OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

Sr. No.	Course Name
1.	Certificate Course in Bioinformatics

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

2019-20

Syllabi of Diploma / Certificate Courses

SYLLABUS OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

1. Certificate course in Introduction to Computers

Sr. No.	Topic Name	Contents
1.	Printer Connection	How To Connect A Printer to Computer
2	Getting To Know Computer	Various Components of Computer How To Connect to the Various Components
3	Introductrion To Gmail	How to ● Create A Google Account ● Login to Gmail ● Write an Email ● Send an Email ● View an Email ● Logout Gmail
4	Compose Options For Eamil	How to Format the Email Text Attach Files to Email Share Files Via Google Drive Insert a Photo or Link to an Email About the Compose Window Options.
5	Google Drive Option	Creating a Document ,a Spreadsheet And a Presentation Uploading Files Sharing Options

2. Certificate course in C and CPP

Sr. No.	Topic Name	Contents
1	First C program	How to ● Write a simple C program. ● Compile it. ● Execute it. Some common errors and their solutions.
2.	First CPP program	How to ● Write a CPP program. ● Compile it. ● Execute it. Some common errors and their solutions.
3.	Tokens	How to define and use tokens. With the help of an example. Some common errors and their solutions.
4.	Functions in **C and CPP**	What is Functions? Syntax of function Significance of return statements. Examples on functions Some common errors and their solutions.
5	Scope of Variables in C and C++	Scope of Variables. Types of variables Global Variables. Local Variables. Example. Some common errors and their solutions.
6	Conditional Statements in **C and CPP**	How to execute a single statement? And a group of statements. Examples on it Some common errors and their solutions.
7.	Nested if and switch statement	Nested if statement Switch statement Some example on it
8.	Increment and Decrement Operators	Increment and Decrement Operators Some examples. Typecasting.
9.	Arithmetic Operators	Arithmetic Operators its types ● Additions. ● Subtraction. ● Division. ● Multiplication. ● Modulus.
10.	Relational Operators	Relational Operators

		• Less Than < • Greater Than> • Less Than or equal to<= • Greater Than or equal to >= • Equal to== • Not equal to !=
11.	Logical Operators	Logical AND. Logical OR. Logical MOT.
12.	Loops in **C and CPP**	For loop While loop Do….. while loop Through examples Some common errors and their solutions.
13	Array in **C and CPP**	Array. Declaration of an array. Initialization of an array. Through examples Some common errors and their solutions.
14.	2- Dimensional Array	What is a 2D array Through examples Some common errors and their solutions.
15.	String in **C and CPP**	What is string? Declaration of string. Initialization of a string. Through examples Some common errors and their solutions
16.	String Library Functions	String Library Functions. Some Examples.
17.	Structures in C	What is a structures? Declaration of structures. Through examples.
18.	Pointers in **C and CPP**	Pointers. To create pointers. And operations on pointers. Through examples.
19.	Functions call in **C and CPP**	Call by value. Call by reference. Through examples.
20.	Files in C	How • To open a file. • To read data from a file. • To write data into a file. Through examples.

3. Certificate course in Arduino

Sr. No.	Topic Name	Contents
1.	Introduction To Arduino	What is the Arduino Device? Features Of Arduino Componenets Of Arduino Board Microcontrollers Installation Of Arduino IDE On Ubuntu Linux OS
2	Ardunio Components And Ide	Set Up Physical Connection Between Arduino and a Computer Ardunio Hardware Ardunio Programming Language
3	First Arduino Program	How to Write an Arduino Program Compile The Program Upload The Program Blink An LED
4	Arduino With Tricolor Led And Push Button	How to connect a Tricolor Led to Arduino Board Write A Program to Blink a Tricolor Led Use Push Button To Control The Blinking.
5	Arduino With Lcd	Connect an LCD to Arduino Board. Write a Program to Display A text Message On The LCD.
6	Display Counter Using Arduino	Connect an LCD And a Push Button To Arduino Board. Write A Program to Increase the Count Whenever The Push button is Pressed.
7.	Seven Segment Display	Connect a Seven Segment Display to Arduino Board. Write A Program to Display Digits From 0 to 4 On Seven Segment Display.
8.	Assembly Programming Through Board	Interface a Seven Segment Display To Arduino Board. Write An Assembly Program To Display aDigit On Seven Segment Display. Display a Digit On the Seven Segment Display. Implement and Verify the and,Or,Xor Operations in Assembly. Implement and Verify Simple Combinational Logic.
9.	Digital Logic Design With Ardunio	Implement and Verify the and,Or,Xor Operations In Assembly. Implement and Verify Simple Combinational Logic.

10.	Avr Gcc Programming Through Arduino	Interface A Seven Segment Display Though Arduino Board. Write A AVR-GCC Program To Display On Seven Segment Display. Display Digits 0To 9 On Seven Segment.
11.	Interfacing Lcd Through Avr – Gcc Programming	Interface LCD Through Arduino Board Write An AVR-GCC Program to Display a Digit On LCD
12	Electronic Component And Connection	Bread Board and its Internal Connection Led On Bread Board Push Button Seven Segment Display On Bread Board
13	Overview Of Arduino	Various Electronic Components and their Connections Contents Related to Other Series
14	Mixing Assembly And C Programming	Write a Function in Assembly Routine to Perform Initialization Call that Assembly Routine In AVR-GCC Program to Blink The Dot Led of Seven Segment Display .

4. Certificate course in Inkscape

Sr. No.	Topic Name	Contents
1	Create and edit Shapes	Inkscape interfaces How to create basic shapes How to Fill color in the shape . Modify shapes using handles.
2.	Fill color and stroke	How to Fill color in objects. Give objects an outline. Various type of gradient. Stroke paint and stroke style.
3.	Create and edit multiple shapes.	How to Copy and paste objects. Duplicate and clone objects. Group and order various objects. Multiple selection and invert selection.
4.	Layers and Boolean operations	What are ● Layers. ● Filters. ● Boolean operations.
5	Align and Distribute Objects	How Align and Distribute Various Objects? Arrange objects in rows and columns. Set spacing between Objects. Create a tile pattern.
6	Create and format text	Inserting text. Formatting and aligning text.

		Spacing and bullet. Create a simple flyer at the end.
7.	Text tool features	Manual Kerning. Spell checking. Super script. Sub script.
8.	Basics of Bezier tool	Draw straight line and closed shapes. Draw curve line. Add, edit and delete node.
9.	Text Manipulations	Create text on path. Create text on shape. Image inside text. Text on perspective. Cut out text.
10.	Overview of inkscape	Draw an edit various predefined shapes.
11.	Create an A4 Poster	Change the document properties. Create an A4 poster. Save the poster in PDF.
12.	Create a 3 fold Brochure	Using guidelines and set them. Design a 3 fold brochure. Using importance of layers.
13	Design a CD label	Create a CD label Template. Design a CD Label. Save the file as PNG.
14.	Designing a Visiting card	Setting for a visiting Card. Designing a visiting Card. Setting to print multiple copies of Visiting card.
15.	Create pattern in inkscape	Cloning. Pattern along path. Spray tool. Path effect color.
16.	Special effects on text	Reflected text. Labeled text. Change the case of text.
17.	Trace bitmap in inkscape	Difference between raster and vector image. Various raster and vector format. Convert raster PNG image to vector.
18.	Warli art for textile design	Warli art for design for borders. Repeat pattern using cloning.
19.	Manage pattern for textile design	To create mango pattern. Draw using pattern along path.

5. Certificate course in Python

Sr. No.	Topic Name	Contents
1.	Getting Started With Ipython	How to Invoke the Ipython Interpreter. Quit The Ipython Interpreter. Navigate the Ipython Session History.
2	Using Plot Command	How to ● Create Simple Plots of Mathematical Functions. ● Use the Plot Window to Study Plots Better.
3	Embellishing A Plot	How to Modify the Attributes of the Plot Color,Line Style,Linewidth. Add a Title to the Plot With Embedded Latex. Label X and Y Axes. Add Annotations to the Plot. Set and Get The Limits Of Axes.
4	Saving Plots	How to Save the Plots Using Savefig() Functions. Save Plots in Different Formats.
5	Multiple Plots	How to Draw Multiple Plots Which are Overlaid. Use of Figure Command. Use the Legend Command. Switch Between the Plots to Perform Some Operations.
6	Subplots	How to Create and Switch Between Subplots.
7.	Additional Features In Ipython	How to ❖ Retrieve Your Ipython Histry. ❖ View a Part of the History ❖ Save A Part of the History to File. ❖ Run A Script Fron Witin Ipython.
8.	Loading The Data Fro Files	Read Data Fro Files Which Contain Data In 1. Single Column Format 2. Multiple Columns Separated By Spaces Or Other Delimiters.
9.	Ploting Data	Define a List of Numbers. Perform Element Wise Squaring Of the List. Plot Data Point. Plot Errorbars.
10.	Other Types Of Plots	How To ● Create Scatter Plot. ● Create Log-Log Plots.
11.	Ploting Charts	How To ● Create Pie Charts. ● Create Bar Charts. ● Find More Information On Matplotib.
12.	Getting Started With List	How To ● Create Lists. ● Access List Elements.

		● Append Elements To Lists. ● Delete Elements From Lists.
13.	Getting Started With For	How To Use For Loop. Use of Range() Functions.
14.	Getting Started With Strings	Define Strings In Different Ways. Concatenate Strings. Print A String Repeatedly. Acesss Individual Elements Of The Strings.
15.	Getting Started With Files	How To ✧ Open a File ✧ Read the Contents the File Line by Line ✧ Read the Entire Content of File at Once ✧ Append the Lines of a File to a List .
16.	Parsing Data	How to ■ Split A String Using A Delimiter ■ Remove The Leading ,Trailing And All Whitespaces In A String. ■ Convert Between Different Built in Data Type
17	Statistics	Statistical Operations In Python Sum a Set Of Numbers How to Find Their Mean ,Median And Standard Deviation.
18	Getting Started With Aray	How to ■ Create An Array Using Data ■ Create Arrays From Lists ■ Perform Basic Array Operations ■ Create An Identity Matrix Use the Method Zero
19.	Acessing Parts Of Array	How to ● Acess And Change ● Individual Elements Of Single Dimensional And Multi- Dimensional Arrays. ● Rows And Columns Of Arrays. ● Elements Of An Array,Using Slicing And Striding.
20.	Image Manipulation Using Array	How to Read Images into Arrays. Perform Processing On Them Using Simple Array Manipulations.
21.	Advanced Matrix Operations	How to ● Find Frobenius and Infinity Norm of a Matrix. ● Find Singular Value Decomposition of a Matrix.
22.	Least Square Fit	How to Generate the Least Square Fit Line For a Given Set of Points.
23.	Basics Datatypes And Operators	How to ● Use Data types in Python ● Numbers ● Boolean.

		• Operators In Python • Arithematic Operators. • Boolean Operators.
24.	Sequence Data Types	Sequence Data Types List Sting Tuple. Accessing the Above Data Types Using Index.
25.	Input And Output	How to • Print Some Value • Print Using Format Specifiers. • Take Input From User. • Display A Prompt to the User Before Taking the Input.
26.	Conditional Statements	If Else Block If /Elif/Else Blocks Ternary Conditional Statement Pass Statement
27.	Loops	For Loop While Loop Break ,Continue and Pass Statements in Loop
28.	Maniputing Lists	Slicing and Striding of Lists Sortv And Reverse Lists
29.	Manipulating Strings	How to • Slice a String And Get Sub string Out Of Them • Reverse A String • Replace Characters in a String
30	Getting Started With Tuples	Understand What Tuples Are ? Compare Tuples With Lists Know Why They Are Needed? Learn To Use Them
31	Dictionaries	Create Dictionaries Add And Delete The Data From Dictionaries Retrieve Data Drom Dictionaries Check For Presence Of Keys
32	Sets In Python	Create Sets From Lists Perform Union, Intersection And Symmetrics Diffeerence Operation Check If a Set is a Subset of Other Understand Various Similarities With Lists
33	Getting Started With Function	Define a Function Define Function With Argumnets Use Doc Strings
34	Advance Features Of Functions	Define And Call Functions With Arbitary Arguments Built in Functions And Its Use In Library Of Python
35	Uisng Python Module	How to Execute Python Scripts From Command Line

		Use Import In Scripts Import Numpy And Matplotlib.Pyplot Modules
36	Writing Python Scripts	What is Importing ? How to Write Your Own Python Module And Its Details.
37	Testing Debugging	What is Software Testing ? How to Use Simple Function Of Their Functionalities Automate Tests What is the Need Of Coding Style?
38	Handing Errors And Exceptions	Understand Errors and Exceptions Handle Errors and Exceptions

6. Certificate course in Latex

Sr.No.	Topic Name	Contents
1.	Letter writing	How to write letters using Latex with options
2	Mathematical type setting	How to get into and leave from the mathematical mode The role of spaces and how to create them Mathematical symbols Amsmath package and its use in creating matrices
3	Equations in Latex	How to create the equations? Components of equations Details of components in equation.
4	Tables and Figures	How to create a table using tabular environment Ways of inserting information in table.
5	Beamer	How to create presentation in Latex and Beamer?
6	Bibliography	Creating reference using Latex and beaptec in details.
7.	Feedback diagram with Maths	The procedure of creating diagram /figure How to Create a figure (xfig)
8.	Latex on Windows using Text works	Download and install MikTex Write a basic Latex Documents using Texworks Configure MikTex to download missing packages.
9.	Report Writing	How to ● Use report and article class ● Create sections ● Automate the numbering of sections ● Create table of contents ● Create the title page

7. Certificate course in Advanced Cpp

Sr No	Topic Name	Contents
1.	Classes And Objects In CPP	Classes Objects Encapsulation And Data Abstraction
2	Constructor And Destructor	What Is Constructor ? Types Of Constructors Destructors Constructors And Destructors With Example
3	Static Variables	What is ● Static Keyword ● Static Variables ● Static Function Through An Example
4	Inheritance In Cpp	Inheritance Types Of Inheritance Example On It
5	Multiple And Hirearchical Inheritance	Definition of Multiple and Hierarchical Inheritance Example on It
6	Function Overloading And Overriding In CPP	What is ● Function Overloading? ● Function Overriding? Example
7.	Ploymorphism In CPP	What is Ploymorphism? What is Virtual Functions? Both Concept Through Example
8.	Abstract Class And Pure Virtual Function In CPP	What is Abstract Class And Pure Virtual Function in CPP With Some Example?
9.	Friend Function	What is Friend Function? Example On Friend Function. Illustration of the Concept Using Online Editor.
10.	Exception Handling In Cpp	Exception Handling In Cpp With Some Example

SYLLABUS OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

1. Certificate Course in Bioinformatics

Paper 1 : Computer Aided Bioinformatics.

UN	Detail Syllabus of the Unit
1	**Communicating Electronically: Email and Web Sites:** Using Email, Observe the email conventions where you work, Keep your messages brief, Make your messages easy to read on screen, Provide an informative, specific subject line,

	Take time to revise, Remember that email isn't private, Creating Web Site, Begin by defining your site's objectives, Provide quick and easy access to the information your readers want, Design pages that are easy to read and attractive, Design your site for international and multicultural readers, Enable readers with disabilities to use your site, Help readers find your site on the Internet, Test your site on multiple platforms and browsers before launching it, Keep your site up to date, Ethics Guideline: Respect intellectual property and provide valid information, Exercises **website creation.**
2	Fundamentals of Computing: Introduction to operating Systems: WINDOWS, NT, UNIX/Linux operating systems. Comparative Advantages of Security (hacking9, cracking) Installation. Portability and Programming of these operating systems. Computer Viruses
3	Computer Networking: LAN, WAN, MODEM. Optical Vs. Electronic Networking. Security of the network, Fire-walls. Network Goals, Applications Network, Network structure, Network architecture, Hierarchical networks, Ethernet and TCP / IP family of protocols, Transport protocol design
4	Programming Language: what is program, algorithms, introduction to various programming languages like C, C++, Python, cobra java, Bioprogramming languages Perl, Bioperl, biojava, etc, markup languages. XML,HTML

Paper II Basics of Bioinformatics

UN	Detail Syllabus of the Unit
1	Basics of Bioinformatics, nature and diversity of biological data, Bioinformatics: emergence and growth, bioinformatics Scenario in India, world. ***International Nucleotide Sequence Database Collaboration***
2	**Browsing Genomic Resources:** Genome Assembly overview Related data resources (EST, STS, GSS, HSS) etc. Genomic databases at EBI and NCBI Genomic databases for human, mouse, yeast and other model organisms Genomic databases for plant, microbial, parasite and viral genomes Challenges in development of genomic databases & resources
3	**Structure visualization:** Factors Affecting Structure of Molecules Principles of Structure: Bonds, bond angles, et. dihedral angles, Anatomy structures: primary, secondary angles, e structural elements (alpha, beta, coil, turns) Tertiary & quaternary structure organization, **visualization tools** for nucleic acid as well as protein.
4	**Use of Bioinformatics:** Agriculture, Pharmacy , Human Health, Biotechnology, Molecular Biology, Drug Discovery.
5	assignments

Paper III Basics of Bioinformatics

UN	**Detail Syllabus of the Unit**

	This paper describes how to acquire information from public domain: biological databases by using computers and internet.
1	What is data? biological data, database classification of biological databases. data base operating system like mysql, oracal. data base management Systems. public domain resources in biology. search engines, Wikipedia. ***In silico LITERATURE MINING/LITERATURE DATABASES Pub Med, Medline, PubMed Central*:** Entrez: search engine to search and retrieve references, concepts in keyword based searches and MeSH terms, other literature databases & Open source journals in the area of Bioinformatic. Searching & retrieval of data: concepts Database search engines: Entrez & SRS Keyword-based search and retrieval, use of wild card characters, narrowing and broadening the search, using history feature, use of Boolean operators, learning use the limits feature, curation and processing of search results, extraction of sequences in various formats, online and batch processing.
2	**NUCLEIC ACID DATABASES** Organization of data, Contents and format of entries, sequence format, submission of data in following databases: o GenBank o EMBL o DDBJ 3 Biological databases II:
3	Biological databases II: Protein sequence database Organization of data, Formats and contents of entries, submission of data in following databases: o SwisProt o PIR PSD o UniProtKB
4	Protein 3d structure databases: protein data bank FSSP, DSSP, CATH, SCOP Metabolic pathway database.
5	Assignments

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE,
North Ambazari Road, Near Ambazari Lake, Nagpur

NAAC ACCREDITED GRADE 'A' WITH CGPA 3.01 (Third Cycle)

CRITERION-II

Teaching- Learning and Evaluation

YEAR-1

2018-19

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

SSR: 2023 FOR NAAC FOURTH CYCLE

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

List of Documents(2018-19)

Sr. No.	Name of Document
1.	Link of Core Courses Subject Syllabi in UG and PG Programme.
2.	List of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
3.	Syllabi of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
4.	Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution

Prof. Pitambar Humane
IQAC Coordinator
CO ORDINATOR
INTERNAL QUALITY ASSURANCE CELL
DHARAMPETH, M. P. DEO MEMORIAL &
SCIENCE COLLEGE, NAGPUR

Dr. Akhilesh Peshwe
Principal
Principal
Dharampeth M.P. Deo Memorial
Science College, Nagpur.

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

Link for RTMNU syllabus for UG and PG

Graduation (UG)

Compulsory English
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Comp_Eng.pdf
Supp. Eng
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Supp_Eng.pdf
Hindi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Hindi_Syllabus.pdf
Marathi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/marathi_syllabus.pdf
Statistics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.A_%20B.Sc_Statistics_Semester_Pattern2013.pdf
Botany
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Botany_Semester_Pattern.pdf
Zoology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Zoology_semester_Pattern_2013.pdf
Microbiology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Microbiology_revised_syllabus_23092020.pdf
Physics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Physics_Semester_Pattern2013.pdf
Chemistry
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Chemistry_Semester_Pattern2013.pdf
B.Sc. Chemistry

B.Sc. Chemistry I Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry I Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_II_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSC_Chem_sem_II_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_II_paper_II_revised_syllabus_080920.pdf
Revised Complete U.G. Chemistry Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Revised_Complete_U.G.ChemistryRYSyllabus2018-19.pdf
Electronics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Electronics_Semester_Pattern2013.pdf
Mathematics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Mathematics_Semester_Pattern2013.pdf
Computer Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Computer_Science_Semester_Pattern2013.pdf
Home Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_home_science_syllabus_scheme_29092020.pdf

Post-Graduation (PG)

Mathematics
https://nagpuruniversity.ac.in/writereaddata/fckimagefile/MSc_Mathematics_Revised_Syllabus__CBCS____22nd_October_2021.pdf

Chemistry

https://www.nagpuruniversity.ac.in/links/Syllabus/Faculty_of_Science/006_CBCS_Syllabus_M.Sc.Chemistry.pdf

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

2018-19

LIST OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

Sr. No.	Course Name
1.	Java
2	Linux
3.	C & CPP
4.	Libreoffice Suite[Base]

LIST OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

Sr. No.	Course Name
1.	Certificate Course in Bioinformatics

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

2018-19

Syllabi of Diploma / Certificate Courses

SYLLABUS OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

1. Certificate course in Java

Sr. No.	Topic Name	Contents
1.	Getting Started With Java Installation	How to Install the JDK Using Snaptic Package Manager? What is Java ? Types and Application Of Java
2	First Java Program	How to ● Create a Simple Java Program ● Compile and Run the Program ● Naming Conventions
3	Installing Eclipse	How to Install Eclipse On Ubuntu And Redhat
4	Getting Started With Java	Create a Program And A Class How to Write And Run A Program?
5	Hello World Program In Java On Eclipse	How to Create Hello World Program In Java On Eclipse
6	Errors And Debugging In Java	What Are Errors ? Identify Errpors Types of Errors Fix the Errors
7.	Programming Features Of Eclipse	Features Of Eclipse(User Friendly)
8.	Arithmatic Opertaions	How to Use ● Addition ● Multiplication ● Substarction ● Division Operators in Program
9.	Numerical Datatype	Unsderstand Numerical Data How to Store the Data Correctly

10.	Strings	How To ● Create String ● Add String ● Convert Strings Upper and Lower Cases
11.	Creating Class	A Class in Java Structure of Class Syntax of Class Example of Java Class
12.	Creating Object	Reference Variables Constructing Objects Memory Allocation In Objects
13.	Instance Fields	What are Instance Fields? How to Use It and Modify The Instances
14.	Methods	How to Create and Call a Method In Java Program
15.	Default Constructor	About Default Constructor And How To Create A Constructor.
16.	Parameterized Constructor	How to Create Parameterized Constructor With Example
17	Using This Keyword	What is This Keyword Use of it With Fields
18	Non Static Block	What is Non Static Block? Execution of Non Static Block With Example.
19.	Constructor Overloading	What Is Constructor Overloading and its Use in a Program.
20.	Method Overloading	What is Method Overloading? How to Overload Method?
21.	Type Conversion	How to Convert Data From One Data Type to Another. Implicit and Explicit Conversion.
22.	Use Input	How to Take User Input in Java ?
23.	Logical Operators	What are Logical Operators? Use of Logical Operators. To Check Multiple Expression Using Logical Opertaors How to Override Precedence Using Parenthesis?.
24.	Realtional Opertaors	Boolean Data Type Relational Operators How To Compare Data
25.	While Loop	While Loop Syntax Example
26.	If –Else Construct	Conditional Statements Its types How To Use Conditional Statements

27.	Nested If And Ternary Operators	Use of Nested If And Ternary Operators With Its Syntax And Example In Java
28.	Switch Case	How to Use the Switch Case In Java With Syntax And Example
29.	For Loop	How to Use the For Loop In Java With Syntax And Example
30	Array	Introduction to Array Create an Array How to Access Data Using Array?
31	Array Opwrations	How to Import an Array Array Opertaions
32	Do-While	Use Of Do—While Loop Synatx Example
33	Subclassing And Method Overriding	Subclassing , Method Overriding Extend Keyword
34	Calling Methods Of The Super Class	How to Call Methods of the Super Class? Use of Super Keyword How to Invoke the Constructor of the Super Class
35	Using Final Keyword	Use of Final Keyword How and When invoke Final Variables?
36	Polymorphism	What is Polymorphism? Run Time Polymorphism Virtual Method Invocation Compile Time Polymorphism
37	Abstract Classes	Abstarct Methods And Concrete Methods Abstract Classes And Concrete Classes Use of Abstract Classes
38	Java Interfaces	How to Create an Interface An Implementation of Class Usage of Interface
39	Static Variables	What are Static Variables? How to Create and Use Static Variables?
40	Static Methods	Defintion Of Static Methods Diiference Between Instance Methods And Static Methods How to Use of Static Methods?
41	Static Blocks	What are Static Blocks How to Declare Static Blocks How to Use Static Blocks.
42.	Exception Handling	What is Exception Handling? Use of Try and Catch Block Finally Block.

43.	Custom Exceptions	What are Custom Exceptions?

2. Certificate course in Linux

Sr.No.	Topic Name	Contents
1.	Basic Commands	Basic Commands Command Interpreter Man Command
2	General Purpose Utilities In Linux	General Command Use To Open Terminal Common Escape Sequences With Echo Command What Is Root User What Are Files In Linux Directories In Linux
3	Simple Filters	Several Commands Use In Linux Head,Tail,Sort,Cut,Paste And Different Symbols Which Can Be Use By The Users
4	File Systems	What Is File And Directory? Directory And Its Use/Purpose File Inode Types Of Files All Files In Linuex Are Related How Tpo Change Directory Use Of Mkdir Command Use Of Rmdir Command
5	File Attributes	What Are File Attributes? Use Of Chmod Command With Syntax And Example. File Permission And Its Types Changing Group Using Chgrp Command Hard Links And Soft Links
6	Redirection Pipes	What Are Pipes ? How To Use It . Example
7.	Working With Linux Process	What Is A Process? Working Of Shell Process? What Is Spawning? What Is Process Attributes?
8.	The Linux Enviorment	How To Operate Linux Enviorment? What Are Different Ways To Manipulate It? What Are Shell Variables?
9.	Basics Of System Administration	What Is Adduser? Su,Usermod,Userdel,Id,Du,Df
10.	Working With Regular Files	How To Use Files And Directories Together From The Linux File System. The Cmp Command.

11.	The Grep Command	The Grep Command With Some Examples.
12	More On Grep Command	More On Grep Command. With Some Examples.
13	The Sed Command	The Sed Command Through Some Examples.
14	Installing Software16.04	How To Install Software In Ubuntu Linux 16.04 Os Via Terminal Synaptic Package Manager. Ubuntu Software Center.
15	Desktop Customization	What Is Launcher How To Remove And Add Application In The Launcher. Use Multiple Desktops. Change The Theme Of Desktop. Internet Connectivity. Sound Settings. Time And Date Setting. How To Swtich To Other User Accounts.
16	Ubuntu Linux Desktop 16.04	Ubuntu Linux Desktop On Gnome Enviorment With Some Examples.

3. Certificate course in C & CPP

Sr. No.	**Topic Name**	**Contents**
1	First C program	How to ● Write a simple C program. ● Compile it. ● Execute it. Some common errors and their solutions.
2.	First CPP program	How to ● Write a CPP program. ● Compile it. ● Execute it. Some common errors and their solutions.
3.	Tokens	How to define and use tokens. With the help of an example. Some common errors and their solutions.
4.	Functions in **C and CPP**	What is Functions? Syntax of function Significance of return statements. Examples on functions Some common errors and their solutions.

5	Scope of Variables in C and C++	Scope of Variables. Types of variables Global Variables. Local Variables. Example. Some common errors and their solutions.
6	Conditional Statements in **C and CPP**	How to execute a single statement? And a group of statements. Examples on it Some common errors and their solutions.
7.	Nested if and switch statement	Nested if statement Switch statement Some example on it
8.	Increment and Decrement Operators	Increment and Decrement Operators Some examples. Typecasting.
9.	Arithmetic Operators	Arithmetic Operators its types ● Additions. ● Subtraction. ● Division. ● Multiplication. ● Modulus.
10.	Relational Operators	Relational Operators ● Less Than < ● Greater Than> ● Less Than or equal to<= ● Greater Than or equal to >= ● Equal to== ● Not equal to !=
11.	Logical Operators	Logical AND. Logical OR. Logical MOT.
12.	Loops in **C and CPP**	For loop While loop Do….. while loop Through examples Some common errors and their solutions.
13	Array in **C and CPP**	Array. Declaration of an array. Initialization of an array. Through examples Some common errors and their solutions.

14.	2- Dimensional Array	What is a 2D array Through examples Some common errors and their solutions.
15.	String in **C and CPP**	What is string? Declaration of string. Initialization of a string. Through examples Some common errors and their solutions
16.	String Library Functions	String Library Functions. Some Examples.
17.	Structures in C	What is a structures? Declaration of structures. Through examples.
18.	Pointers in **C and CPP**	Pointers. To create pointers. And operations on pointers. Through examples.
19.	Functions call in **C and CPP**	Call by value. Call by reference. Through examples.
20.	Files in C	How ● To open a file. ● To read data from a file. ● To write data into a file. Through examples.

4. Certificate course in Libre office Suite[Base]

Sr No	**Topic Name**	**Contents**
1.	Introduction	What is Lireoffice Suite? Prerequisites For Using Base What Can You Do With Base? Relational Data Base Basics Create New Database Create A Table
2	Table And Relationship	Adding Data To A Table Define And Create Relationship Data Base
3	Modify A Simple Form	How to ● Enter Data Into A Form ● Modify Data In Form
4	Create A Simple Form	What is a Form? How to Create a Form Using the Wizard ?

5	Build A Complex Form With Form Control	Building a Complex Form Modify the Form
6	Add A List Box Form Control To A Form	How to Add a List Box Form Control ?
7.	Add Push Button To A Form	How to Add Push Button To A Form?
8.	Create Queries Using Query Wizard	How to ● Create Queries Using Query Wizard ● Select Field ● Set The Soring Order Of Fields ● Provide Search Criteria Or Conditions
9.	Enter And Update Data In Form	How to Enter And Update Data in a Form? How to Add Form Control in a Form?
10.	Create Queries In Design View	Create A Query By Using a Design View Add Table to the Query Design Window Select Field.
11.	Modify A Report	How to Modify a Report by Customizing the Layout and Look and Fill of the Report
12	Create Tables	How To Create A Table By Creating Views Using The Copy Method
13	Create Subform	How To Create A Subform With Example
14	Create Simple Queries In Sql View	How to ● Create Simple Queries In Sql View. ● Write Simple Sql ● Use Select and From And Where Clause.
15	Access Data Source	How to ● Access Other Data Sources ● Register .Odb Databases ● View Data Sources.
16	Database Maintenance	How to ● Maintain A Data Base ● Modify Data Base Structure ● Defragment A Database ● Take Backups
17	Indexes Table Filter And Sql Command Window	How To Indexes Table Filter And Sql Command Window
18	Database Design Purpose	What is Database Design ? Determining the Purpose of our Database Finding and Organizing information required Dividing the Information Into Table.
19	Database Design –Primary Key And Relationships	Database Design Turn Information Into Column Specify The Primary Key Set Up Database Relationship

20	Define –Refine Database Design And Normalization Rules	Refine The Database Design Apply The Normalization Rule And Test The Databases
21	Create Report	How To Create A Report Select ,Lable And Sort The Report Fields Select Report Layout Choose Report Type : Static Or Dynamic

SYLLABUS OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

1. Certificate Course in Bioinformatics

Paper 1 : Computer Aided Bioinformatics.

UN	Detail Syllabus of the Unit
1	**Communicating Electronically: Email and Web Sites:** Using Email, Observe the email conventions where you work, Keep your messages brief, Make your messages easy to read on screen, Provide an informative, specific subject line, Take time to revise, Remember that email isn't private, Creating Web Site, Begin by defining your site's objectives, Provide quick and easy access to the information your readers want, Design pages that are easy to read and attractive, Design your site for international and multicultural readers, Enable readers with disabilities to use your site, Help readers find your site on the Internet, Test your site on multiple platforms and browsers before launching it, Keep your site up to date, Ethics Guideline: Respect intellectual property and provide valid information, Exercises **website creation.**
2	Fundamentals of Computing: Introduction to operating Systems: WINDOWS, NT, UNIX/Linux operating systems. Comparative Advantages of Security (hacking9, cracking) Installation. Portability and Programming of these operating systems. Computer Viruses
3	Computer Networking: LAN, WAN, MODEM. Optical Vs. Electronic Networking. Security of the network, Fire-walls. Network Goals, Applications Network, Network structure, Network architecture, Hierarchical networks, Ethernet and TCP / IP family of protocols, Transport protocol design
4	Programming Language: what is program, algorithms, introduction to various programming languages like C, C++, Python, cobra java, Bioprogramming languages Perl, Bioperl, biojava, etc, markup languages. XML,HTML

Paper II Basics of Bioinformatics

UN	Detail Syllabus of the Unit
1	Basics of Bioinformatics, nature and diversity of biological data, Bioinformatics: emergence and growth, bioinformatics Scenario in India, world. ***International Nucleotide Sequence Database Collaboration***
2	**Browsing Genomic Resources:** Genome Assembly overview Related data resources (EST, STS, GSS, HSS) etc. Genomic databases at EBI and NCBI Genomic databases for human, mouse, yeast and other model organisms Genomic databases for plant, microbial, parasite and viral genomes Challenges in development of genomic databases & resources
3	**Structure visualization:** Factors Affecting Structure of Molecules Principles of Structure: Bonds, bond angles, et. dihedral angles, Anatomy structures: primary, secondary angles, e structural elements (alpha, beta, coil, turns) Tertiary & quaternary structure organization, **visualization tools** for nucleic acid as well as protein.
4	**Use of Bioinformatics:** Agriculture, Pharmacy , Human Health, Biotechnology, Molecular Biology, Drug Discovery.
5	assignments

Paper III Basics of Bioinformatics

UN	**Detail Syllabus of the Unit** This paper describes how to acquire information from public domain: biological databases by using computers and internet.
1	What is data? biological data, database classification of biological databases. data base operating system like mysql, oracal. data base management Systems. public domain resources in biology. search engines, Wikipedia. ***In silico LITERATURE MINING/LITERATURE DATABASES Pub Med, Medline, PubMed Central*:** Entrez: search engine to search and retrieve references, concepts in keyword based searches and MeSH terms, other literature databases & Open source journals in the area of Bioinformatic. Searching & retrieval of data: concepts Database search engines: Entrez & SRS Keyword-based search and retrieval, use of wild card characters, narrowing and broadening the search, using history feature, use of Boolean operators, learning use the limits feature, curation and processing of search results, extraction of sequences in various formats, online and batch processing.
2	**NUCLEIC ACID DATABASES** Organization of data, Contents and format of entries, sequence format, submission of data in following databases: o GenBank o EMBL o DDBJ 3 Biological databases II:
3	Biological databases II: Protein sequence database Organization of data, Formats and contents of entries, submission of data in following databases: o SwisProt o PIR PSD o UniProtKB

4	Protein 3d structure databases: protein data bank FSSP, DSSP, CATH, SCOP Metabolic pathway database.
5	Assignments

Dharampeth Education Society's
DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE,
North Ambazari Road, Near Ambazari Lake, Nagpur-440033

Program Outcome, Program Specific Outcome & Course Outcome

For B. Sc. (Science & Home Science) and M. Sc. (Mathematics)

Internal Quality Assurance Cell (IQAC)

CONTENTS

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY NAGPUR AFFILIATED UG & PG COURSES

IIT SPOKEN TUTORIAL CERTIFICATE COURSE

UGC SANCTIONED CERTIFICATE AND DIPLOMA COURSES

DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN, RTM NAGPUR UNIVERSITY AFFILIATED CERTIFICATE COURSES

BOTANY

Department of Botany	After successful completion of three years degree program in the subject Botany the students are able to:
Program Outcomes	**PO1:** Students know about different types of lower & higher plants their evolution in from algae to angiosperm &also their economic and ecological importance. **PO2:** Cell biology gives knowledge about cell organelles & their functions. **PO3:** Molecular biology gives knowledge about chemical properties of nucleic acid and their role in living systems. **PO4:** Genetics provides knowledge about laws of inheritance, various genetic interactions, chromosomal abrasions & multiple alleles. **PO5:** Structural changes in chromosomes. **PO6:** Student can describe morphological & reproductive characters of plant and also identified different plant families and classification. **PO7:** They know economic importance of various plant products & artificial methods of plant propagation. **PO8:** Various concepts in ecology and phytogeography. **PO9:** Use modern Botanical techniques and decent equipment. **PO10:** To inculcates the scientific temperament in the students and outside the scientific community.
Program Specific Outcomes	**PSO1:** Students acquire fundamental Botanical knowledge through theory and practical. **PSO2:** To explain basis plant of life, anatomy, reproduction and their survival in nature. **PSO3:** Helped to understand role of living and fossil plants in our life. **PSO4:** Understand good laboratory practices and safety. **PSO5:** To create awareness about cultivation, conservation and sustainable utilization of biodiversity. **PSO6:** To know advance techniques in plant sciences like tissue culture, plant disease management, artificial gene transfer etc. **PSO7:** Students understand about the phytogeography of India, ethnobotanically important plants and their use.
Course Outcomes B. Sc Botany	
Course Outcome for Semester-I	
PAPPER-I: **VIRUSES, PROKARYOTES, ALGAE & BIOFERTILIZERS**	**CO1:** Study of Microbes and algae to understand their Diversity. **CO2:** Know the systematics, morphology and structure of Viruses, bacteria, Mycoplasma and algae. **CO3:** To know life cycle pattern of microbes and their economic importance.

	CO4: To know evolution of microbes and algae. **CO5:** To learn skill of preparation and use of biofertilizers for sustainable development.
PAPPER-II: **FUNGI, LICHEN, PLANT PATHOLOGY, BRYOPHYTA & MUSHROOM CULTIVATION**	**CO1:** Study of Fungi, Lichens, plant pathology and Bryophyta. **CO2:** To know the systematics, morphology and structure of fungi, Lichens, plant pathogens, hosts and Bryophytes **CO3:** To know life cycle pattern of fungi, lichens, plant pathogens and bryophytes. **CO4:** To know economic importance of fungi, lichens and Bryophytes. **CO5:** To know evolution of fungi, lichens and Bryophytes. **CO6:** To learn skill of cultivation and importance of mushrooms for human consumption.
Lab Work:	• To get acquainted with ultrastructure of viruses and bacteria, to study staining method of bacteria • To study structure and reproduction of *Nostoc* • To study the structure and reproduction in Algae, like *Chara, Vaucheria, Ectocarpus* and *Batrachospermum* • To learn the method of identification and characterization of bacteria useful in biofertilizers • To learn staining method of fungi and bryophytes. • To get acquainted with different plant pathogens and lichens • To learn the technique of mushroom cultivation
Course Outcome for Semester-II	
PAPPER-I: **PALAEOBOTANY, PTERIDOPHYTA, GYMNOSPERMS & SOIL ANALYSIS**	**CO1:** Study of Palaeobotany, geological time scale and morphology of angiosperms. **CO2:** To know life cycle pattern of Pteridophyta and Gymnosperms. **CO3:** To know the systematics, morphology and structure of Pteridophyta and Gymnosperms. **CO4:** To know economic importance of Pteridophyta and Gymnosperms. **CO5:** To know evolution of Pteridophyta and Gymnosperms. **CO6:** To learn the skill of soil analysis for cultivation of variety of plants.
PAPPER-II: **MORPHOLOGY OF ANGIOSPERMS & FLORICULTURE**	**CO1:** To study the morphology of angiosperms with respect to evolution of plants. **CO2:** To the evolution of different floral organ for sexual reproduction in angiosperms. **CO3:** To know the variation among the reproductive organs of the angiosperms. **CO4:** To know the systematics, morphology and structure of angiosperms. **CO5:** To know the adaptive pollination and reproductive biology of angiosperms. **CO6:** To learn the skill of floriculture and its tools and techniques.

Lab Work:	• Observation and study of types of fossils • Study of structure and reproduction pteridophytes like, Selaginella & Equisetum and gymnosperms like, Cycas & Pinus • To get acquainted with types, physical and chemical properties of soil • Study of morphology of angiosperms, • Study of identification and commercial aspects of cut flowers
Course Outcome for Semester-III	
PAPPER-I: **ANGIOSPERM SYSTEMATICS, EMBROLOGY & INDOOR GARDENING**	**CO1:** To Study vegetative and floral characters of angiosperms. **CO2:** To know the preparation of floral formulae and floral diagrams of angiosperms. **CO3:** To know economic importance of angiosperms families. **CO4:** To know the pattern of embryogenesis in various angiosperms plants. **CO5:** To learn the skill for development of indoor gardening and its importance.
PAPPER-II: **ANGIOSPERM ANATOMY & HORTICULTURE**	**CO1:** To gain knowledge of different plant tissue and tissue systems. **CO2:** To understand structure and type of cells and tissues in plants, type of vascular bundles and stellar systems. **CO3:** To know the simple and complex tissues and its functions. **CO4:** To know the process of secondary growth and its role in formation of wood and periderm **CO5:** To learn the skill for horticultural practices used.
Lab Work:	• To Study fossil angiosperms • To learn the anatomy of dicot and monocot • To study embryology of angiosperms • To get acquainted with the techniques used in landscaping and indoor gardening • To study various horticultural crops
Course Outcome for Semester-IV	
PAPPER-I: **CELL BIOLOGY, PLANT BREEDING, EVOLUTION & SEED TECHNOLOGY**	**CO1:** Gain knowledge about cell and its function. **CO2:** Learn the scope and importance of Cell and Molecular biology. **CO3:** To understand ultrastructure of cell wall, plasma membrane and cell organelles **CO4:** To understand the morphology and structure of chromosomes. **CO5:** To understand the different techniques used in plant breeding. **CO6:** To know the process of evolution of plants in universe **CO6:** To learn the skill used in seed technology
PAPPER-II: **GENETICS, MOLECULAR**	**CO1:** To study structure, biochemical nature and role of nucleic acids.

BIOLOGY & PLANT NURSERY	**CO2:** To understand the type and applications of mutations. **CO3:** Understand the Mendelian and neo-Mendelian genetics. **CO4:** Know about interaction of genes, multiple alleles and linkage and crossing over. **CO5:** To learn the skill for preparation of plant nurseries and its importance for nature conservation
Lab Work:	• To study ultrastructure of cell organelles • To study cell division, mitosis and meiosis with use nuclear stain • To learn the different biostatistics methods • To study seed dormancy, viability and percentage of germination • To prove Mendel's laws of inheritance with the help of coloured beads • Study of interaction of genes through different genetics problems • To study sterilization for plant nursery and methods of propagation
Course Outcome for Semester-V	
PAPPER-I: **PLANT PHYSIOLOGY, MINERAL NUTRITION & HYDROPONICS**	**CO1:** To know the scope and importance of plant physiology. **CO2:** To understand plant & water relation and mineral nutrition. **CO3:** Understand process of photosynthesis, C_3, C4, CAM pathways. **CO4:** Understand the process of respiration, nitrogen metabolism and plant movement **CO5:** To learn the technique of development of hydroponics.
PAPPER-II: **PLANT ECOLOGY & ORGANIC FARMING**	**CO1:** To study concept of ecology and ecosystems. **CO2:** To understand climatic and edaphic factors. **CO3:** To know physiographic factors and interrelations among the living organisms. **CO4:** To understand the components of ecosystems, autecology, synecology and plant succession. **CO5:** To know the adaptations of plants. **CO6:** To learn the skill and importance of organic farming for healthy life.
Lab Work:	• To study the plant physiology experiments, like photosynthesis, respiration, permeability, RQ, photoperiodism, plant movements, etc. • To get acquainted with mineral nutrition and hydroponics • Study of different qualitative and quantitative methods used in plant ecology • To learn the techniques used in organic farming
Course Outcome for Semester-VI	
PAPPER-I: **BIOCHEMISTRY, BIOTECHNOLOGY &**	**CO1:** To study carbohydrates, lipids, amino acids and enzymology. **CO2:** To know the plant tissue culture techniques and

HERBAL TECHNOLOGY	applications. **CO3:** To understand tools and techniques used in genetic engineering. **CO4:** To know the artificial gene transfer techniques. **CO5:** To learn the skill used in formation of dye and cosmetics from plants. **CO6:** To know the basic concept of herbal technology.
PAPPER-II: **PHYTOGEOGRAPHY, UTILIZATION OF PLANTS, TECHNIQUES & PHARMACOGNOSY**	**CO1:** To know the phytogeography of India and world **CO2:** To know the natural resources and various types of pollutions and its impact on living organism. **CO3:** To study the natural resources and its conservation strategies. **CO4:** To know the economic importance of plants and ethnobotany. **CO5:** To study microscopy, electrophoresis, centrifugation and chromatography. **CO6:** To learn the basics of pharmacognosy and skill for used of plants in pharmacognosy.
Lab Work:	• To study the biochemical experiments • To study the different instruments and equipment used in biotechnology • To study the different techniques used in herbal technology • To learn types of pollution parameters. • To get acquainted with ethnobotany and economic botany with suitable examples • To study the techniques used in pharmacognosy

CHEMISTRY

Department of Chemistry	After successful completion of three years degree program in the subject Chemistry the students are able to:
Program Outcomes	**PO1:** The Programme enables the students to understand basic facts and concepts in Chemistry. **PO2:** To develop the ability to apply the principles of Chemistry, to develop problem solving skills, to become familiar with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies. **PO3:** Students know about importance of Qualitative and Quantitative analysis used for different samples like soil samples, alloys estimation, water analysis. New technological world using nanomaterials, properties of nano materials magnetic properties of materials. **PO4:** Thermodynamic and Thermochemistry useful in our daily life and related with our surrounding atmosphere. **PO5:** Nuclear Magnetic resonance spectroscopy allows the molecular structure of a material to be analyzed by observing the measuring the interaction of nuclear spins when placed in a powerful magnetic field and extensively used in medicine in the form of magnetic resonance imaging and for analysis of chemicals. **PO6:** Bioinorganic chemistry provides knowledge about significant role of metal ions in biological system which is required for the maintenance of life. **PO7:** Student can describe the process It also develops skills in the proper handling of apparatus and chemicals and also gets exposure to the different processes used in industries and their applications. **PO8:** Use modern techniques used in analysis of materials and handling of the new equipment during the practical. **PO9:** To inculcates the scientific temperament in the students during the experiments and how to corelate with outside the scientific community.
Program Specific Outcomes	**PSO1:** The B.Sc. programme enabled the students to enhance their critical thinking, during the three years period of study and the curriculum motivates the mental thoughts and suppositions of the students. This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and validity of the practical knowledge. This Analysis leads to take decisions at intellectual, directorial and personal from different perspectives of life.

	PSO2: Understand the basic principles and concepts underlying the inorganic, organic and physical chemistry. **PSO3:** Comprehend the applications of chemistry in various walks of life. **PSO4:** Students gained functional knowledges of the fundamental theoretical concepts and experimental methods of Chemistry. **PSO5:** The students will be benefited to equip themselves to job requirements in the quality control, analytical laboratory or production wing of any Chemical or Pharmaceutical industry. **PSO6:** Able to use instrumental methods of chemical analyses. Students acquire fundamental Botanical knowledge through theory and practical.
Course Outcomes B. Sc. Chemistry	
Course Outcome for Semester-I	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** Basic knowledge of atomic structure, inorganic fundamental of a periodic property. **CO2:** Conceptualization of Valence bond theory (VBT) and Molecular Orbital theory (MOT), and VSPER theory. **CO3:** Differentiation in ionic and metallic bond, and S-block elements. **CO4:** A study of P-block elements, oxyacids of Sulphur, hydride of Phosphorus, and noble gases. **CO5:** Food adulteration process and detection, test for detection physical adulteration and chemical adulteration and how to identify the food adulterant which are used various food products
PAPPER-II:PHYSICAL CHEMISTRY	**CO1:** Basic knowledge of thermodynamics and calculations of problems related to Thermo-chemistry. **CO2:** Difference between Ideal gas and Real gas and their related equation. **CO3:** Understanding of Liquid State with emphasis on properties of liquid. **CO4:** Concept of adsorption isotherm and principles of catalysis. **CO5:** Types of colloidal, electrophoresis and electro-osmosis, emulsion and gels
Course Outcome for Semester-II	
PAPPER-I: ORGANIC CHEMISTRY	**CO1:** Understand the concept structure, bonding in organic compounds and different types of reaction mechanisms. **CO2:** Understand the concept of stereochemistry in detail. **CO3:** Understand the nomenclature, synthesis, chemical and physical properties of alkanes, cycloalkanes and alkenes **CO4:** Understand the nomenclature, synthesis, chemical and physical properties of dienes, alkynes and also the concept of aromaticity of organic compounds. **CO5:** Fuels and its calorific values properties and uses application of lubricants in industries

PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** CO1: Second law of thermodynamics and free energy work functions. **CO2:** CO2: Understanding of Phase rule and liquid-liquid mixture. **CO3:** Insight into Nuclear Chemistry and Molecular Structure. **CO4:** laws of Chemical kinetics. **CO5:** Types of pollutions and its control measures, types of pollutants, adsorption techniques
Course Outcome for Semester-III	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** Diagrammatic representation of molecules according to MOT, and properties of interhalogen compounds **CO2:** Chemistry of first transition elements and non-aqueous solvents **CO3:** Comparative study of the second and third transition series and error in chemical analysis **CO4:** Chemistry of lanthanides and actinides, and lanthanide contraction
PAPPER-II: ORGANIC CHEMISTRY	**CO1:** Understand nomenclature, synthesis, chemical properties of alkanes in aryl, alkyl halides. **CO2:** Understand nomenclature, synthesis, chemical properties of dihydric, trihydric alcohols and phenols in detail **CO3:** Understand nomenclature, synthesis, chemical properties of aldehydes and ketones and mechanisms of nucleophilic addition **CO4:** Understand nomenclature, synthesis, chemical properties of carboxylic acids and their derivatives along with reactive mechanisms.
Course Outcome for Semester-IV	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** A detail study of coordination compounds and its applications. **CO2:** Isomerism and redox process in inorganic compounds. **CO3:** The concept organometallic and metal carbonyl compounds. **CO4:** Applications of inorganic macromolecules in the biological concept, and acid-bases principles.
PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** Insight into laws of crystallography and Bravais lattices **CO2:** Debye-Huckel theory and concepts related to electrochemistry **CO3:** Introduction to Rotational and Vibration Spectroscopy. **CO4:** Basics of Quantum Chemistry, Operators and Schrodinger wave function
Course Outcome for Semester-V	
PAPPER-I: ORGANIC CHEMISTRY	**CO1:** The students will understand some fundamental aspects of organic chemistry. They will learn mechanism of some organic reactions, classification of polymers, structure and uses of some commercial and natural polymers. **CO2:** To know stereochemistry and various possible conformations of organic compounds and how it affects

	the reaction outcome. **CO3:** To be familiarize with the important photochemical reactions in Organic Chemistry. **CO4:** To understand the functions and applications of bioorganic compounds.
PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** To study the basic postulates of quantum mechanics. **CO2:** To enable the students to solve the simple quantum mechanical models such as simple harmonic oscillator, particle in a 1D- box, rigid rotor, H atom etc. **CO2:** To understand the quantum mechanical aspect of angular momentum and spin. **CO3:** Enable the students to predict the point group of important molecules and to know how they are classified **CO4:** To understand the idea of space groups and to learn the theory of molecular symmetry. **CO5:** To gain skill to apply group theory to vibrational and electronic spectroscopy.
Course Outcome for Semester-VI	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** To know the structure and bonding of important coordination compounds. **CO2:** To understand the magnetic properties of complexes and to know how magnetic moments can be employed for the interpretation of their structure **CO3:** To get an overview about the stereochemistry of coordination compounds **CO4:** To get an idea about the basic coordination chemistry of Lanthanides and Actinides. **CO5:** Ability to prepare inorganic complexes. Ability to prepare inorganic complexes. **CO6:** To know about VBT, CFT and MOT of co-ordination complexes
PAPPER-II: ORGANIC CHEMISTRY	**CO1:** To impart the students a thorough knowledge about the mechanisms of reactions of some selected functional groups in organic compounds **CO2:** To give an outline of applied organic chemistry and the applications of organic chemistry in various spheres of chemical sciences. **CO3:** To give an elementary idea of chemotherapy, organic spectroscopy and photochemistry. **CO4:** To analyze organic compound using UV, IR and NMR spectroscopic techniques, which provides platform for students to work in industries.

COMPUTER SCIENCE

Department of Computer Science	After Successful completion of three year degree program in Computer Science a student should be able to know:
Program Outcomes	**PO1:** To develop problem solving abilities using a computer. **PO2:** To build the necessary skill set and analytical abilities for developing Computer based solutions for real life problems. **PO3:** To implement quality software development practices. **PO4:** To create awareness about process and product standards. **PO5:** To train students in professional skills related to Software Industry. **PO6:** To prepare necessary knowledge base for research and development in Computer Science **PO7:** To help the students to build-up a successful career in Computer Science.
Program Specific Outcomes	**PSO1:** Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems. **PSO2:** Design, implements, test, and evaluate a computer system, Component or algorithm to meet desired needs and to solve a computational problem. **PSO3:** To Enhance skills and adapt new computing technologies for attaining professional excellence and carrying research. **PSO4:** Apply fundamental principles and methods of Computer Science to a wide range of applications. **PSO5:** Impart an understanding of the basics of our discipline. **PSO6:** Practice for continued professional development.
Course Outcomes B. Sc Computer Science	
Course Outcome for Semester-I	
Paper-I: (Programming in C)	**CO1:** To illustrate the flowchart and design an algorithm for a given problem. They understand the basic concept of programming structure. **CO2:** Students learnt the knowledge of fundamentals of writing C program which include data types, keywords, tokens, variables, and operators. Develop conditional and iterative statements to write C programs **CO3:** To solve user defined functions with real time problems. **CO4:** Students developed their concepts to write C program that uses Pointers, Arrays, and Strings. **CO5:** Understand the knowledge of user defined data types that include structure and union to solve problems. **CO6:** Students can write the programs which includes file concept to show input and output of files in C.
Paper-II: (Fundamentals of IT)	**CO1:** Bridge the fundamental concepts of computers with the present level of knowledge of the students. **CO2:** Familiarize operating systems, programming languages, peripheral devices, networking, multimedia and internet **CO3:** Understand binary, hexadecimal and octal number systems and their arithmetic.

	CO4: Understand how logic circuits and Boolean algebra forms as the basics of digital computer **CO5:** Demonstrate the building up of Sequential and combinational logic from basic gate.
Course Outcome for Semester-II	
Paper-I: (Object Oriented Programming Using 'C++')	**CO1:** To understand the object-oriented methodology which involves elements and features of object-oriented programming. **CO2:** Students developed the concept of class, object and structure of class which includes definition of class members and also, they learned how to write the programs using class. **CO3:** Students learnt the basic concept of constructor and destructor. Also, they were able to overload the unary and binary operators using the concept of operator overloading. **CO4:** Understand how to reuse code by implementing the OOPs Inheritance concept in C++. Also, they got knowledge of dynamic objects. **CO5:** Students were able to understand how inheritance and virtual functions implement dynamic binding with polymorphism. **CO6:** Students learnt how to use exceptional handling in C++ programs
Paper-II: (System Analysis and Design)	**CO1:** Identify various types of information systems concepts and terminologies **CO2:** Discuss the initial phase of system Development Life Cycle (SDLC) using analytical tools and quantitative technique used to identify problem **CO3:** Define problem and opportunities that initiate projects **CO4:** Evaluate information systems projects to identify various aspects of feasibility of these projects **CO5:** Apply at least one specific methodology or tool for analyzing business situation by modeling using a formal technique.
Course Outcome for Semester-III	
Paper-I: (Data Structures)	**CO1:** To be able to implement the abstract data type list as a linked list using the node and reference pattern. **CO2**: Select appropriate data structures as applied to specified problem definition. Analyze run-time execution of previous learned sorting methods, including selection, merge sort, heap sort and Quick sort and also calculates the complexity of all sorting and searching methods. **CO3:** To understand the abstract data type stack and notation like prefix infix and postfix expression formats. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures and design applications based on it. **CO4:** Determine and analyze the complexity of given Algorithms. **CO5:** Ability to have knowledge of tree and graph concepts.
Paper-II: (Operating Systems)	**CO1:** Describe and explain the fundamental components of a computer operating system **CO2:** Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems. **CO3:** Describe and extrapolate the interactions among the various

	components of computing systems. **CO4:** Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems.
Course Outcome for Semester-IV	
Paper-I: (Java Programming)	**CO1:** Explain the Use of java programming language Concept and programming technologies in software development. **CO2:** Demonstrate the Concepts of Thread and Applets **CO3:** Identify classes, objects, members of the class and relationships among them needed for a specific problem. **CO4:** Able to understand basic Concepts of java like variables, operators and tokens etc. **CO5:** Design and Develop Applications using AWT controls in Java.
Paper-II: (Linux Operating System)	**CO1:** To understand the basic commands and directory structures use in Linux OS and explain the use of all these commands to make the effective use of the environment to solve problems. **CO2:** Design and develop applications using Vi Editor in Linux OS. **CO3:** Able to identify the differences between processes and shells use in Linux OS. **CO4:** Able to Understand the basic set of Communication utilities commands and other commands use in Linux OS. **CO5:** To learn Graphical user Interfaces like KDE and GNOME.
Course Outcome for Semester-V	
Paper-I: (Visual Basic Programming)	**CO1:** Explain the basic Concepts of Program building block control statements and the basic concepts of function and procedure. **CO2:** Discuss about graphics handling related control and properties and Develop a Graphical User Interface (GUI) based on problem description. **CO3:** Discuss about the fundamental functions and properties of Advanced ActiveXControl. **CO4:** Design and Develop the programs which are based on events that retrieve input from a file as opposed to input only provided by user. **CO5:** Explain the procedure of creating menus and how to use these menus while designing applications in VB. (Menu Editor). **CO6:** Describe the concepts of database handling using DAO, ADO and RDO control with data report concepts.
Paper-II: (Database Management System)	**CO1:** To learnt the fundamental elements of traditional file processing system, objective of database system. **CO2:** Students learnt the basic concept of different data models which includes Hierarchical, Network, and E-R and Relational model. **CO3:** Students are able Design E-R model to represent simple database application **CO4:** Students developed the concept of how to convert E-R model into relational tables and how to perform relational operation on tables through relational algebra. **CO5:** Students developed the concept of functional dependency and improve the database design by the concept of Normalization.
Course Outcome for Semester VI	

Paper-I: (Compiler Construction)	**CO1:** Students learnt the major concept areas of language translation and compiler design **CO2:** Students got an awareness of the function and complexity of compilers. **CO3:** Students were able to understand the role of Lexical analyzer, its design, and implementation. Students got knowledge of context free grammars, Derivation and parse trees. **CO4:** Students are able to identify the similarities and differences among various parsing techniques and grammar transformation techniques
Paper-II: (SQL and PL/SQL)	**CO1:** Able to Understand the basics of SQL with control structure and sublanguages like DDL, DML and DCL/TCL. **CO2:** Able To identify the differences between integrity constraints and value constraints. **CO3:** Explain how functions, triggers, cursors and stored procedure work in PL/SQL**.** **CO4:** Compare SQL with PL/SQL and integrate the concept of procedural language with SQL to build advance applications. **CO5:** Able to understand the basics of PL/SQL Programming: PL/SQL Data Types, Identifiers, Operators and Expressions, Iterative Statements, Conditional Statements,

ELECTRONICS

Department of Electronics	After successful completion of three years degree program in the subject Electronics the students are able to:
Program Outcomes	**PO1:** Ability to design and conduct electronics experiments, as well as to analyze and interpret data. **PO2:** Utilize the basic knowledge of science Electronics and Communication. **PO3:** To provide opportunity to students to learn the latest trends in Electronics. **PO4:** To satisfy the needs of the core Electronics Industry useful for the society in all walks of life. **PO5:** To provide opportunities to the students to formulate, analyze and resolve the problems in Electronics Industry.
Program Specific Outcomes	**PSO1:** After completing the program, interested students can pursue in research field or in development field. **PSO2:** Students can become entrepreneur and can work on multidisciplinary projects.
Course Outcomes for B. Sc. ELECTRONICS	
Course Outcome for Semester-I	
PAPER-I: BASIC CIRCUIT COMPONENTS & NETWORK ANALYSIS	**CO1:** To enrich the students with the basic requirement of electronic circuits. **CO2**: To describe the theorems useful for circuit operation. **CO3:** To explore the use of energy sources for circuit operations. **CO4:** To familiarize about the use of transducers in instrumentation systems
PAPER-II: FUNDAMENTALS OF DIGITAL ELECTRONICS	**CO1:** To enrich the students with the basic requirement of digital electronics. **CO2:** To describe the use of Boolean Algebra for circuit operations. **CO3:** To elaborate the use of flip flops as memory in data processing system. **CO4:** To explore the use of binary circuits in digital system. **CO5:** To familiarize about the basic building blocks required for digital system.
Course Outcome for Semester-II	
PAPER-I: SEMICONDUCTOR DEVICES	**CO1:** To explain about semiconductors used for the fabrication of semiconductor devices. **CO2:** To acquire the knowledge of transistor used in many electronic circuits. **CO3:** To familiarize about the field effect transistor and its operation. **CO4:** To explore the use of power devices required in electronics circuits. **CO5:** To familiarize about the applications of diode, transistor and power devices.
PAPER-II:	**CO1:** To enrich the students with the digital ICS used in

ADVANCED DIGITAL ELECTRONICS	electronics circuits. **CO2:** To enhance the use of Flip-Flops in the construction of counters. **CO3:** To familiarize the use of Counters & Registers in data processing system. **CO4:** To explore the use of binary memory in digital system. **CO5:** To disseminate about the building blocks required for digital system.
Course Outcome for Semester-III	
PAPER-I: ANALOG CIRCUITS	**CO1:** To illustrate applications of diode as clippers, clamper and rectifier. **CO2:** To describe the role of transistor in amplification, signal analysis and two port hybrid circuit for testing amplifier parameters. **CO3:** To elaborate the concept of feedback and construction of feedback amplifier and oscillators. **CO4:** To explore the use of power amplifier in electronics circuits. **CO5:** To familiarize about the applications of diode and transistor.
PAPER-II: LINEAR INTEGRATED CIRCUITS	**CO1:** To study DC & AC characteristics of operational amplifier. **CO2:** To elucidate and design linear and nonlinear circuits of OP-AMP. To study timer IC and its applications. **CO3:** To elaborate the role of filters in electronics circuits. **CO4:** To explore the knowledge of linear integrated circuits and its uses.
Course Outcome for Semester-IV	
PAPER-I: BASIC COMMUNICATION ELECTRONICS	**CO1:** To understand functioning of basic processes in communication systems. **CO2:** To understand analogue modulation & demodulation techniques. **CO3:** To Understand transmission and reception systems. **CO4:** To understand propagation of radio waves in communication systems. **CO5:** To understand the process of analogue signal communication system.
PAPER-II: ANALOGUE AND DIGITAL CIRCUITS	**CO1:** To study DAC and ADC used for data conversions in electronics system. **CO2:** To elucidate and design regulated DC power supply for operating electronic devices. **CO3:** To study PLL IC 565 and its applications. **CO4:** To elaborate the role of transducers in Bioelectronics circuits. **CO5:** To explore the knowledge of Analogue and Digital circuits and its uses.
Course Outcome for Semester-V	
PAPER-I: Modern Communication Systems	**CO1:** To understand the concept optical communication and its operation **CO2:** To understand various digital modulation and

	demodulation techniques. **CO3:** To analyse the performance of digital communication system in terms of error rate and spectral efficiency. **CO4:** To understand the telecommunication traffic, channel and cellular capacity **CO5:** To understand various application of cellular technology.
PAPER-II: INTRODUCTION TO MICROPROCESSOR	**CO1:** To understand importance of Microprocessors as a programmable digital system element in computer system. **CO2:** To understand architecture and features of 8085 Microprocessor. **CO3:** To explore some basic concepts of microprocessors through assembly language programming. **CO4:** To augmented the knowledge of interfacing the peripheral to increase the flexibility of microprocessor. **CO5:** To grown-up the in-depth understanding of the operation of microprocessors and machine language programming & interfacing techniques.
Course Outcome for Semester-VI	
Paper-I: Programming in "C"	**CO1:** After completion of course, Students are able to Develop their programming skills **CO2:** Familiar with elements of C language **CO3:** Understand operators, Expression and Preprocessors **CO4:** Understand different decision making and concept of looping in C **CO5:** Understand Array, Structure, Function and Pointers, their declaration and use
Paper-II: MICROCONTROLLER 8051 AND ITS APPLICATIONS	**CO1:** To understand architecture and features of 8051 Microcontroller. **CO2:** To learn Programming of 8051 microcontroller. **CO3:** To learn interfacing of 8051 Microcontroller with real world input and output devices. **CO4:** To understand the coding and interfacing of 8051 with various IO devices. **CO5:** To understand importance of Microcontrollers in atomization and control system

COMPULSORY ENGLISH
SUPPLEMENTARY ENGLISH
ENGLISH AND COMMUNICATION SKILLS

Department of English	**After successful completion of three years degree program in the subject English the students are able to:**
Program Outcomes	**PO-1:** Students will be able to develop Life skills through the different life lessons incorporated in the prose and characterisation. **PO-2:** Students will be able to make sensible and ethical decisions and inculcate moral values those that are demonstrated in the literature. **PO-3**: Comprehensive skills are developed through reading and writing exercises. **PO-4:** Students will learn effective use of formal and informal use of English language **PO-5:** Students will be able to learn their critical faculties required in personal and professional life. **PO-6:** Students will be able to tap the intrinsic and extrinsic motivational theories through the text prescribed. **PO-7:** Students should be able to write business communication and other formal writings required in their professional life. **PO-8:** Students will be able to understand the concepts and strategies of communication skills with special reference to writing and listening skills. **PO-9:** Students will be able to write and appreciate different types of prose such as essay, paragraph writing, dialogue writing etc. **PO-10:** Students will be able to understand the different state of minds for example humour, struggle, resilience, success, innovation and the strategies to deal in such situations through motivational and inspiring stories.
Program Specific Outcomes	**PSO1:** Students will acquire fundamentals of formal writing skills required in a workplace. **PSO2:** Students will be able to use correct grammar to improve their writing and speaking skills. **PSO3:** Students will review and inculcate moral and ethical values as discussed in the prescribed prose. **PSO4:** Students will improve their analytical power through reading and writing exercises. **PSO5:** Students will learn important business communication through accurate use of language and formats. **PSO6:** Students will be able to demonstrate concepts of creative skills and innovative presentation skills
Course Outcomes B. Sc Compulsory English	
Course Outcome for Semester-I	

UNIT-I: **PROSE** **1. My struggle for an Education: Booker T Washington** **2. Florence Nightingale: Lytton Strachey**	**CO1:** To motivate student to understand the importance of education in one's life. **CO2:** To inspire students through the real-life examples of struggle and success. **CO3:** To inculcate the concept of community service and philanthropy among the youth. **CO4:** To set examples of benevolence and strength through self- worth, self -image and self -identity.
UNIT-II: **PROSE** **1. The Birth of Khadi: Mahatma Gandhi** **2. Go, Kiss the World: Subroto Bagchi**	**CO1:** To integrate and revive the idea of swadeshi moment as a contribution to the development of Indian nationalism. **CO2:** To extend the concept of self-generation and self-reliance and considering clothing as a power changing mechanism in freedom struggle. **CO3:** To introduce the model of Child -Parent Relationship in shaping the life of an individual. **CO4:** To help students identify their role models to learn life skills through them.
UNIT-III: **POETRY** **1. Ulysses: Alfred Tennyson** **2. Yussouf: James Russel Lowell** **3. If: Rudyard Kipling**	**CO1:** To extend the idea of resilience, vigor and self-determination in the youth. **CO2:** To help students understand and incorporate life skills such as bravery, fearlessness, heroism in the times of struggle and hardships. **CO3:** To make students learn the importance of forgiveness and moving ahead in their lives. **CO4:** To help students to evolve as Samaritans and spread the word of fraternity among individuals. **CO5:** To help students to have determination in the face of failure. **CO6:** To provoke students in the direction of sportsmanship in the competitive world.
UNIT-IV: **1. Comprehension of Unseen Passage** **2. Prepositions** **3. Subject-Verb Agreement** **4. Summarizing**	**CO1:** To improvise the comprehension skills through reading and writing. **CO2:** To revise the use of grammar in day-to-day life. **CO3:** To make students explain the idea briefly in their own words.
Course Outcomes B. Sc Compulsory English	
Course Outcome for Semester-II	
UNIT-I: **PROSE** **1.Grassroot innovation and Social Enterprise: Changing Lives** **2. The Two Gentlemen of Verona**	**CO1:** To introduce the students about inventions through innovations. **CO2:** To inspire students towards innovation through real time success stories. **CO3:** To teach students the life-skills such as focus and self-control, facing challenges, making connections etc. **CO4:** To inculcate the habit of hard-work and diligence

	irrespective of their age.
UNIT –II: **PROSE** 1. **The Verger** 2. **Synthesis of Science and Spirituality**	**CO1:** To involve students in understanding the basic principles of value education. **CO2:** To impart reasoning of conventional and non-conventional education in one's life. **CO3:** To institute the concept of science and spirituality in the minds of youth. **CO4:** To foster the young minds with connection between science and spirituality.
UNIT -III: **POETRY** 1. **Richard Cory** 2. **Allow sanity a little space** 3. **Refugee Blues**	**CO1:** To share the idea of resilience in face of adversity. **CO2:** To unveil the learners about the evil and dark forces prevalent in this millennial and how one should deal with it. **CO3:** To bring forth the stories of refuges focusing on their accommodating and tolerant behaviors.
UNIT-IV: **WRITING SKILLS** 1. **Paragraph Writing** 2. **Application and C.V. Writing** 3. **Phrasal Verbs**	**CO1:** To inculcate writing skills through idea development strategies. **CO2:** To teach students the skill of writing applications and C.V. **CO3:** To make appropriate use of phrasal verbs to improve language skills.
Course Outcomes B. Sc Supplementary English	
Course Outcome for Semester-I	
UNIT-I: **PROSE** **Short Stories**	**CO1:** To revise the learners with the concepts of compassion, love and care. **CO2:** To convey the students the purpose of life through enlightenment and wisdom. **CO3:** To promote the importance of humour
UNIT -II: **Short stories**	**CO1:** To revise the concepts of wisdom and knowledge in the constant changing world. **CO2:** To expand and explore on the idea freedom and responsibility. **CO3:** To share the views on duality concept of real and fake.
UNIT-III: **Vocabulary Expansion**	**CO1:** To introduce the varied words used in English Language. **CO2:** To maximize the use of different use of vocabulary in reading and writing.
UNIT -IV: 1. **Essay writing** 2. **Email**	**CO1:** To develop the critical thinking and writing among students on various current issues. **CO2:** To develop email writing skills as a part of formal communication.
Course Outcomes B. Sc Supplementary English	
Course Outcome for Semester-II	
UNIT-I: **Short Stories**	**CO1:** The stories teach how healthy sense of humour can help one deal with tough times. **CO2:** The students learn the pros and cons of having and lacking integrity in one's life. **CO3:** To teach the learners the meaning of 'Luxury' and

	connotations attached to it.
UNIT- II: **Short stories**	**CO1:** To teach the learners how the serious things can also be leant through dark humor. **CO2:** To impart philosophical lessons through the technique of storytelling. **CO3:** To impart that reading can also be an experiential learning process.
UNIT-III: **1. Writing Advertisements** **2. Letter writing**	**CO1:** To make students aware of strategies of Advertisement writing. **CO2:** To guide students how to write different types of formal letters.
UNIT-IV: **1. Story writing based on given outline** **2. Reporting an event**	**CO1:** To develop the creative writing skills through development of story. **CO2:** To develop critical thinking and decision making of the students. **CO3:** To improve report writing skills of the students. **CO4:** To develop comprehension skills of any situation.

HOME SCIENCE

Department of Home Science	After successful completion of three years degree program in the subject Home Science the students are able to:
Program Outcome	**PO1:** Develop sensitivity towards the needs of family and society and cater to them. **PO2:** All round development of the personalities of the members in home & family. **PO3:** Ddevelop in the learner an understanding of the need for healthy environment and skills. **PO4:** Efforts are taken to create and maintain the above attributes amongst students. **PO5:** Develop in them the ability to take care of the nutritional needs of the family members and ensure good, 'Food handling practices **PO6:** Impart in the learner the basic knowledge related to textiles used in the home and develop skills for their optimum utilization **PO7:** Make learners aware of the rights of consumers and instill in them wise purchasing habits **PO8:** Foster understanding of human developmental process and use it to strengthen interpersonal relationships. **PO9:** Orientation with the educational and vocational scope of Home Science and the need to practice/develop entrepreneurship **PO10:** Sensitivity towards some of the major psychological and health problems of the community and the programs of the government to overcome these.
Program Specific Outcomes	**FOOD SCIENCE AND NUTRITION** **PSO1:** Enable to pursue higher education **PSO2:** Understand the role of food and nutrition for the welfare of the community **PSO3:** Excel in the area of personal & public health nutrition **PSO4:** Apply skill-based knowledge in food industry **PSO5:** Acquire entrepreneurial skills in the field of food science & nutrition **PSO6:** Public health nutrition for employment in state & central government **HUMAN DEVELOPMENT** **PSO1:** Describe how individuals change from Womb to Tomb **PSO2:** Relate principles of human development with self, family & society **PSO3:** Apply methods of teaching and training towards administration of early learning centers **PSO4:** Appraise & identify life situations in need to referral services **PSO5:** Manage life crisis at every life span **PSO6:** Demonstrate skills to assess human behavior

	PSO7: Advocate domain specific programs& policies **PSO8:** Become Entrepreneurs in establishing learning center **TEXTILES & LAUNDRY** **PSO1:** Gain knowledge in Textile Production Techniques **PSO2:** Acquire skill in textile dyeing and printing **PSO3:** Equipped with skill as a designer **PSO4:** Acquire dexterity in Surface Design & Apparel Construction **PSO5:** Acquire entrepreneurial skills in textiles & fashion **FAMILY RESOURCE MANAGEMENT** **PSO1:** Students exhibit efficient resource use at home & work as they learn management of resources **PSO2:** Act as proactive agents of change **PSO3:** Career options like Hotel Management, Event Management, Front Office Management, Designing Interiors **PSO4:** Role of able designers **PSO5:** Achieve social advancement through value education and family management concept. **PSO6:** Acquire professional skills in financial management and control, designing of interiors and work places and equipment, institutional management and rendering consumer services. **PSO7:** Develop entrepreneurship skills and self-employment potential. **EXTENSION EDUCATION** **PSO1:** Competency in Rural Development Practices Impart skill training programmes **PSO2:** Get sensitized on issues of society **PSO3:** Acquire skill and attitude to work with communities
Course Outcome for Semester-I	
PAPER-I: FUNDAMENTALS OF FOOD SCIENCE AND NUTRITION-1	**CO1:** To study the introduction of food and nutrition, basic terms used in Food and Nutrition. Definitions-Foods, Nutrition, Optimum nutrition, Nutritional status, Nutrients and Health **CO2:** To know the functions of food-Physiological, psychological and social **CO3:** To learn characteristics of basic food groups and their contribution to the diet **CO4:** To know about nutrients and their type (Macronutrient / Micronutrient) **CO5:** To study thermodynamic effect of food (SDA) and Scope of Nutrition. **CO6:** To study definition, Concept and factors affecting balanced diet **CO7:** To learn Recommended Dietary Allowances (RDAs) of the ICMR for the different food groups for various life stages. **CO8:** To understand the term Energy: Definition and factors affecting BMR. Units of measuring food energy: Calorie, kilo-calorie, joule, kilo-joule and mega- joule **CO9:** To study Energy measurement of food (Bomb calorimeter) **CO10:** To study Carbohydrates – Definition, classifications,

	functions, sources, digestion and absorption and deficiency states. **CO11:** To learn about Fiber- Definition, Types of dietary fiber and sources. Role of fiber in prevention of diseases **CO12:** To study Protein- Definition, classifications, functions, sources, digestion and absorption and deficiency states Protein sparing action of carbohydrates **CO13:** To learn Fats - Definition, classifications, functions, sources, digestion and absorption and deficiency states.
PAPER-II: FUNDAMENTALS OF HUMAN DEVELOPMENT	**CO1:** Students learn basic concepts, meaning and definitions to study the relevance &scope of the subject of Human Development. **CO2:** Acquire the knowledge of Governmental level projects, schemes and centers where the Human Developmentalist can apply and use knowledge. **CO3:** Concept of child and family welfare Schemes. **CO4:** children with special needs **CO5:** Students learn the twin processes namely growth and development to understand how human beings undergo changes. **CO6:** theoretical perspective and biological and environmental aspects responsible for the developmental changes. **CO7:** Students gain the Knowledge of important life span and stages **CO8:** Importance of prenatal stage, imp of prenatal care, factors governing the prenatal Development. **CO9:** Concept of WHO concept of Child friendly hospitals. **CO10:** Students understand the term neonatal Stage of Development. CO11: Concepts like caring the new born, health and well- being are dealt with special emphasis and relevance.
PAPER-III: FUNDAMENTALS OF TEXTILES AND CLOTHING	**CO1:** To study the basic knowledge ofTextiles **CO2:** To know the scope and importance of clothing. **CO3:** To learn more about classification of textiles fiber manufacturing process. **CO4:** To know different factors affecting clothing. **CO5:** To study the various tools required for garment construction and drafting methods **CO6:** To learn different parts, functions and care of sewing machine. **CO7:** To acquire knowledge for preparation of cloth for clothing construction.
PAPER-IV: FUNDAMENTALS OF FAMILY RESOURCE MANAGEMENT	**CO1:** Exercise and demonstrate use and mastery of the elements of design, recognize elements of design in works of art **CO2:** Develop aesthetic sense and to be good art consumer, selecting appropriate concepts and forms of art **CO3:** Understand the significance of management **CO4:** Develop the ability to evaluate the management efficiency and effectiveness in the family and other organizations. **CO5:** Successful integration of the three objectives of aesthetic

	planning which are beauty, expressiveness and functionalism
PAPER-V: FUNDAMENTAL OF HOMES CIENCE EXTENSION	**CO1:** To gain the knowledge regarding types of education **CO2:** To understand the field of extension education& objectives principle, fields & essential links in the chain of Rural Development. **CO3:** To know Philosophy of Home Science & it's scope **CO4:** To understand Home Science Extension Objectives and Characteristics **CO5:** To learn Rural Sociology - Meaning of sociology and Rural Sociology, Scope of Rural Sociology **CO6:** To know Rural Society - Characteristics of Rural Society, rural social groups, Classification of Social groups. **CO7:** To know Social Problems, studying social problems. **CO8:** To understand Social Problems like poverty, Problems of population explosion, Caste tension, Problem of Unemployment, Poor Health & sanitation, Problems of tribal and solutions to the problems faced.
PAPPER-VI: ECOLOGY AND ENVIRONMENT-I	**CO1:** To get acquainted with the physical environment and its components. **CO2:** To know the methods to protect the environment and conserve natural resources **CO3:** To know the ecosystem, ecology, food chain, food web and ecological pyramids. **CO4:** To get acquainted with various biogeochemical cycles, like oxygen cycle, carbon cycle, nitrogen cycle, hydrological cycle, etc. **CO5:** To know the renewable and non-renewable natural resources, national parks and sanctuaries and conservation of wild life. **CO6:** To know the various types of pollutions and its control measures.
Lab Work:	• To understand the determination of hydrogen ion concentration (pH) and DO • To study the estimation of acidity and chlorosis of water • To get acquainted with the lay-out and plan of a garden
PAPER-VII: BASIC CHEMISTRY-I	**CO1:** To know the importance of pure water, impurities present in water, sources of water pollution, ions responsible for hardness of water **CO2:** Methods used for purification of water for domestic purpose and commonly used methods are sterilization: boiling, chlorination **CO3:** To understand the use of Alloy: Classification of alloy (ferrous and Non-ferrous), purpose of making an alloy **CO4:** To gain knowledge of Effect of alloying various elements on properties of steel, composition and uses of stainless steel and brass. **CO5:** To know how to prepared Solutions during practical's: Types of solutions, different ways of expressing concentration of

	solution (equivalent weight, molecular weight, normality and molarity) **CO6:** To understand Physical Properties of Liquids: Surface tension (definition, determination of surface tension by Stalagmometer method). Viscosity (definition, determination by Ostwald‟s Viscometer). **CO7:** To gain knowledge about the Colloids: Definition, types of colloidal systems, Types of colloidal solution, methods of preparation, properties (Tyndall Effect, Brownian Movement, Electrophoresis, Electro-osmosis) and colloids in daily life (applications) **CO8:** To know the Emulsion and gel: definition, types, methods of preparation, properties and its applications.
Lab Work:	• To know the • Types of analysis used in chemistry analysis • A) Volumetric analysis: 1. Single acid base titration, Determine the Normality and weight per litre 2. Determination of total and permanent hardness of water by EDTA titration. B) Physical Experiments 1) Determination of viscosity of given liquid by Ostwald‟s Viscometer. 2) Determination of Surface tension of given liquid by Stalagmometer. 3) Preparation of colloidal solution of starch
Paper –VIII: Applied Physics and Basic Computer-I	**CO1:** Measurements, system for measurements, basic concepts and least count of any instrument, scalar and vector quantities. **CO2:** To know the fundamental and derived quantities and their units. **CO3:** Basic Newtonian mechanics, concept of centripetal and centrifugal forces and their uses. **CO4:** Concept of friction and related applicability. **CO5:** Computer basics and its characteristics. Unit of memory, working of individual computer peripherals and related concepts.
Paper-IX: English and Communication Skills	**CO1:** To prepare the students to communicate effectively and fluently in English. **CO2:** To enable students listening, speaking reading and writing. **CO3:** To strengthen grammatical accuracy **CO4:** To prepare the students to deal with customers, professional, counselors in correct grammatical, idiomatic English. **CO5:** To provide personality development training through situational role play, interview techniques, group discussions, seminar presentation etc.
Course Outcome for Semester-II	
PAPER-I: FUNDAMENTALS OF FOOD SCIENCE AND	**CO1:** To study Vitamins - Classification of Vitamins **CO2:** To learn Fat Soluble Vitamins: Functions, Sources and Deficiency

NUTRITION-II	**CO3:** To learn Water Soluble Vitamins: To study their Functions, Sources and Deficiency **CO4:** To study Minerals, Functions, Sources and Deficiency **CO5:** To learn about Major Mineral and trace elements **CO6:** Learn functions of water in human body, water balance, sources of water, effect of dehydration and its prevention. **CO7:** Methods of Cooking: Objectives of cooking food, advantages of cooking food, different cooking methods and different cooking media and effect of different cooking methods on nutritive value of food
PAPER-II: DEVELOPMENT IN EARLY YEARS	**CO1:** Concept of Early years of child development as important years of life, Infancy stage of development - students understand the terms development tasks &milestones in reference with different developmental aspects. **CO2:** Students gain the knowledge of the growing capacities of infants and the overall developmental changes. **CO3:** Students gain the knowledge of norms and associated changes in physical, social, cognitive, language, emotional, intellectual capacities with change in moral aspects. **CO4:** Students gain the concept of ECCE, objectives and importance cognitive & language growth and conditions facilitating for healthy growth & development.
PAPER-III: SEWING TECHNIQUES	**CO1:** To understand the importance and necessity of various construction techniques for different fabrics. **CO2:** To acquire knowledge the skills to apply those construction techniques in a sample from. **CO3:** To acquire knowledge and skill regarding stitching techniques for various garment components such as plackets, pockets, cuffs, collars and fasteners which are ultimately used for stitching of any garments. **CO4:** To learn different fashion accessories like headgears, footwear, Handbags. **CO5:** To study types and use of jewelry.
PAPER-IV: INTERIOR DECORATION & DESIGN	**CO1:** Develop skill in using colour to create different effects in pace, with the use of various colour schemes. **CO2:** Gain knowledge of flowers / floral decoration and arrangement. **CO3:** Development of efficient and cost-effective room and floor plans that meet the needs of residential and/or commercial clients. **CO4:** Create a space that is stylish and is comfortable. A functional space that ticks off the ergonomic requirements of us and also looks pleasant. **CO5:** Learners will develop skills that will enable them to plan or assist in the planning of their own living space area and décor, or may provide a foundation for a career in this field.
PAPER-V: SOCIALSURVEY AND COMMUNITY	**CO1:** To learn about History of Community Development **CO2:** To understand elements of community development: Role of community development worker **CO3:** To know Community development programmes:

DEVELOPMENT	Shriniketan rural reconstruction Gurgaon experiment & Etawah pilot project b) Indian village service **CO4:** To understand the term Social Survey & its importance **CO5:** To gain knowledge regarding Social Research. **CO6:** To learn Gender and Development meaning of Sex ratio. **CO7:** To understand Poverty Alleviation Programmes: Efforts taken by Government agencies. **CO8:** To understand eradication of poverty-a) National Rural Health Mission b) Integrated Child Development scheme
PAPPER-VI: ECOLOGY AND ENVIRONMENT-II	**CO1:** To know the development of gardens and nurseries, its importance and entrepreneurship. **CO2:** To study the different ornamental plants used in gardens, nurseries and kitchen gardens **CO3:** To study the different plant propagation techniques and garden implements & accessories **CO4:** To know the method of vermiculture and vermicomposting
Lab Work:	• To get acquainted with methods of gardening and methods of plant propagation • To study the technique of mushroom cultivation and vermicomposting.
PAPER-VII: BASIC CHEMISTRY-II	**CO1:** To know which type of Fuels: Definition, classification, characteristics of good fuel, calorific value, preparation of Gober gas. **CO2:** To know the concept, importance, and process of Crude petroleum and its refining by fractional distillation, cracking of petroleum, composition and application of LPG, Precautions while using LPG **CO3:** To Know Acid and base: Concept of acid, base and salt, (Arrhenius theory and Lowry and Bronsted Theory), Conjugate pair, neutralization reaction. **CO4:** To know pH and pH scale, (Numerical on pH scale) Buffer solution and its applications in everyday life. **CO5:** To know Organic Compounds: Definition, saturated and unsaturated hydrocarbon, classification of organic compounds based on their structure and functional groups. Definition of alkane, alkene and alkyne with examples. **CO6:** To Understand Homologous series, IUPAC nomenclature of alkane, Laboratory preparation, chemical properties and uses of methane and ethylene. **CO7**: Corrosion: Definition, atmospheric corrosion (Corrosion by oxidation and by other gases). Factors causing atmospheric corrosion, **CO8:** Methods for protection of metals from corrosion (Galvanizing, tinning and electroplating).
Lab Work:	• To estimate the Haemoglobin percentage. • To understand the life cycles of parasites. (*Entamoeba histolytica*, Roundworm, *Plasmodium vivax* and *Plasmodium falciparum*, *Wuchereria bancrofti*)

Paper-VIII: Applied Physics and Basic Computer - II	**CO1:** Concept of basic electricity, ohm's law, resistance measurements in different combinations, simple calculations therein. **CO2:** Light and electromagnetic wave. Concept of reflection, refraction and absorption, Physical phenomenon related to natural phenomenon such as reflection, transparency, opaqueness etc. **CO3:** Lens and related optics, use of these principles for human eye assistance. **CO4:** X-rays, their principle, generation and applicability. Harmful radiations such as alpha, beta and gamma rays, their characteristics and properties including their applicability. Computer hardware and peripherals of computer system with details of different types of printers.
Course Outcome for Semester-III	
PAPER-I: COMMUNITY NUTRITION	**CO1:** To understand malnutrition, its types, causes, symptoms, prevalence and nutritional problems due to malnutrition. **CO2:** To understand the basic principles of nutritional assessment as applied to the study of community nutrition. **CO3:** To understand the role of National organizations and international organizations (ICAR, ICMR, NIN, CFTRI) and (FAO, WHO, UNICEF, CARE) in community nutrition and health. **CO4:** To understand the importance, objectives and methods of evaluation of nutrition education. To know the problems and develop solutions in organizing nutrition education programme. **CO5:** To become familiar with the ongoing schemes and programmes for combating nutrition-related problems in the country – National Nutrition Programme. **CO6:** To develop an understanding of the principles underlying Food Preservation, Food Fermentation, Leavening Agents and Food Additives.
PAPER-II: DEVELOPMENT IN LATE CHILDHOOD AND ADOLESCENCE	**CO1:** Students learn the significant Developmental Changes & aspects of development in terms of Physical attainments, Motor Skills, Changing CO1: Emotions with importance of Emotional self-regulation, changes in self-concept & importance of Self Esteem, need for attaining basic growth &building self-confidence through their capacities they master during Childhood. **CO2:** Students also learn the media with its influence on child's development. Relationships within family & outside influencing the child & his potentialities **CO3:** Students learn the pattern of cognitive & language growth within the conditions & factors facilitating development & theoretical implications & perspective supportive to it. Students gain the growth in terms of morality & moral reasoning acquired during this phase of life. **CO4:** Students learn the physical changes that occur during the

	Puberty phase of life & the effect of puberty changes. They learn the term & meaning of Adolescence with the growth spurt during this period of life & concepts like attaining Physical maturity Sexual maturity & Adolescent as a transitional Period. Need of Sex Education. **CO5:** Students learn the pattern of changes in respect to intellectual growth, Cognitive abilities, creative accomplishments & factors for developing creative mind. Adolescent and language accomplishments, also the concept of need of identity, search for identity with parental & factors to determine it. Students get to understand the importance of healthy parent adolescent relationships, Peer relations & it's positive advantages & adjustments.
PAPER-III: TEXTILE DESIGN	**CO1:** Study natural dyes and its importance **CO2:** Study synthetic dyes and their uses **CO3:** Study methods of dyeing **CO4:** Study common dyeing defects their remedies **CO5:** Study dye application **CO6:** Study the concept of dyeing and printing, Study different methods of printing, Study common printing defects and remedy **CO7:** Study preparation of cloth for printing, Study after treatment of printing goods. **CO8:** Study paint textile of India &Study traditional print textile of India **CO9:** Study traditional woven textile of India, Study techniques used in woven textile, Study colour, yarn and motif used in a saree & shawls of India. **CO10:** Study costumes of different states of India. **CO11:** Study draping style of traditional costumes of India.
PAPER-IV: **HOUSING AND INTERIOR DECORATION**	**CO1:** Learners understand regarding housing needs, Principles, Planning of house **CO2:** Experimenting with space, Preparing house plans. **CO3:** Develop graphic skills to express ideas in design, forms, and economic use of space. **CO4:** Implement Decision about applicable design principles in Interior Decoration. **CO5:** Implement decisions about Furniture selection and arrangement in available space.
PAPER-V: EXTENSION COMMUNICATION TECHNIQUE	**CO1:** To understand Extension teaching: Definition of extension teaching, principles of extension teaching. **CO2:** To know Extension teaching process: Teaching plan, Role of teacher in different levels, **CO3:** To study Extension learning process: Definition of extension learning, Learning experience, **CO4:** To gain knowledge on Psychology of learning Types of learning. **CO5:** To know Extension teaching methods **CO6:** To gain Approaches in Extension: Meaning, Strong and weak points of interpersonal.

	CO7: To study Interpersonal approach: Home visit, office call, personal letter and telephone. **CO8:** To understand Art of Presentation: Meaning, five basic steps of presentation and equipment ofcampaign work. **CO9:** Devices useful for effective communication: Over Head projector, opaque projector, DVD, LCD.
PAPER-VI: APPLIED PHYSIOLOGY	**CO1:** Students are able to get knowledge of the cell structure and function, histology, gross anatomy, and physiology of several organ systems. **CO2:** Students are able to understand structure and function of various organs and organ systems like nervous system of human body. **CO3:** It provides basic knowledge of first aid.
Lab Work:	• Students are able to know about bones and joints • Application of triangular bandage and roller bandage. • Artificial respiration
PAPER-VII: APPLIED CHEMISTRY	**CO1:** To know Carbohydrates: Definition, classification, open chain structure of glucose and fructose. **CO2:** To know Manufacture of cane sugar, optical isomerism of asymmetric carbon atom, plane polarised light, dextro and leavo rotatory compounds. **CO3:** To know Fermentation: Definition, ideal conditions for fermentation, application of fermentation. **CO4:** To know Preparation of vinegar and ethanol by fermentation process. **CO5:** To know Oils and Fats: Definition, difference between oils and fats, saponification value, iodine value, rancidity and hydrogenation of oils, refining of edible oil, naturally occurring fatty acids (saturated and unsaturated), essential and non-essential fatty acids. Omega names of MUFA and PUFA. **CO6:** To know Soap and Detergents: Definition, types of soap, Industrial method of preparation of soap, cleansing action of soap. **CO7:** To know Difference between soap and detergents, composition of detergent., Liquid detergents.
Lab Work:	• Preparations of cosmetics: i) Shampoo (Simple and herbal) ii) Perfumes • Preparation of dyes and drug: • Methyl salicylate from salicylic acid. • Orange dye from beta naphthol and aniline or p- toluidine compare the cleansing action of detergents/ shampoo by Stalagmometer • To know How to use of physical balance. • Preparation of standard solution for titration. Identification of Carbohydrates: Glucose, fructose, sucrose and starch • Determination of total fatty acid present in given sample of soap. • Determination of total alkali present in given sample of soap

Paper-VIII: APPLIED PHYSICS AND COMPUTER APPLICATIONS-1	**CO1:** To learn about electricity related basic parameters, electrical safety and related devices. **CO2:** Principle of heat, its conduction, Conversion of electricity into heat, heat-based appliances. **CO3:** Computer system and its operating, word processing software (MS WORD) and database creation and management software (MS EXCEL)
Course Outcome for Semester – IV	
PAPER-I: COMMUNITY NUTRITION	**CO1:** To learn principles of meal planning. To plan and calculate balanced diets for family members **CO2:** Concept of RDA, Recommended set- up, Reference persons and RDA **CO3:** Principles and advantages of meal planning Diet planning with reference to special individual requirements **CO4:** Nutrition during adulthood: a) Balanced diet for adult man and women. b) Nutritional requirements c) Dietary guidelines for adults **CO5:** To know Nutrition during pregnancy and lactation a) Physiological changes during pregnancy b) Desirable weight gain c) Nutritional requirements and their importance d) Diet during pregnancy e) Dietary guidelines for pregnancy **CO6:** Nutrition during infancy: a) Growth and development during infancy and Nutritional requirements b) Advantages of breast feeding **CO7:** Importance of Weaning & Supplementary foods **CO8:** Understand Nutrition during: 1. Preschool children 2. School going children, a) Growth and development b) Nutritional requirements c) Dietary guidelines for children **CO9:** Nutrition during Adolescence: a) Growth and Development during adolescence b) Nutritional requirements c) Dietary guidelines for adolescent **CO10:** Geriatric nutrition
PAPER-II: DEVELOPMENT IN ADULTHOOD	**CO1:** Concept of who is an adult? adulthood stage - biological and physiological perspective, diversity in adult lifestyle, cultural variations in roles & expectations **CO2:** Adult life span changes namely physical & cognitive. adult development of self-identity – psycho-social changes within the framework of work, career, parenthood, family marriage. **CO3:** Middle age changes concept of physiology; health. cognitive changes in cognitive skills, middle age as time of crisis students understands the importance of age as age of

	generativity, expertise and experience. concept of aging-approaching retirement, changes and adjustment needed. society and community attachment with an effective social role. **CO4:** Concept of aging, demographic status, sensitizing towards age related issues and adjustments. importance of recreation and wellness in late adulthood. understanding age specific needs: specific problems of elderly concept of retirement homes and dwelling. **CO5:** Governmental policies and welfare schemes for senior citizens
PAPER-III: SURFACE ORNAMENTATION TECHNIQUES	**CO1:** Study natural dyes and their importance, study of synthetic dyes and their uses. **CO2:** Study methods of dyeing **CO3:** Study common dyeing defects their remedies. **CO4:** Study dye application **CO5:** Study the concept of dyeing and printing. **CO6:** Study different styles of printing. study different methods of printing. **CO7:** Study new methods of printing. **CO8:** Study common printing defects and remedy. **CO9:** Study preparation of cloth for printing. **CO10:** Study types of printing used in printing **CO11:** Study after treatment of printing goods. **CO12:** Study painted textile of india. **CO13:** Study traditional printed textile of india. **CO14:** Study traditional woven textile of india. **CO15:** Study techniques used in woven textile. **CO16:** Study colour, yarn and motif used in sarees, shawls of india. **CO17:** Study costumes of different states of india. **CO18:** Study draping style of traditional costumes of india.
PAPER-IV: HOUSING AND HOME FURNISHING	**CO1:** Implement decisions about housing and furnishings. **CO2:** Learner gain knowledge about the role of internal amenities in contributing for satisfying family living. **CO3:** Learn techniques that will help one to construct some furnishing items, relative to their function and decorative purposes. **CO4:** Learn concept of natural and artificial lighting in relation to housing and its plan. **CO5:** Learn concept of waste management and its techniques.
PAPER-V: MEDIA IN EXTENSION	**CO1:** To understand communication techniques **CO2:** To gain knowledge on mass communication andmedia. **CO3:** To know media in extension: meaning of media,electronic media, print media, and folk media. **CO4:** To study electronic media: radio as mass medium, **CO5:** To learn print media - types of print media, impactof print media **CO6:** To gain knowledge on folk media. folk forms as mass media, Indian folk forms.

	CO7: To understand advertisement as mass media. **CO8:** To gain knowledge journalism in extension.
Paper-VI: APPLIED PHYSIOLOGY-II	**CO1**-Students get knowledge about structure and function of heart, valves blood vessels **CO2**-students are able to understand about digestive system, respiratory system and excretory system **CO3**-students also know about endocrine system and reproductive system.
PAPER-VII: APPLIED CHEMISTRY-II	**CO1:** To know Polymers: Definition, addition and condensation polymerization, preparation and uses of polyethylene, PVC, Nylon-6, Nylon-66 and polyester. **CO2:** To know Rubber: Definition, chemical nature and vulcanization, synthetic rubber (Buna-S) and uses. **CO3:** To understand, Textile Chemistry: Definition, Requisite of a true dye, Types of fibres: structure features of fibres (Cotton, wool, silk, cellulose acetate, polyaminde, polyesters), Basic operations in dyeing process (preparation of the fibre, preparation of dye bath, application of dye and finishing), Various methods of dyeing (direct dyeing, vat dyeing, Mordant Dyeing, and disperse dyeing). **CO4:** To know Witts theory of colour and constitution, classification of dyes based on their functional group- i) Nitro ii) Nitroso and iii) Azo, pollution problem due to dye industry **CO5:** To know Cosmetics: Definition, functions and ingredients of shampoo, face powder, cold cream, lipstick, hazards of cosmetics. **CO6:** To Know Drugs: Preparation and uses of following drugs: i) Aspirin ii) Paracetamol and iii) oil of winter green. **CO7:** To know Essential oils: Definition, occurrence and methods of extraction of essential oils. Eucalyptus oil, Rose oil, Lavender essential oil **CO8:** To know Perfumes: Definition, characteristics of perfume, composition of perfumes, formulation of any two perfumes.
Lab Work:	• Titration of strong acid vs strong base (Acid-base double titration) • Determination of pH of different solutions by using pH paper Detection of functional group Acids, Alcohols, Aldehydes and Ketones. • Preparation of acidic and basic buffer solution
Paper-VIII: APPLIED PHYSICS AND COMPUTER APPLICATIONS-II	**CO1:** To learn about electricity, effects of electric current, electromagnetism principle and devices based on it such as transformer and motors, their working. **CO2:** Motor based electrical appliances, chemical effect of electric current, conversion of chemical energy into electric energy, batteries and electrochemical platting. **CO3:** MS power point and internet related knowledge.
Course Out Come for Semester - V	

PAPER-I: DIET THERAPY- I	**CO1:** To provide knowledge about causes And Symptoms Of Various diseases. **CO2:** Understand the role of diet. **CO3:** To plan, calculate and prepare diets for various diseases, to learn principles of diet therapy **CO4:** Diet counselling, role of dietician in health care, dietetic care in hospital patients and its importance, Understanding of therapeutic adaptations of the normal diet: A) Soft Diet B) Clear Liquid Diet C) Liquid Diet D) Bland Diet E) Low Fibre Diet F) High Fibre Diet To understand modes of feeding: A) Enteral B) Parental **CO5:** To know concept of weight management: overweight and obesity causes, symptoms and principles of dietary management of overweight and obesity, concept of underweight **CO6:** Understanding and importance of various gastrointestinal disorders -dietary management of gastro-intestinal disorder, peptic ulcer, diarrhoea, constipation & ulcerative colitis **CO7:** Liver disorders and gall bladder disorders: dietary disorders – viral hepatitis, liver cirrhosis, hepatic coma
PAPER-II: FAMILY DYANAMICS AND DEVELOPMENTAL ASSESSMENT	**CO1:** Students learn the concept of marriage, changing concept of marriage, forms of marriage, eugenics and other considerations in mate selection. Concepts like preparation and readiness for marriage. Pre-marriage Counseling – Need and Importance. **CO2:** Family as a nuclear unit of society. Changing trend, changing concept of family in terms of structure, constitution, roles, demands and responsibilities, students become aware of functions and conceptualize the need of healthy interpersonal relationships, parental techniques, rearing pattern, need of child disciplinary methods. Students are trained to understand the possibilities of crisis situation within a family with a need to crisis resolution. Students learn the expected adjustments within the family stage namely establishing, expanding and contracting stage. **CO3:** Students acquire the knowledge of assessment, need and purpose along with the concept of developmental milestone as benchmarks to development. Acquire the skills to perform certain tests understanding tools techniques of infant testing need of neurological assessment; need for assessing auditory & visual impairment. **CO4:** Students get acquainted with the need of role of early stimulation developmental activities for raising social, cognitive, emotional physical motor skills, language behavior. Home intervention; concept of early intervention in developmental delay. Ngo's and governmental level programmes, policies of early stimulation (birth to six years of age) with its application for normal and children with special needs.

PAPER-III: ADVANCE PATTERN MAKING	**CO1:** Develop skilled pattern making **CO2:** Study commercial pattern envelope **CO3:** Study important marking in pattern making. **CO4:** Study different layouts and their uses. **CO5:** Methods of fabric estimation. **CO6:** Study different methods of pattern designing. **CO7:** Study grading, its principles. **CO8:** Study draping and its importance in designing. **CO9:** Study different layouts and their uses. **CO10:** Study flat pattern and its uses. **CO11:** Study darts and its manipulation and methods. **CO12:** Study types of figures and its defects. **CO13:** Study principles of design and its effect. **CO14:** Study of fitting problems and their remedy. **CO15:** Study of different texture on different type of figure. **CO16:** Study different plackets and its application. **CO17:** Study skirts and waist band its application. **CO18:** Study collars, classification and types. **CO19:** Study different fabric construction techniques. **CO20:** Designing garment by using different types of fabric.
PAPER-IV: ADVANCED RESOURCE MANAGEMENT II	**CO1:** Learners gain knowledge about different types, scope, role and Management of resources in relation to Human Life. **CO2:** Learners recognize the importance of wise use of resources in order to reach personal and family goals. **CO3:** Learners understand the importance of motivating factors in management –values, goals and standards. **CO4:** Develop ability to take rational decisions. **CO5:** Develop the ability to evaluate the management efficiency and effectiveness in the family and other organizations.
PAPER-V: PROGRAMME PLANNING & BUILDING IN EXTENSION	**CO1:** To learn Program planning for extension work. **CO2:** To study Program building in extension **CO3:** To understand Community organization: **CO4:** To gain knowledge about innovations in communication, The SMCRE model, Diffusion, Relation between Communication **CO5:** To learn Innovation Decision Process, Innovativeness, and stages involved in adoption process. **CO6:** To gain knowledge on Information from communication media. **CO7:** To understand Group Mobilization, Definition of social groups, occasions of group association, groups in rural communities. **CO8:** To understand the concept of change agent, Meaning & traits of change agents, role of change agents.
PAPER-VI: NUTRITIONAL BIOCHEMISTRY-I	**CO1:** Develop an understanding of the principals of biochemistry (as applicable to human nutrition) **CO2:** Obtain an insight into the chemistry of major nutrients like carbohydrates, proteins and lipids and physiologically important compounds.

	CO3: Understand the biological processes and systems as applicable to humannutrition. **CO4:** Understanding the basic Sources, structure, physical properties and uses of macro nutrients **CO5:** To know about the importance of nucleic acids, Structure of a mononucleotide. Bases found in nucleic acids. Difference between RNA and DNA and their functions. Structures of DNAs & RNAs and also understanding the concept of Base pairing rule. **CO6:** Apply the knowledge acquired to human nutrition and dietetics **CO7:** To understand the concept of High Energy compounds ATP & ADP **CO8:** To understand the aspects like Inborn errors of metabolism like Sickle cell anemia &Gout.
Lab Work:	• To know the color reactions of carbohydrates and proteins • To understand the procedure of Preparation of Potato Starch andidentify with solubility test and color Reactions • To understand action of Ptyalin (Salivary Amylase) on Starch.
PAPER-VII: HEALTH SCIENCE AND HYGINE	**CO1:** To understand the concepts of Infection, contamination, host, communicable and non-communicable diseases, source of infection, and Incubation period. **CO2:** To know the types of communicable and non-communicable diseases. **CO3:** To understand the modes of transmission of disease- Direct and Indirect. **CO4:** To gain knowledge of measures taken for the prevention and control of diseases. **CO5:** To understand the aims, objectives, principles of Health Education and to know the role of communication in Health Education **CO6:** To understand the concepts of disinfection, sterilization, disinfectant, antiseptic, and deodorant and to know about the types of disinfectants. **CO7:** To gain knowledge about the principles and work of WHO and UNICEF. **CO8:** To understand the implication of drug addiction, Narcotics, Alcoholism, smoking, their control, and prevention. **CO9:** To understand the definition, necessity, advantages, and methods of family planning. **CO10:** To understand the concepts of Birth rate, Death rate, and Census. **CO11:** To understand the various aspects of Geriatrics
Lab Work:	• To know the different commonly used insecticides and disinfectants. • To identify and determine the count of different blood cells.

Course Outcome for Semester - VI	
PAPER-I: DIET THERAPY-II	**CO1:** Dietary management in a) Fever b) Anaemia c) Surgery d) Burns e) Cancer f) Food Allergy **CO2:** Diabetes Mellitus: dietary management of diabetes mellitus a) Role of diet in the management of IDDM and NIDDM b) Complications of diabetes mellitus **CO3:** Food exchange list-use of food exchange list in meal planning of diabetic people, hypertensive people **CO4:** Dietary management of coronary heart diseases **CO5:** Renal Disorders - dietary management in special conditions
PAPER-II: CARE AND WELL BEING IN HUMAN DEVELOPMENT	**CO1:** Students understand the relevance of care & concept of holistic well-being understand the need of care giving for attaining wellness with special attention to vulnerabilities (age specific). How to draw meaning of subjective wellbeing? its implication in understanding quality of life. **CO2:** Students are taught the need to understand Critical Issues in Infancy period, childhood adolescence. concept of wellness with the role & importance of health care, nutritional psychological counseling. **CO3:** Concept of care & well-being in adulthood with understanding the needs of elderly concept of wellness at different stages of work domains in adulthood, health care. **CO4:** Students acquire the need of facilities provisions & amp; policies at community, state and national level for promoting wellbeing. Important need-based health programme for the holistic approach to wellbeing under the broad spectrum of care
PAPER- III: FASHION DESIGING	**CO1:** Study fashion terminology **CO2:** Fashion movement **CO3:** Study theories of fashion adoption, trends in India. **CO4:** Study fashion classification, fashion cycle. **CO5:** Study factors influencing fashion. **CO6:** To learn process of fashion design **CO7:** To know the origin of fashion and clothing theories. **CO8:** To study clothing theories. **CO9:** To study different silhouettes in fashion. **CO10:** To know international fashion centers and fashion categories. **CO11:** To study fashion leaders, followers. **CO12:** To learn role of clothing in social, cultural scenario. **CO13:** To know the clothing and gender differentiation. **CO14:** To study different departments in apparel production and their working **CO15:** To know the marketing and merchandizing of fashion **CO16:** To study fashion forecasting. **CO17:** To learn different style and methods of fashion advertisement.
PAPER-IV: ADVANCED	**CO1:** Learners develop ability to manage various resources. Developing ability to apply management principles in

RESORCE MANAGEMENT-II	experimental house and in day today life experience and various small events. **CO2:** Learn the concept and application of entrepreneurship skills in Management. **CO3:** Learners develop ability to apply work simplification techniques. **CO4:** Creating awareness regarding intelligent choices of consumer goods.
PAPER-V: COMMUNITY DEVELOPMENT AND MANAGEMENT	**CO1:** To understand leadership in extension, motivation for extension work, to study extension training, to understand the concept of coordination in extension work. **CO2:** To gain knowledge regarding community development, Participatory Approach in community development, To understand Extension Administration **CO3:** To gain knowledge on Extension monitoring evaluation Meaning of monitoring evaluation.
PAPER-VI: NUTRITIONAL BIOCHEMISTRY-II	**CO1:** To understand the concept of Anabolism and Catabolism & its relation tonutrition. **CO2:** To know the concept of Carbohydrate, protein and lipid Metabolism**:** Absorption, transport and assimilation. **CO3:** To introduce definition and significance of intermediary metabolism like Glycolysis, Kreb's cycle (Detail process of energy and energetics), Glycogenesis and Gluconeogenesis **CO4:** To understand the concept of blood sugar regulation: hypoglycemia, hyperglycemia and renal threshold andGlucose Tolerance Test **CO5:** To introduce, definition, process and importance of: Transamination, Oxidative Deamination and Urea Formation. **CO6:** To know the classification of Enzymes according to IUB system. Effect of temperature and pH on the activity of enzymes. **CO7:** To understand the concept of Lipidprofile (Cholesterol, Bile acids, Triglycerides) & Health status. **CO8:** To know the definition of: Lipogenesis and Hyperlipidemia. Formation of Ketone bodies in diabetics. Elementary idea of Beta Oxidation.
Lab Work:	• To know the color reactions ofcarbohydrates and proteins • To understand the procedure of Preparation of Potato Starch and identify with solubility test and colorReactions • To understand action of Ptyalin(Salivary Amylase) on Starch.
PAPER-VII: PUBLIC HEALTH	**CO1:** To understand the basic concept, structure, and classification of bacteria and viruses. **CO2:** To know the concept, importance, and process of Gram Staining. **CO3:** To understand aspects like etiology, diagnosis, treatment, and prevention of non-communicable diseases – Diabetes mellitus and Nephrotic Syndrome **CO4:** To know the aspects like the causative agent, mode of transmission, epidemiology, diagnosis, treatment, prevention,

	and control of communicable diseases - Hepatitis, Cholera, Typhoid, Dysentery, Tuberculosis, Poliomyelitis, Measles. **CO5:** To understand the aspects like the causative agent, mode of transmission, epidemiology, life cycle, diagnosis, treatment, prevention, and control of parasitic infections (Amoebiasis & Ascariasis) and diseases spread by insects (Malaria & Filaria). **CO6:** To understand the classification and mechanism of immunity. **CO7:** To understand the concept of vaccines and to know the routine immunization schedule. **CO8:** To understand antibiotics and their classification
Lab Work:	• To understand the morphology and structure of different microorganisms- *Staphylococci, Streptococci, Mycobacterium Tuberculosis, E. coli*, Malarial Parasite, Filarial Parasite. • To know about the physical & chemical examination of Urine. • To estimate the Haemoglobin percentage. • To understand the life cycles of parasites. (*Entamoeba histolytica, Roundworm, Plasmodium vivax* and *Plasmodium falciparum, Wuchereria bancrofti*)

MATHEMATICS

PROGRAM OUTCOME FOR B. SC. MATHEMATICS

Department of Mathematics	After successful completion of three years degree program in the subject Botany the students are able to:
Program Outcomes	**PO1:** To develop creative and critical thinking. **PO2:** To develop effective communication. **PO3:** To build strong leadership qualities and develop team spirit. **PO4:** To learn to become better and effective citizens of the country. **PO5:** To develop moral maturity and ethical behavior. **PO6:** To learn about the environment and sustainability process. **PO7:** To self-direct a life-long learning system. **PO8:** To learn knowledge application. **PO9:** To learn analytical, scientific reasoning and problem solving. **PO10:** To gain Information / Digital Literacy.
Program Specific Outcomes	**PSO1:** Construct mathematical arguments, proofs and develop mathematical as well as analytical thinking **PSO2:** Critically interpret numerical data, graphical data and develop models **PSO3:** Apply mathematical knowledge to a career and research related to mathematical sciences PSO4: Apply critical thinking skills to solve problems which can be modelled mathematically.
Course Outcomes B. Sc . Mathematics	
Course Outcome for Semester-I & II	
Sem. I & II Paper-I: Algebra & trigonometry, Differential and difference equations	**CO1:** Understand the applications of De Moiver's theorem, properties of groups and subgroups **CO2:** Learn basic properties of first order, higher order differential equations and solve them with different methods. **CO3:** Understand to find unknown solution by using known solution, the formation of difference equation, solution of homogeneous and non-homogeneous linear equation. **CO4:** Understand the concepts of rank, Eigen values of matrices, solution of homogeneous and non-homogeneous system of equations.
Sem I & II Paper-II: Calculus, Vector calculus & improper integrals	**CO1:** Understand basic properties of limit, continuity and derivability of functions, expansion of functions in terms of infinite series by using different methods. **CO2:** Find indeterminate forms and partial differentiation of functions with two or more variables **CO3:** Understand basics of directional derivatives, gradient, divergence and curl **CO4:** Evaluation of double and triple integral, improper

	integrals and their convergence.
Course Outcome for Semester-III & IV	
Sem III & IV Paper-I: Advanced calculus, Partial Differential equations & calculus of variations	**CO1:** Understand concept of limit and continuity of functions of two variables, application of Mean value theorems **CO2:** Study of convergence, divergence of sequences and series using various tests. **CO3:** Understand ordinary differential equation in more than two variables and methods of finding solution **CO4:** Study Lagrange's method, Charpit's method, Jacobi's method to solve PDE, homogeneous and non-homogeneous PDE with constant coefficients
Sem III & IV Paper-II: Differential equations & group homomorphism, Mechanics	**CO1:** Understand basic properties of Laplace transforms, inverse Laplace transforms and solution of ordinary differential equation using Laplace transform. **CO2:** Study of group homomorphism, isomorphism in details. **CO3:** Understand kinematics in two dimensions, mathematical exposition and geometrical representation of simple harmonic motion. **CO4:** Study mechanics of system of particles and Lagrange's equations.
Course Outcome for Semester-V & VI	
Sem V & VI Paper-I: Analysis, Abstract algebra	**CO1:** Study Fourier series and it's convergence, existence of Riemann-Stieltjes integral, construction of analytic function, harmonic function etc. **CO2:** Understand conformal mapping, bilinear transformation. **CO3**: Study Group automorphism, inner automorphism, vector spaces and it's properties, subspaces, basis, dimensions etc. **CO4:** Understand algebra of linear transformation and its inverse, matrix associated with linear map and vice versa, properties of inner product space.
Sem V & VI Paper-II: Metric space, complex integration & Algebra, Special theory of relativity	**CO1:** Understand concepts of countable, uncountable sets, completeness, compactness, connectedness of metric space. **CO2:** Calculation of zeros and different types of singularities of analytic function, application of Cauchy's residue theorem to evaluate integral. **CO3:** Study geometrical interpretation, group properties of Lorentz transformations and basics of tensors, metric tensors etc. **CO4:** Understand equivalence of mass and energy, transformation formulae for mass, momentum and energy, relativistic equations of motion, Maxwell's equations etc.

MICROBIOLOGY

PROGRAMME OUTCOME FOR B. SC. MICROBIOLOGY	
DEPARTMENT OF MICROBIOLOGY	**After successful completion of three years degree program in the subject Microbiology the students will be able to:**
PROGRAM OUTCOMES	**PO1:** Demonstrate laboratory skills applicable to Microbiological and Clinical methods including laboratory safety. **PO2:** Acquire skills for accurately reporting observations and findings through oral, written and digital formats. **PO3:** Apply the knowledge of microbiology from multiple fields to critically analyse and evaluate microbiological, environmental and health related issues and to create awareness and impact of microbiology outside the science community. **PO4:** Practice flexible professional skills needed for careers in microbiology & related professional and scientific fields like-Health sector, medical laboratory technology (MLT), Water testing labs, Dairy and food Industry as quality assurance and quality control professional etc, can opt for either post graduate study program, research, or for various competitive exams and professional courses. Exposure provided to the students during the add-on bioinformatics certificate course would help students gain awareness of career options in the software industry too. **PO5:** Students will be able to expand their learning horizons through use of multidimensional learning resources to keep themselves at par with the pace of scientific and research development worldwide.
PROGRAM SPECIFIC OUTCOMES	**PSO1:** The subject helps to gain knowledge about all types of microbial world, living as well as non-living, its harmful & useful interactions with human, animals, plants, bacteria and the environment **PSO2:** Students will be able to recognize structural & functional relationship of all living beings at molecular & cellular level. **PSO3:** They will get acquainted with importance of microorganisms as model systems in Genetics & Molecular Biology. **PSO4:** Students will be able to demonstrate basic microbiological techniques & acquire experimental and quantitative skills encompassing preparation of laboratory reagents, media, conducting experiments, handling different instruments, analysing samples& interpreting results.

COURSE OUTCOME FOR B SC MICROBIOLOGY	
Title of the Paper	**COURSE OUTCOME FOR SEMESTER -I**
Paper-I: FUNDAMENTALS OF MICROBIOLOGY (New Syllabus)	**By the end of this course, the students will be able to:** **CO1:** Get knowledge about basic branches of microbiology, they will understand the contribution of eminent scientists in the development of microbiology. **CO2:** Acquainted with the ultrastructure of bacterial cell, concepts of prokaryotic and eukaryotic cell's, their differences with examples. **CO3:** They will acquire the knowledge about nutritional requirements, classification of bacteria on the basis of nutritional habits. **CO4:** Learn about the growth of microbes, cell cycle and reproduction processes, various environmental parameters affecting their growth & different techniques used for their detection & quantification.
Paper-II: BASIC TECHNIQUES IN MICROBIOLOGY (New Syllabus)	**CO1:** Understand the basic principles and applications of various types of microscopic techniques. **CO2:** The students learn different techniques of Cultivation and preservation of bacteria, yeast and fungi. They are acquainted with various culture collection centres in India and abroad. **CO3:** Understand different staining techniques, role of reagent and dyes principles involved in these staining techniques. **CO4:** Get acquainted with various disinfectants, antiseptic and antimicrobial agents used in microbial control. They come to know about its mode of action and mechanism involved in microbial control.
Lab Work:	**By the end of this semester students will be able to demonstrate:** • Trained for handling various basic as well as advanced instruments used in microbiology laboratory. • Know about preparations of different types of media and methods to cultivate the microbes. • Able to demonstrate different staining procedures, stains & reagents used and microscopic observations of various types of bacteria. • Able to isolate different types of bacteria from samples of milk, water, soil etc. • Able to demonstrate sensitivity of bacteria to antibiotics, and UV radiation effect
COURSE OUTCOME FOR SEMESTER -II	
Paper-I: MICROBIAL	**By the end of this course, the students will be able to:** **CO1:** Know about the Prokaryotic microbial diversity with

DIVERSITY	examples, general characters & their life cycle. **CO2:** Get acquainted with Eukaryotic microbial diversity with examples, general characters & their life cycle. **CO3:** Understand the general characters, morphology and classification of viruses, mode of replication and methods of cultivation. **CO4:** Conceptualize various kind of positive and negative microbial interactions.
Paper-II: FOOD MICROBIOLOGY & MILK MICROBIOLOGY	**CO1:** Get acquainted with various food and milk products, their production techniques, various diseases caused, prevention of spoilage and its preservation. **CO2:** Gain knowledge about food safety and food standards
Lab Work:	**By the end of this semester students will be able to demonstrate:** • Demonstrate Slide culture techniques for the cultivation and study of mould. • Get Acquainted with SPC method to determine quality of food. • Learn to visualize under Microscope different characteristics of Fungi (*Aspergillus, Penicillium* and *Mucor*) Protozoa *(Plasmodium vivax, Trypanosoma* and *Amoeba*) & Algae (*Spirullina, Anabena* and *Euglena*), *Mycoplasma, Rickettsia* and *Chlamydia*. • Know the method of Coliform detection in food as per BIS. • Enumeration of total aerobic viable count from raw and pasteurized milk by serial dilution method. • Can demonstrate MBRT and Phosphatase test. • Know the technique to study the Effect of salt and sugar on microbial growth. • Demonstrate to find out MIC of preservative compound.
COURSE OUTCOME FOR SEMESTER III	
Paper-I: CHEMISTRY OF ORGANIC CONSTITUENTS AND ENZYMOLOGY (Old syllabus)	**By the end of this course, the students will be able to:** **CO1:** Acquire knowledge about classification of organic compounds like Carbohydrates and lipids and get acquainted with their structures and various bonds involved in them. **CO2:** Understand classification & structures of amino acids& proteins. **CO3:** Concept building about classification, structures and functions of enzymes, their mode of action and reaction mechanism. Understand steady state kinetics. **CO4:** Gain knowledge about nucleic acids, structures and their differences. Can describe importance of vitamins to human body and their deficiency syndrome.
Paper-II: INDUSTRIAL	**CO1:** Know the scope of industrial microbiology and

MICROBIOLOGY	screening methods used for isolation of industrially important microbes. **CO2:** Gain knowledge about different Fermenter configurations& designs. **CO3:** Scale up and DSP. **CO4:** Concept building about industrial production of SCP, Baker's yeast, ethanol, penicillin and semisynthetic penicillin, citric acid, Vit B12, beer and wine.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate and Identify carbohydrates and lipids from unknown samples. • Demonstrate enzyme activity by bacteria (amylase, catalase, gelatinase, lipase) • Estimate proteins, DNA and RNA by spectrophotometric method • Get knowledge and hands on training on- production of ethanol and methods of estimation. • Get acquainted with the isolation procedure of amylase producer from soil. • Demonstrate Leavening capacity of yeast and Immobilization of yeast for invertase activity.
COURSE OUTCOME FOR SEMESTER IV	
Paper-I: METABOLISM	**By the end of this course, the students will be able to:** **CO1:** Understand the general strategy of metabolism and conceptualize various metabolic processes operating in living cells. **CO2:** Gain knowledge about methods of DNA replication, models of replication, enzymes involved and Prokaryotic transcription process and mechanism. **CO3:** Acquainted with deamination processes, Urea cycle, glucogenic and ketogenic amino acids Genetic code and Prokaryotic translation **CO4:** Understand the mechanism by which energy is generated.
Paper-II: APPLIED MICROBIOLOGY	**CO1:** Get acquainted with multiple tube dilution technique, IMViC classification and understand the significance of bacteriological analysis of drinking water. **CO2:** Gain knowledge about various methods applied for treatment of water and waste water & understand the importance of disposal of industrial wastes and techniques used in its disposal. **CO3:** Understand the techniques of air analysis, various samplers used & methods involved. Know the role of soil microbes and methods involved in biofertilizer & biopesticide productions. Conceptualize PSB, mycorrhiza & microbial leaching process. **CO4:** Gain knowledge about Food spoilage, pathogens involved and methods of preservations. Food borne diseases and food intoxications.

Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate the techniques to isolate microbes from water and waste water. • Know the techniques to find out MPN, DO, COD, BOD, alkalinity of water and IMViC tests. • Understand the methods of chlorination of water and Chlorine demand. • Hands on Knowledge about MBRT and Phosphatase test
COURSE OUTCOME FOR SEMESTER V	
Paper-I: **MEDICAL MICROBIOLOGY**	**By the end of this course, the students gain knowledge about:** **CO1:** Concept building about various epidemiological concepts and definitions. Various modes by which infections spread in community, portal of entry& exit and their control. **CO2:** Microbial mechanism of Pathogenicity and virulence, exaltation and attenuation methods, MID, MLD, ID 50, LD50. **CO3:** Acquire knowledge about methods used in isolation and identification of various pathogenic organisms, based on their morphology, cultural characteristics, biochemical characteristics, serology and lab diagnosis. **CO4:** Understand the Basic principles of drug designing, the role of these drugs and antimetabolites in disease control.
Paper-II: **MOLECULAR BIOLOGY AND BIOINSTRUMENTATION**	**CO1:** Acquainted with various concepts – related to gene, different types of mutation and its regulation. **CO2:** Concept building about various processes by which gene transfer occurs amongst microbes **CO3:** Understand the principles, methodology and application of various bio instruments like spectrophotometer, electrophoresis, chromatography, centrifuge etc **CO4:** Get acquainted with Isotopic tracer technique and its applications.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate bacterial and plasmid DNA isolation techniques. • Gain knowledge and hands on training on restriction digestion technique. • Demonstrate spectrophotometrically creatinine estimation. • Demonstrate gel filtration, paper chromatography and TLC. • Knowledge and hands on training on isolation and identification of pathogenic bacteria (*E coli, S aureus, Salmonella, Proteus*).

COURSE OUTCOME FOR SEMESTER VI	
Paper-I: IMMUNOLOGY	**By the end of this course, the students will be able to:** **CO1:** Concept building about defensive mechanism of host against diseases, various terminologies used and definitions of epidemic, endemic, pandemic, nosocomial infection, zoonotic infection, vector, types and role of vectors, portal of entry portal of exit of pathogens. **CO2:** Knowledge about Haematopoiesis, Cells of immune system, general characters of B and T cells, cellular and humoral immunity. **CO3:** Understand the structures, properties, types and importance of Antigens and Immunoglobulins, Ag-Ab reactions in Diagnostic immunology. **CO4:** Gain knowledge about ELISA test, its application and various Hypersensitivity reactions and their types.
Paper-II: BIOTECHNOLOGY	**CO1:** Know the tools and techniques of genetic engineering **CO2:** Knowledge about DNA, fingerprinting and its application in forensic science **CO3:** Acquainted with the methods of production of insulin, interferon. Vaccines, monoclonal antibody. Understand the applications of biotechnology in agriculture **CO4:** Acquire knowledge about the advantages /disadvantages of genetic engineering for humans & comprehend the production and importance of genetically modified foods and animals, know about the ethics to be followed.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate VDRL test, Widal test, immunodiffusion technique And Western blot technique. • Perform PCR • Development of spheroplast • Get the knowledge of lab production of biofertilizer and soya sauce

PHYSICS

Department of Physics	After successful completion of three years degree program in the subject Physics the students are able to:
Programme Outcome:	**PO1:** Gain a thorough understanding of the subject. **PO2:** Lay the groundwork for future learning. **PO3:** Learn the fundamentals of research. **PO4:** Instill good moral and ethical ideals in yourself. **PO5:** Recognize your societal and environmental responsibility. **PO6:** Develop communication and professional skills. **PO7:** Acquire the ability to accept a wide range of ideas and points of view. **PO8:** Empower yourself to meet the demands of a changing universe.
Program Specific Outcomes	**PSO1:** Understand the principles of physics, matter characteristics, and electrodynamics, as well as the basic notions of scientific process. **PSO2:** Understanding the theoretical foundations of quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, astrophysics, statistical physics, photonics, and thermodynamics. **PSO3:** Understand and apply electrical ideas in the design of various analogue and digital circuits. **PSO4:** Understand the fundamentals of computer programming and numerical analysis with PSO4. **PSO5:** Use laboratory experiments to test and apply theoretical principles.
Course Outcomes of B.Sc. Physics	
B. Sc. Semester-1	
Paper – I: Properties of Matter and Mechanics: Learning Outcomes:	**CO1:** The curriculum covers general characteristics of matter, which include solid and liquid. Elasticity is a solid property that offers a notion of material strength in three forms, as well as liquid viscosity and its relevance. Surface tension in a liquid's geometrical form. **CO2:** Mechanics covers the fundamentals. Newton's laws of motion and how they're used. Students' imagination is improved by geometrical descriptions of rules, and the study of restrictions leads to the area of physics known as classical mechanics. The relationship between M.I. and body movements is given by rotational motion.
Paper-II: Electrostatics, Time varying fields & Electric Currents:	Students will be able to: **CO1:** State and express Coulomb's law in vector form and apply it to solve for E due to stationary charges, Electric potential due to point charge, owing to dipole, and field due to dipole at any place after finishing this course.

	CO2: Able to establish that potential is force per unit charge and to describe V and its link to energy conceptually. **CO3:** Able to explain the similarities and differences between a conductor and a dielectric, the action of an electric field, dielectric polarisation, polar and non-polar molecules, and the Classius-Mossoti equation. **CO4:** When given epsilon and the free charge on the dielectrics, be able to determine the E field inside the dielectric. **CO5:** Able to grasp the fundamental concepts of parallel plate capacitors, including capacity derivation with or without the use of a calculator. When given epsilon and the free charge on the dielectrics, it is possible to determine the E field inside the dielectric. **CO6:** Able to grasp the fundamental concepts of parallel plate capacitors, including capacity derivation with and without dielectrics, as well as solve numerical issues. **CO7:** Able to articulate and explain Faraday's laws of electromagnetic induction, self and mutual induction, transformers and their operation, transformer losses and applications, and Kirchhoff's laws. **CO8:** Able to study series resonance, frequency derivation, power in an ac circuit, and solve mathematical problems.
B. Sc. Semester- II	
Paper-I: Oscillations, Kinetic theory of gases and Thermodynamics:	**CO1:** Students will be able to grasp linear and angular S.H.M., as well as the S.H.M. differential equation and its solution. Also capable of developing damped oscillation differential equations and energy dissipation via damped oscillations. **CO2:** The basics and applications of forced vibrations, resonance, and its energy and quality factor will be understood by the students. Also included are gas laws and their applications. **CO3:** Students will learn about gas transportation phenomena and the thermodynamics that underpin it. Also, the role of thermodynamic laws in engine efficiency.
Paper-II: Gravitation, Astrophysics, Magnetism and Magneto statics:	**CO1:** The students get an understanding of the fundamental rules of classical mechanics, which improves their understanding of planetary motion and interactions. **CO2:** An introductory course in astrophysics piques students' curiosity in space science. **CO3:** Studying atomic magnets at a microscopic level improves students' intellectual abilities in material research and provides insight into the relationship between electric and magnetic fields as a future key to power consumption.
B. Sc. Semester-III	
Paper-I: Sound waves, Applied acoustic, Ultrasonic and Power supply Learning	**CO1:** Students learn about the many types of waves and their properties. They also learn about harmonics, sound quality, and the human ear's reaction and audibility to sound. Students may learn about sound intensity measurement and the influence of temperature on sound. **CO2:** Students are familiar with various sound measurement

	instruments such as transducers, sound recording, and sound reproduction. **CO3:** Students learn about ultrasonic waves, their characteristics, ultrasonic wave generating methods, and research applications. **CO4:** Students learn about the necessity of voltage, current, and load management, as well as power supply and conversion from alternating current to direct current.
PHYSICS - Paper-II: Physical optics and Electromagnetic waves:	**CO1:** Students are able to explain how light behaves as a wave. **CO2:** Examine how light intensity varies owing to interference and diffraction. • Understand Michelson and Fabry-Parot Interferometer Applications **CO3:** Examine the concept of polarisation and how it is used. **CO4:** Understand electromagnetic waves, Maxwell's field equations, and their transverse nature. **CO5:** Explain Poynting's theorem and its significance.
B. Sc. Semester IV	
PHYSICS - Paper-I: Solid state physics, X-ray and Laser:	**CO1:** Students will have a fundamental understanding of crystal systems and spatial symmetry, Miller indices, and how different diffraction methods are used to study crystalline materials. **CO2:** Be familiar with the notion of a reciprocal space lattice and the meaning of Brillouin zones. **CO3:** Students will be able to identify the different types, characteristics, and uses of X-rays. **CO4:** Students explain the fundamentals of lasers, how they are made, and how they are used.
PHYSICS - Paper-II: Solid state electronics, and Molecular physics:	**CO1:** Students will learn the fundamentals, manufacturing, and applications of LED, Solar Cell, and BJT in everyday life, as well as the concepts, applications, and special characteristics of FET, JFET, and MOSFET. **CO2:** Students will be able to explain and quantify vibrational and rotational energy, kinds of molecules, diatomic molecules as harmonic and anharmonic oscillators, rotational-vibrational spectra, and the Born Oppenheimer approximation. **CO3:** Students who understand the relevance and applicability of Raman spectroscopy in molecular physics are also familiar with the Frank-Condon principle, the fundamentals of NMR and ESR, and their spectroscopic applications.
B. Sc. Semester –V	
Paper-I: Atomic physics, free electron theory and Statistical physics:	**CO1:** Students comprehend the many theories of the atomic model, as well as the various quantum numbers. The student also investigates how the momentums and magnetic moments associated with various electron motions are orientated, as well as their interactions. **CO2:** Students learn about electron conduction, both electrical and thermal. Fermi temperature band, Fermi energy. Free

	electron theory: different theorems, models, and experiments Material classification is also important. **CO3:** The student gains an understanding of - space, Gamma space, probability distribution, and thermodynamic probability, Principle of a priori probability, Boltzmann's entropy relation, different states, Maxwell Boltzmann distribution law, and its application; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann' Students will also study Bose-Einstein statistics, as well as the Fermi Dirac distribution and how to use it.
Paper-II: Quantum mechanics, Nanomaterials and Nanotechnology:	Students will be able to: **CO1:** Understand the major components of quantum mechanics' historical evolution, as well as wave characteristics of matter, after finishing this course. **CO2:** Capable of relating classical mechanics to quantum mechanics. **CO3:** Able to solve Schrodinger equations in one to three dimensions and understand them physically. **CO4:** Familiarity with the fundamentals of nanoscience and nanotechnology, as well as their relevance in everyday life.
B. Sc. Semester VI	
Paper-I: Relativity, Nuclear physics and Bio Physics	**CO1:** Students comprehend frame of reference, special theory of relativity postulates, and relativistic variation in length, time, mass, velocity addition, and mass energy equivalence. **CO2:** They can design radiation detectors, charge accelerators, and nuclear reactions, as well as the many types of nuclear processes and their significance in modern technology. **CO3:** Students are able to describe and grasp the essential ideas of decay particles. **CO4:** Students will be able to understand bio physics and its significance in the medical profession.
Paper-II: Electronics, Fiber optics, Communication and Digital electronics	**CO1:** Students will understand the construction and operation of amplifiers and oscillators, as well as their applications. **CO2:** Students will be able to understand the fundamental principles and operations of fiber optics, as well as the importance of optical fibre, light wave propagation in optical fiber, and its role in communication. **CO3:** They will also be familiar with communication kinds such as AM and FM, as well as their core theory and how television is broadcast using these methods. **CO4:** The students will be able to understand how large amounts of data are kept in current times utilizing technologies such as Number Systems, as well as the theory behind it.

STATISTICS

Department of Statistics	After successful completion of three years degree program in Statistics a student should be able to:
Programme Outcomes	**PO1:** Demonstrate, solve and an understanding of major concepts in all disciplines of statistics **PO2:** Solve the problem and also think methodically, independently and draw a logical conclusion. **PO3:** Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of statistical experiments. **PO4:** Create an awareness of the impact of statistics on the society, and development outside the scientific community. **PO5:** Use modern techniques and different Statistical software
Programme Specific Outcomes	**PSO1:** Make aware and handle the sophisticated data. **PSO2:** Gain the knowledge of Statistics through theory and practical. **PSO3:** To learn about basic principles of design of experiment. **PSO4:** To gain knowledge about official statistics; purpose and functions of CSO, NSSO **PSO5:** Understand basic concepts of Statistical Quality Control and Uses of SQC **PSO6:** To study applications of statistics in the field of industrial statistics, operation research, survey sampling technique etc. **PSO7:** Use modern statistical tools, Models, Charts and Equipment. **PSO8:** Develop research-oriented skills.
Course Outcomes B. Sc I Statistics Semester-I	
Paper-I: Probability Theory	**CO1:** Understand the Theory of Probability. **CO2:** Able to apply additive and multiplicative laws of probability **CO3:** Obtain the various results on theorems in probability CO-4. Distinguish between measures of location and measure of dispersion. **CO4:** Identify Conditional Probability, Bayes theorem, and Chebyshev's inequality **CO5:** Concept of Random variable, pmf, pdf, pgf, distribution function, mgf and its uses
Paper-I**: Descriptive Statistics-I**	**CO1:** Able to plan, execute and analyze a data **CO2:** Use and understand basic concepts of Descriptive statistics **CO3:** Analyze data and understand concept of population census

	CO4: Analysis of categorical data using various techniques and draw conclusions. **CO5:** Apply statistics to draw different types of diagrams and graphs
Course Outcomes B. Sc I Statistics Semester-II	
Paper-I: Probability Distribution	**CO1:** Understand various Discrete and Continuous distributions. **CO2:** Able to have the knowledge of Discrete Distributions such as Bernoulli, Binomial, Poisson, Uniform, Hyper geometric and Geometric, Negative Binomial with their properties and applications **CO3:** Able to have the knowledge of Continuous Distributions such as Uniform, Beta, Gamma, Normal and their properties **CO4:** Distinguish between Bernoulli distribution and Binomial distribution **CO5:** Understand concept of Lack of memory property of Geometric distribution.
Paper-I**: Descriptive Statistics-II**	**CO1:** Able to plan, execute and analyze a data. **CO2:** Use and understand concepts of central tendency and location. **CO3:** Understand different concepts and measures of dispersion **CO4:** Analysis the concept of bivariate data and correlation coefficient as well as regression. **CO5:** Apply different types of partition values and the concepts of skewness and kurtosis The concepts of central tendency and location.
Course Outcomes B. Sc II Statistics Semester-III	
Paper-I: Statistical Methods	**CO1:** Drawing random samples from uniform and normal distribution. **CO2:** Able to find moments and correlation coefficient of bivariate probability distribution. **CO3:** Obtain a joint probability distribution of random variable (one or two dimensional) in the given situation. **CO4:** Distinguish between t- distribution and F- distribution. **CO5:** Identify the type of Statistical situation in which different Transformation of variable technique can be applied.
Paper-II: Economics Statistics	**CO1:** Construction of Price and Quantity index number by simple aggregative method **CO2:** Construction and uses of Wholesale Price Index number. **CO3:** Able to determine concept of purchasing power of money **CO4:** Fitting of Pareto curve to income data. **CO5:** Analyze data pertaining to seasonal Indices and to interpret the results. **CO6:** summarize and analyze the data using Economic time series.

	CO7: Apply statistics in the various fields.
Course Outcomes B. Sc II Statistics Semester-IV	
Paper-I: Statistical Inference	**CO1:** To solve problems on chi-square for testing independence of attributes. **CO2:** To solve problems on t-tests and construction of confidence intervals for single mean and difference of two means, paired t-test. **CO3:** Identify the characteristics properties of good estimator. **CO4:** Identify the type of statistical situation to which central limit theorem can be applied. **CO5:** Understand the construction of confidence interval.
Paper-II: Applied Statistics	**CO1:** Explain the sources of demographic data. **CO2:** Calculation of Percentile scores and T-scores for a given frequency distribution of raw scores. **CO3:** Comparison of raw scores on the basis of (i) Percentile, (ii) Z scaling, (iii) T scaling. **CO4:** Able to solve numerical problems on construction and use of life tables. **CO5:** Can do computation of CDR and Standardized death rates by direct and indirect methods. **CO6:** Be able to compute and interpret Gross Domestic rates
Course Outcomes B. Sc III Statistics Semester-V	
ST-301: Paper-! - Statistical Quality Control and Linear Programming Problem	**CO1:** Use tools of SQC, draw control charts for mean, standard deviation and range **CO2:** Able to draw conclusion about whether process is in statistical quality control or not. **CO3:** Obtain the optimum solution of Linear programming problem. **CO4:** Distinguish between Process and product control **CO5:** Identify the General form of LPP and Standard form of an LPP.
ST-302: Survey Sampling Techniques	**CO1:** Able to plan, execute and analyse a sample survey **CO2:** Use and understand basic concepts of sample survey, sampling and types of sampling and non-sampling errors **CO3:** Analyze data and understand concept of stratified sampling, systematic sampling and cluster sampling and compare various sampling techniques. **CO4:** Analyse data using various sampling techniques and draw conclusions.56 **CO5:** Apply statistics in the various fields of sampling techniques
Course Outcomes B. Sc III Statistics	

Semester-VI	
ST-311: Operations Research	**CO1:** To solve and understand different concepts of Network Analysis and Construct Network Diagram **CO2:** Able to understand concept of Duality in LPP, relationship between primal and dual problem and its economic interpretation **CO3:** Identify the balanced transportation problem and unbalanced transportation problem, **CO4:** Identify two-person zero sum game and solution of game. **CO5:** Understand concept of Duality in LPP, relationship between primal and dual problem and its economic interpretation
ST-312: -Experimental designs	**CO1:** Able to explain factorial experiments, Yates' method to calculate main effects and interaction effects in 2^2 and 2^3 factorial experiments **CO1:** Analyse data using various experimental designs CRD, RBD, LSD and draw conclusions. **CO1:** Comparison of theory of linear estimation, analysis of variance (ANOVA) **CO1:** Able to analyse data using various ANOVA techniques and draw conclusions. **CO1:** Understand basic principles of designs of experiments. **CO1:** Be able to compute and interpret ANOVA for one way and two-way classified data.

ZOOLOGY

Department of Zoology	After successful completion of three years degree program in the subject Zoology the students are able to-
Program Outcome	**PO1:** classification and Identification of organisms according to their characteristic features. **PO2:** Correlates the Morphology, physiology and biology of invertebrate and vertebrates. **PO3:** Gain the knowledge of Micro-technique for preserving tissue and specimens. **PO4:** Analyse interactions among the various organisms of different phylas, their distribution and relationship with the environment. **PO5:** Gain knowledge about economic importance and application of knowledge agro based small industries like sericulture, apiculture, aquaculture, fish breeding, pear-culture. **PO6:** Understand concept of genetics and its importance in human health. **PO7:** Understand the use of biotechnology, biostatistics and bioinformatics.
Program specific Outcome	**PSO1:** Students are able to understand the basic concept of cell biology, environmental biology, genetics, physiology, taxonomy and applied zoology. **PSO2:** Understand the application of biological sciences in aquaculture, sericulture, vermin-culture, pearl-culture and apiculture. **PSO3:** Perform procedures as per laboratory standards in the area of physiology, cell biology, environmental biology, genetics, entomology, Biotechnology fisheries. **PSO4:** Gain knowledge about research methodology i. e. skills of micro technique which consists of preservation of tissue and specimens, their staining techniques
Course Outcome of B.Sc. Zoology	
Zoology SEM I	
Paper-I: Life and Diversity of Animals – Non-chordates (Protozoa to Annelida)	**CO1:** Students get knowledge about unity and diversity of life on the earth. **CO2:** Students will be able to identify and classify non-chordates on the basis of their peculiar characteristics. **CO3:** students will be able to understand phylum wise structural features, morphology, anatomy, physiology, habit and Habitat. **CO4:** Students will be able to explain how organisms' function at different level of grade of Organization like cellular, tissue, organ and organ system. **CO5:** They will be able to give examples of the physiological adaptation, development, behavior of

	different forms of life. **CO6:** Students understand economic importance of non-chordates as well as life cycle of pathogenic organisms.
Paper – II: Environmental Biology	**CO1:** Students get knowledge and understand about different strata of atmosphere. **CO2:** Students able to understand /recognize biological, chemical, physical components of earths system. **CO3:** Students will also understand how natural system human designed system work together and conflict with each other. **CO4:** Students understood about environmental issues like water pollution, Air pollution, soil pollution and noise pollution. **CO5:** Students able to understand and gain knowledge about renewable and non-renewable energy sources.
Lab. Work	• Studied museum specimen (classification and structural features0 • Learn about estimation of Dissolved oxygen and carbon dioxide PH and hardness of water • Studied pond ecosystem • Learn about dissection and perform mounting of biological material
Zoology - SEM II	
Paper – III: Life and Diversity of Animals – Non-chordates (Arthropoda to Hemichordata)	**CO1:** Students understood role of insect vectors in spreading diseases, mode of infection and symptoms. **CO2:** Students also understood economic importance of molluscans. **CO3:** Students understood affinities of hemichordates with different phyla. **CO4:** Students get knowledge about indirect development through various larval stages.
Paper – IV: Cell Biology	**CO1:** Students will be able to understand structure and functions of cell and cell organelles. **CO2:** Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells and cell organelles **CO3:** Students will understand how these cellular components are used to generate and utilize energy in cells **CO4:** Students will understand types of cell division that is mitosis and meiosis **CO5:** Students will apply their knowledge of cell biology to study environmental or physiological responses of cell
Lab Work:	• Studied Museum specimen (classification and structural features) • Studied permanent slides of larva of different animals and sections through different organs

	• Perform cell biology experiments, mounting and studied dissection.
Zoology - SEM III	
Paper-V: Life and diversity of Animals - Chordates (Protochordata to Amphibia	**CO1:** Students are able to understand diversity of earlier chordate from Protochordata to amphibian. **CO2:** Students are also studied about growth and development, evolution of different system of chordates. **CO3:** Students also get knowledge about adaptations, parental care and sexual dimorphism in chordates
Paper – VI: Genetics	**CO1:** Students are able to understand Mendel's laws of inheritance, basic concepts of gene, transmission of hereditary characters. **CO2:** Students also understand about interaction of genes. **CO3:** Students also understand concept of lethal genes, chromosomal disorder and syndrome caused due to abnormal chromosomal no. **CO4:** Students also understand about population genetics and application of genetics
Lab Work:	• Studied museum specimen of chordates (classification and structural features) • Observed and studied permanent slides of developmental biology and sections through different organs • Perform genetic experiments and studied karyotype of genetic traits.
Zoology - SEM IV	
Paper - VII: Life and Diversity of Animals – Chordates(Reptilia, Aves and Mammals)	**CO1:** Students understand about classification of reptiles, Aves and mammals based on structural variation. **CO2:** Get knowledge about Biting mechanism in snakes, adaptations in Aves and mammals. **CO3:** Get information about modern evolution theories, genetic basis of evolution **CO4:** Understand comparative study of development of heart and aortic arches in birds, Aves and mammals. **CO5:** Study different aspects of chick development
Paper - VIII: Molecular Biology and Immunology	**CO1:** Understand detail structure of DNA and RNA as a genetic material, structure of gene. **CO2:** Students are able to understand different processes like replication, transcription, protein synthesis. **CO3:** Able to understand concept of immunity, types of antigen antibody and their interaction **CO4:** Get information about types of immune response and about immune deficiencies.
Lab Work:	• Studied classification and identification of chordates • Studied skeleton of rabbit and fowl • Studied permanent slides of chick embryology and permanent slides. • Perform staining and immunology and molecular biology experiments.

Zoology - SEM V	
Paper-IX: General Mammalian Physiology I	**CO1:** It gives knowledge about structural features and functions of different systems like digestive, respiratory and circulatory. **CO2:** General properties of enzymes, enzyme activity **CO3:** Digestive glands, respiratory pigments, respiration mechanism and in detail circulatory system.
Paper-X: Aquaculture and Economic entomology and	**CO1:** This paper gives knowledge about-application of zoology and economic importance of zoology like fresh water aquaculture, prawn culture, pearl culture, apiculture, sericulture, and lac culture. **CO2:** Gives information about economic entomology and methods of pest control.
Lab Work:	• Perform physiology experiments i.e. estimation of carbohydrates, proteins, fats and vitamins. • Perform counting of red blood cells and white blood cells. • Studied histological slides • Perform mounting, • Collection and identification of local fishes. • Studied different insect pests.
Zoology - SEM VI	
Paper-XI: General Mammalian Physiology II	**CO1:** Get knowledge about nerve and muscle physiology, **CO2:** Studied in detail structure and function of different endocrine glands. **CO3:** Understood reproductive system, causes of infertility in male and female.
Paper-XII: Applied Zoology II (Bio-techniques ,micro techniques, Biotechnology, Bioinformatics and Biostatistics	**CO1:** Students are able to understand methods of separation of biomolecules, micro techniques (different staining methods **CO2:** Understand importance and role of bioinformatics **CO3:** Understand application of statistics in biology and biotechnology.
Lab Work:	• Detection of urea albumin sugar and creatinine in urine • Perform biotechnology experiments and micro-technique methods • Perform and studied application of bioinformatics and biostatistics. • Observed histological slides.

MATHEMATICS

PROGRAMME OUTCOME FOR M. SC. MATHEMATICS

Department of Mathematics	After successful completion of two years post-graduation degree program in the subject Mathematics the students are able to:
Program Outcomes	**PO1:** To acquire the strong foundation of basic concepts, this will benefit them to become good academicians. **PO2:** To apply the concept of mathematical tools to address real life problems. **PO3:** To pursue research in reputed institutions and solve the existing mathematical problems using the knowledge of pure and applied mathematics. **PO4:** To qualify various competitive exams like CSIR-UGC NET, SET, GATE, MPSC, UPSC, etc.
Program Specific Outcomes	**PSO 1:** To imbibe problem-solving and computational skills **PSO 2:** To understand the motivation behind the statements and proofs **PSO 3:** To enhance self-learning and improve own performance. **PSO 4:** To inculcate abstract mathematical thinking.
Course Outcomes M. Sc . Mathematics	
Course Outcome for Semester-I	
1T1 Algebra	**CO1:** To assimilate the concept of automorphism, conjugacy, G-set, etc. **CO2:** To analyse properties of solvable group, alternating group, etc. **CO3:** To study Sylow's theorem and related concepts. **CO4:** To understand maximal and prime ideals. Develop knowledge of R-homomorphism and quotient modules.
1T2 Real Analysis-I	**CO1:** To attain mastery in concept of uniform convergence, continuity, differentiation and integration. **CO2:** To understand theorems on inverse function, implicit function, and Rank theorem. **CO3:** To study Topological manifolds, Differentiable manifolds, Real Projective space, Grassman manifolds. **CO4:** To study in detail about Lie groups.
1T3 Topology-I	**CO1:** To understand basics of cardinality and Topological Spaces. **CO2:** To study open set, closed set, limit point, etc. **CO3:** To assimilate the concept of Connected set, Compact and countably compact spaces. **CO4:** To attain mastery in concept of and -spaces.
1T4 Ordinary Differential Equations	**CO1:** To solve first order linear differential equations. **CO2:** To understand second order equations with regular singular points and work out its applications. **CO3:** To study existence and uniqueness of solutions of first order differential equations.

	CO4: To analyse system of differential equations.
1T5 Integral Equations	**CO1:** To know the relation between differential and integral equations, and how to change from one to another. **CO2:** To understand different kinds of kernels and use techniques for solving problems on each kind. **CO3:** To explain types of Voltera equations and solve linear Volterra and singular integral equations using appropriate methods. **CO4:** To use Hilbert transform a general and finite one for solving a wide range of differential and integral equations.
Course Outcome for Semester-II	
2T1 Algebra -II	**CO1:** To understand the unique factorization domains, principal Ideal domains and Euclidean domains. **CO2:** To analyze properties of algebraically closed fields, splitting fields. **CO3:** To compute Galois groups in simple cases and apply the group-theoretic information to comprehend results about fields. **CO4:** To develop knowledge of Ruler and compass constructions.
2T2 Real Analysis -II	**CO1:** To gain knowledge of measurable sets and measurable functions. **CO2:** To acquire mastery on Lebesgue Integral. **CO3:** To study Convex functions, Lp-spaces. **CO4:** To learn Baire category theorem and its application. **CO5:** To understand Riesz-Fischer theorem and approximation in Lp-spaces.
2T3 Topology-II	**CO1:** To study continuous functions, product topology and metric topology. **CO2:** To gain knowledge of connectedness, compactness. **CO3:** To achieve the zenith in treating Countable Axioms, and Separable, Regular and Normal spaces. **CO4:** To understand theorems like The Urysohn's Lemma, Urysohn's Metrization Theorem.
2T4 Differential Geometry	**CO1:** To study the theory of curves and surfaces in three spaces. **CO2:** To analyse global properties of curves such as the four-vertex theorem. **CO3:** To understand the fundamental quadratic forms of a surface, intrinsic and extrinsic geometry of surfaces, and the Gauss-Bonnet theorem. **CO4:** To understand two dimensional Riemannian manifolds. **CO5:** To analyse problem of metrization and of continuation.
2T5 Classical Mechanics	**CO1:** To learn D-Alemberts principle and formulate Lagranges equation of motion. **CO2:** To understand Legendre transformations and solve different problems. **CO3:** To formulate Hamiltonian equation and understand its physical significance. **CO4:** To gain knowledge of Canonical transformations and solve problems on it.

Course Outcome for Semester-III	
3T1 Complex Analysis	**CO1:** To explain the concepts of Analytic Functions, and Elementary Functions. **CO2:** To understand Mobius Transformation and mappings of regions under some special transformations. **CO3:** To construct the proofs of Cauchy Integral Formula, Liouvellis Theorem, and solve problems related to Taylor and Laurent series. **CO4:** To identify different types of singularities, zeros of analytic function. **CO5:** To study the maximum principle and Schwarz's lemma.
3T2 Functional Analysis	**CO1:** To understand Banach Spaces, The Hahn-Banach Theorem. **CO2:** To study the open Mapping Theorem, Hilbert Spaces. **CO3:** To analyse different operators and their properties **CO4:** To understand Category theorem, uniform boundedness theorem, strong and weak convergence.
3T3 Mathematical Methods	**CO1:** To attain mastery in Fourier integral theorem and its application. **CO2:** To attain mastery in application of Laplace and Fourier transform. **CO3:** To study applications of finite Sturm-Liouville transforms. **CO4:** To study application of finite Hankel transform, finite Legendre transform and finite Mellin transform.
3T4 Core Elective General Relativity	**CO1:** To describe Riemannian geometry in tensor formalism. **CO2:** To define energy momentum tensor of various fluids and understand gravity due to curved spacetime. **CO3:** To obtain Einstein's field equations by different approach and Poisson's equations as an approximation to Einstein field equations. **CO4:** To solve Einstein's field equations for static spherically symmetric Schwarzschild space-time and calculate the advances of perihelion, relativistic frequency shifts for sources moving in a gravitational field, as well as the bending of light passing through a spherical mass distribution.
3T5 - Operational Research-I	**CO1:** To understand basics and formulation of linear programming problems and revised simplex method (with and without artificial variables). **CO2:** To apply simplex method to solve real life problems. **CO3:** To study integer programming and its application. **CO4:** To understand the concept of Bounded variable technique for L.P.P. and unconstrained optimization. **CO5:** To study of Queuing Theory and Poisson queueing models- M/M/1, M/M/C for finite and infinite queue length.
Course Outcome for Semester-IV	
4T1 - Dynamical Systems	**CO1:** To attain mastery in Dynamical systems, vector fields, its fundamental theorem, and Existence & uniqueness of a solution.

	CO2: To study of Stability and Liapunov function of dynamical system. **CO3:** To understand the Poincare Bendixson theorem and its applications. **CO4:** To analyze Autonomous equations and differentiability of flows.
4T2 – Partial Differential Equations	**CO1:** To classify partial differential equations and transform into canonical form. **CO2:** To solve linear partial differential equations of both first and second order. **CO3:** To solve boundary value problems for Laplace's equation, the heat equation, the wave equation by separation of variables, in Cartesian, polar, spherical and cylindrical coordinates.
4T3 – Advanced Numerical Methods	**CO1:** To obtain the solutions of Transcendental and polynomial Equations. **CO2:** To find solutions of system of equations using direct methods and Iteration methods. **CO3:** To attain mastery to solve problems using polynomial interpolation theory. **CO4:** To acquire knowledge of Numerical methods to find solution of integral Equations.
4T4 Core Elective-Cosmology	**CO1:** To study Einstein and de-Sitter static models and their comparison with actual universe. **CO2:** To study Cosmology, master the concepts of Cosmological principle, Hubble law, Weyl's postulate, deceleration parameter, etc. **CO3:** To understand the nature of Robertson-Walker metric in view of closed, open and flat models of the universe. **CO4:** To acquire knowledge about steady state universe and its viability vis-a-vis actual universe.
4T5 - Operations Research–II	**CO1:** To identify and develop operations research model describing a real-life problem. **CO2:** To understand the mathematical tools that are needed to solve various optimization problems. **CO3:** To solve various linear programming, transportation, assignment, queuing, inventory, and game problems related to real life.

CHEMISTRY

PROGRAMME OUTCOME FOR M.Sc. CHEMISTRY

Department of Chemistry	After successful completion of two years degree program in the subject Chemistry the students are able to:
Program Outcomes	PO1: The Programme enables the students to understand basic facts and concepts in Chemistry. PO2: To develop the ability to apply the principles of Chemistry, to develop problem solving skills, to become familiar with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies. PO3**:** Students know about importance of Qualitative and Quantitative analysis used for different samples like soil samples, alloys estimation, water analysis. New technological world using nanomaterial, properties of Nano materials magnetic properties of materials. PO4: Thermodynamic and Thermochemistry useful in our daily life and related with our surrounding atmosphere. PO5: Nuclear Magnetic resonance spectroscopy allows the molecular structure of a material to be analyzed by observing the measuring the interaction of nuclear spins when placed in a powerful magnetic field and extensively used in medicine in the form of magnetic resonance imaging and for analysis of chemicals. PO6: Bioinorganic chemistry provides knowledge about significant role of metal ions in biological system which is required for the maintenance of life. PO7: Student can describe the process It also develops skills in the proper handling of apparatus and chemicals and also gets exposure to the different processes used in industries and their applications. PO8: Use modern techniques used in analysis of materials and handling of the new equipment during the practical. PO9: To inculcates the scientific temperament in the students during the experiments and how to correlate with outside the scientific community.
Program Specific Outcomes	**PSO1:** The M.Sc. programme enabled the students to enhance their critical thinking, during the two years period of study and the curriculum motivates the mental thoughts and suppositions of the students. This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and

	validity of the practical knowledge. This Analysis leads to take decisions at intellectual, directorial and personal from different perspectives of life. PSO2: Understand the basic principles and concepts underlying the inorganic, organic, physical and analytical chemistry. PSO3: Comprehend the applications of chemistry in various walks of life. PSO4: Students gained functional knowledge of the fundamental theoretical concepts and experimental methods of Chemistry. PSO5: The students will be benefited to equip themselves to job requirements in the quality control, analytical laboratory or production wing of any Chemical or Pharmaceutical Industry. PSO6: Able to use instrumental methods of chemical analyses. Students acquire fundamental knowledge through theory and practical.
Course Outcomes M. Sc. CHEMISTRY	
Course Outcome for Semester-I	
PAPER-I: INORGANIC CHEMISTRY (1T1)	1. Predict the nature of bond and its properties through various electronic structural methods; bonding models. 2. Design new coordination compounds based on a fundamental understanding of their electronic properties. 3. Appreciate specialized and advanced topics in inorganic and coordination chemistry 4. Correlate structure and bonding with reactivity of boron clusters. 5. Analyze structures of various binuclear, trinuclear, tetranuclear, pentanuclear & hexa-nuclear compounds with reference to halide, oxide, alkoxide and acetate metal clusters.
PAPER-II: ORGANIC CHEMISTRY (1T2)	1. Implement rules of aromaticity to various organic molecules. 2. Sketch organic molecules in different projection formula and assign its configuration. 3. Apply their understanding about the organic reactions of industrial significance with respect to the chemo- selectivity, regioselectivity and enantioselectivity. 4. Analyze the product distribution and the stereochemistry of various organic products. 5. Evaluate the relationship between structure and reactivity of organic compounds.

PAPER-III: PHYSICAL CHEMISTRY (1T3)	4. Understand, analyze and exercise the principles of classical thermodynamics in various applications 5. Understand the concept of Gibbs free energy or Gibbs function and Phase equilibria. 6. Understand the concept of adsorption and its application in surface chemistry. 7. Analyze and understand the characterization techniques for polymer. 8. Understand the principles of chemical kinetics and their applications in chemical dynamics.
PAPER-III: ANALYTICAL CHEMISTRY (1T4)	3. Select a specific analytical technique based on sample and target analyte 4. Develop analytical ability and critical thinking in selection of statistics and their use in making interpretation meaningful and productive. 5. Understand the principles of chromatographic techniques. 6. Select proper chromatographic technique among the available techniques. 7. Explain the logic behind working of indicator used in each type of titration 8. Apply electro analytical techniques based on conductance and emf measurements.
PRACTICAL-I: INORGANIC CHEMISTRY (1P1)	1. To prepare various complex and carry out characterization of complex. 2. To understand the separation and determination of metal ion from alloy solution by using volumetric gravimetric, spectrophotometric analysis. 3. To understand qualitative analysis of radicals by using semi microanalysis. 4. To understand the micro scale techniques for detection of radicals.
PRACTICAL-II: PHYSICAL CHEMISTRY **(1P3)**	1. Understand various principles involved in small experiments and their interpretations. 2. To handle different apparatus and instruments with care and precision. 3. Interpret the results obtained and access the outcome. 4. Implement and relate the theoretical principles in experiments.

Course Outcome for Semester-II	
PAPER-I: INORGANIC CHEMISTRY (2T1)	1. Recollect the principles of electronic structure, bonding and reactivity of coordination complexes 2. understand the concept of synthesis and stability of transition metal organometallic complexes 3. develop the possible catalytic pathways leading to desired products 4. apply the principles of transition metal coordination complexes to derive reaction mechanisms. 5. identify the structural aspects of metal carbonyls and metal nitrosyls.
PAPER-II: ORGANIC CHEMISTRY (2T2)	1. Predict the orientation and stereochemistry of the product of addition and elimination reaction 2. Apply enolate chemistry to achieve molecular complexity 3. Design organic reactions in order to achieve the required product(s) 4. Formulate green chemistry synthesis to increase atom economy 5. Application of free radicals in functional group transformation
PAPER-III: PHYSICAL CHEMISTRY (2T3)	1. Understand the quantum mechanical applications in actual practice and in spectroscopy 2. Understand the states of solid various crystal structure and pattern in them 3. Understand the concept of ideal and non-ideal solutions 4. Understand the theories of electrolytes 5. Understand the thermodynamics of real processes 6. Understand the distribution laws and their applications 7. Understand the fundamentals of Nuclear sciences
PAPER-IV ANALYTICAL CHEMISTRY (2T4)	1. To understand and execute the techniques of sampling of gases, liquids, solids and particulates. 2. To understand various stoichiometric reactions and calculations. 3. Suggest most suitable modern chromatographic technique for separation of analyte from matrix.

	4. Explain various types of columns and detectors used in chromatography. 5. Discuss molecular absorption and molecular emission spectroscopy principle and applications. 6. Design experiments based on spectrophotometry and polarographic analysis. 7. Formulate experiments based on optical and electro analytical techniques.
PRACTICAL III: ORGANIC CHEMISRTY(2P2)	1. Design the methodologies to develop eco-friendly and green technology for industry and research. 2. Develop methods and remedies for reactions with environmental pollution. 3. Improve scientific practical information orally and in writing. 4. Get awareness about laboratory safety and handling of chemicals. 5. Apply different purification techniques recrystallization, distillation and solvent extraction.
PRACTICAL-IV: ANALYTICAL CHEMISTRY (2P4)	1. Carry out calibration of glassware available in the laboratory. 2. Analyze the data obtained through experiments using statistical analysis parameters. 3. Estimate quantitatively analyte present in different samples using classical and instrumental methods of analysis. 4. Design experiments based on classical and instrumental techniques. 5. Understand the principles involved in visual and instrumental volumetric techniques.
Course Outcome for Semester-III	
PAPER-I: ORGANIC CHEMISTRY (3T1)	1. Identify a pericyclic reaction and categorise it as a cycloaddition, a group transfer reaction, a sigmatropic rearrangement, or an electrocyclic reaction 2. Apply frontier molecular orbital (FMO) theory to rationalise selectivity and reactivity aspects of pericyclic reactions. 3. Understand the reaction mechanism of various common reagents employed in organic synthesis

	4. Understand the reactivity of sulphur, silicon and phosphorous elements. 5. Evolution of cross-coupling reactions in modern organic synthesis
PAPER-II: ORGANIC CHEMISTRY (3T2)	1. Learn the important aspects of steroids and terpenoids. 2. Understand the biosynthesis of natural products. 3. Analyze the enzyme reactions involved in various life processes 4. Illustrate the structure elucidation of unknown naturally occurring organic compound 4. Apply the knowledge of organic reactions for the total synthesis of useful natural products
PAPER-III: POLYMER CHEMISTRY (3T3)	1. Understand the principals involved Polymer design and development. 2. Get an idea about various polymers and their uses. 3. Explain the various methods of polymer preparation. 4. To provide an idea about various utilities and preparation of industrially suitable polymers
PAPER-IV: SPECTROSCOPY I (3T4)	1. Understand interaction between electromagnetic radiation with matter. 2. Calculate the energy of radiation in various units and interconvert them. 3. Discuss various types of sources and detectors used in different spectroscopies. 4. Summarize the principles involved in UV-visible and IR spectroscopy. 5. Apply proper spectral techniques depending on type of sample and required information
PRACTICAL-I: ORGANIC CHEMISTRY I(3P1)	1. Meticulously record physical constants 2. Perform qualitative estimation of functional groups 3. Monitor the progress of reaction 4. Recrystallize /distill the separated compounds 5. Extend these skills to organic synthesis
PRACTICAL-II: POLYMER CHEMISTRY **(3P3)**	1. To perform synthesis and characterization of different Polymers. 2. To monitor Thermal analysis, crystallinity, of Polymer 3. To understand kinetics of polymerization. 4. To understand magnetic and electrical properties of polymer

Course Outcome for Semester-IV	
PAPER-I: ORGANIC CHEMISTRY (4T1)	1. Understand the applications of enolates in C-C bond formation 2. Demonstrate stereochemical description of common organic reactions 3. Understand the use of resolution for separation of racemic mixtures. 4. Recognize the chemical reactions of carbonyl compounds and alkenes under photochemical conditions.
PAPER-II: ORGANIC CHEMISTRY (4T2)	1. Understands the reactivity of heterocyclic compounds in various reaction conditions 2. Understand the electrophilic, nucleophilic reactions and synthesis of various heterocycles. 3. Design the synthesis of drugs and natural products 4. Demonstrate the applications of organometallic reagents in C-C bond formation
PAPER-III: POLYMER CHEMISTRY (4T3)	1. Understand the principles involved in polymerization processes. 2. Classify the need of techniques required for polymerization. 3. To characterize the various polymers 4. Elaborate specific polymers and their utility at various places
PAPER-IV SPECTROSCOPY I (4T4)	1.Interprete the structures of simple molecules using physical methods of analysis 2. Understand and interprete the NMR data 3. Analyse X ray diffraction data 4. Develop the skills of analytical ability 5. Execute out the combined application of spectral method
PRACTICAL III: ORGANIC CHEMISRTY(4P1)	1. Meticulously record physical constants 2. Perform qualitative estimation of functional groups 3. Monitor the progress of reaction 4. Recrystallize /distill the separated compounds 5. Extend these skills to organic synthesis
PROJECT (4S1)	1. Carry out detailed literature survey on selected project topic. 2. Identify the gap in literature to design a project proposal. 3. Carry out experiments to obtain necessary information. 4. Put all the obtained results in systematic

	manner in the form of a project report. 5. Present the project report in front of audience in the form of PowerPoint presentation. 6. Write own research paper based on project

IIT SPOKEN TUTORIAL CERTIFICATE COURSE

Department of Computer Science	Successful completion of IIT Spoken Tutorial certificate Course a student should be able to know:
Program Outcomes	**PO-1** Students will learn different software's in short and simple steps. **PO-2** To build the necessary skills set and analytical abilities for developing Computer based solutions for real life problems. **PO-3** To train students in professional skills related to Software Industry. **PO-4** To help the students to build-up a successful career in Computer Science. **PO-5** To create new opportunities for the students to get better future job opportunities. **PO-6** To train the students in advance programming languages and handling Free open-source software's. **PO-7** Students those who have completed their training of the course will get participation certificate.
Program Specific Outcomes	**PSO1**-Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems. **PSO2-** To Enhance Programming skills, applications and adapt new computing technologies for attaining professional excellence **PSO3**- Practice for continued professional development. **PSO4**- Apply fundamental principles and methods of Computer Science to a wide range of applications. **PSO5**- Impart an understanding of the basics of our discipline.

CERTIFICATE COURSE IN ADVANCED CPP

Course Outcome for Advanced CPP	
Course X I Advanced CPP	**CO1**- After completion of the course students will develop the ability to make their own applications for business and industry using Advance CPP. **CO2-** Students will be able to enhance their reading, listening and programming Skills. They can also understand the Powerful features, simple syntax of these programming languages. **CO3-** Students can enhance their employability skills at the end of the course. **CO4-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN ARDUINO

Course Outcome for Arduino	
Course V Arduino	**CO1:** After completion of the course students will display the ability to write their own programs which help them for building digital devices and interactive objects that can sense and control physical devices. **CO2** - After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students will be able to enhance their reading, listening and programming Skills. **CO4-** Students can enhance their employability skills at the end of the course as hardware professional.

CERTIFICATE COURSE IN C AND CPP

Course Outcome for C and CPP	
Course II C and CPP	**CO1 -** After completion of the course students will be able to develop their own applications for business and industrial by the use of this language. **CO2-** After Completion of online assessment test students will get passing/completion certificate and participation certificate will get them after completion of their training **CO3-** Students will be able to enhance their reading, listening and programming Skills. They can also understand the powerful features, simple syntax of these programming languages. **CO4 -** Students can enhance their employability skills at the end of the course. **CO5-** Students can widely use this in the process of development of operating systems.

CERTIFICATE COURSE IN INKSCAPE

Inkscape	
Course III Inkscape	**CO1:** After completion of the course students can use Inkscape Graphics art and design software application for the editing and creation of original images, icons, graphical

	elements of web pages and art for user interface elements. **CO2:** At the end of this course student can work on desktop publishing like creating banners, posters, brochures, CD cover image, artwork for textiles, etc. **CO3:** Students can enhance their employ-ability skills after concluding the course. **CO4:** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN INTRODUCTION TO COMPUTERS

Course Outcome for Introduction to Computers	
Course I Introduction to Computers	**CO1 -** After the completion of this certificate course students can practically do setup the configuration of output devices like printer with the machine. Along with this they will also get the knowledge about the functioning of basic parts of a computer, connecting the parts using cables. **CO2-** Students will be able to work with the computer environment easily. They can enhance their communication computational skills. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO4 -** Students will be able to enhance their reading, listening Skills. **CO5-** Students can enhance their employability skills at the end of the course.

CERTIFICATE COURSE IN JAVA

Course Outcome for Java	
Course VIII Java	After successful completion of the course, the students are able to **CO1-** Develop reusable programs Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes. **CO2-** Students will be able to Design event driven GUI and web related applications which imitate the real word scenarios. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

	CO4- Enhance their reading, listening and programming Skills. **CO5-** They can also understand the Powerful features, simple syntax of these object oriented programming languages using the concepts of inheritance, polymorphism, interfaces and packages. **CO6-** Students can enhance their employability skills at the end of the course.

CERTIFICATE COURSE IN LATEX

Course Outcome for LaTex	
Course X LaTex	**CO1-** At the end of this course students can prepare reports, letters and presentations especially useful for persons engaged in writing/ publishing documents from science/ arts/ commerce fields. **CO2-** Students can enhance their knowledge about the functionality of typesetting software. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO4-** Students will be able to enhance their reading, listening and programming Skills. **CO5-** Students can enhance their employability skills at the end of the course..

CERTIFICATE COURSE IN LIBREOFFICE SUITE [BASE]

Course Outcome for LibreOffice Suite [Base]	
Course IV LibreOffice Suite [Base]	**CO1-** At the end of this course student trains in computer usage skills in LibreOffice suite base. **CO2-** After the Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3**- Students will be able to enhance their reading, listening and programming Skills. **CO4** - Students can enhance their employ-ability skills at the end of the course. **CO5-** Students will be able to understand full-featured desktop database front end which is designed to meet the needs of a broad array of user's . They can represent and store their information using this in a systematic manner. .

CERTIFICATE COURSE IN LINUX

Course Outcome for Linux	
	CO1- Students will be able to understand the basic commands of Linux operating system and can write shell scripts. **CO2 –** Students will be able to create file systems, directories and understand how to operate them. **CO3-** Students will be able to create processes background and fore ground etc. by fork () system calls . **CO4-** Students can enhance their employability skills at the end of the course. **CO5-** Students can widely use this in the process of development of operating systems. **CO6–** After Completing the course final examination students will get passing certificate if they scored 40%marks and participation certificate to all those who were admitted for the course.

CERTIFICATE COURSE IN PHP AND MYSQL

	Course Outcome for PHP and MYSQL
Course VI PHP and MySQL	**CO1-** After completion of the course students develop their own applications and website. **CO2-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students learn to unleash the true power of dynamic page development with MySQL database integration. **CO4-** Students can enhance their employ-ability skills after concluding the course. **CO5** - Students are also taught how to create database connections and to execute SQL statements directly from PHP scripts

CERTIFICATE COURSE IN PYTHON

Course Outcome for Python	
Course XII Python	**CO1-** This course Explain the basic principles of Python programming language and Implementation of database and GUI applications. **CO2-** It help the students how to implement the concept of

	object oriented in python. . **CO3-** At the end of the course students understood how to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. **CO4-** Students can enhance their employability skills at the end of the course. **CO5-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN RDBMS

Course Outcome for RDBMS	
Course VII RDBMS	**CO1-** After completion of the course students can with all modern database systems like MS SQL Server, IBM DB2, Oracle, MySQL, PostgreSQL and Microsoft Access. **CO2-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students can work with industry database management after the successful execution of this course. **CO4-** Students can enhance their employ-ability skills at the end of the course. **CO5-** Design and Develop Applications using AWT controls in Java.

UGC SANCTIONED CERTIFICATE AND DIPLOMA COURSES
CERTIFICATE COURSE IN BIOINFORMATICS

Department of Computer Science	Successful completion of Certificate Course in Bioinformatics a student should be able to know:
Program Outcomes	**PO-1** This certificate course is targeted towards imparting theoretical as well as practical knowledge and required skills of Bioinformatics to its participants. **PO-2** It provides basic knowledge of fundamentals of computing & networking and various operating systems like WINDOW, LINUX and UNIX. **PO-3** To provide insights to programming languages like

	BioPerl and BioJava in developing Bioinformatics tools. **PO-4** To introduce the students to MarkUp languages like HTML and XML.
Program Specific Outcomes	**PSO1**- To build in candidates a strong foundation in interdisciplinary sciences such as Computer Sciences and Biological Sciences, to develop accelerated and precise technologies for industrial problems, and prepare them for productive careers in fields of biotechnology, pharmaceutical, bioinformatics, Research, and healthcare industries. **PSO2-** Strengthening ongoing university research in the area of bioinformatics, in particular and life science in general. Further it will be helpful in creating an advanced research facility to carry out research in frontier areas of bioinformatics, biotechnology, and molecular modelling.
for Certificate Course in Bioinformatics	
Paper I Computer Aided Bioinformatics	**CO1 –** Students will be able to learn computer networking its architecture and protocol types. **CO2-** Students gain knowledge about MarkUp languages to develop basic web page. **CO3-** Students learn about basics of programming languages like C, CPP, JAVA, Bioperl etc which would help them to develop different tools in bioinformatics. **CO4-** At the end of the certificate course students will be able understand the basic concepts of operating system and its working with applications.
Paper II Basics of Bioinformatics	**CO1 –** After Completion of this course students will be able to understand the basics of Bioinformatics and nucleotide sequence and its collaboration. **CO2-** Students learn about the databases like NCBI and EBI in details and its working. **CO3-**. At the end of this course students will be able to understand visualization tools which are used for nucleic acid as well as protein. **CO4-** Students understood the applications of bioinformatics in details and what are the future job opportunities in the market.
Paper III Public Domain Resources in Biology	**CO1** – Students will be able to understand how to acquire information from public domain biological databases by using computers and internet at the end of this course. **CO2-** Students will be able to understand how to organize

	data and submission of data in the data bases like GenBank , EMBL, DDBJ, Biological databases II: **CO3-.** Students will be able to understand the details of protein sequence databases and its organization. **CO4-** After Completion of this course students will learn protein sequence data structure and they also help to get better opportunities in IT industry.

DIPLOMA IN BIOINFORMATICS

Department of Computer Science	**Successful completion of Diploma in Bioinformatics a student should be able to know :**
Program Outcomes	**PO-1** This certificate course is targeted towards imparting theoretical as well as practical knowledge and required skills of Diploma in Bioinformatics to its participants. **PO-2** It provides basic knowledge of Sequence analysis, prediction methods of proteins, Functional Genomics and its applications. **PO-3** To provide insights to Derived Databases with its Sequence and Structure. **PO-4** To introduce the students to Various Data Models which are used for Data Storage.
Program Specific Outcomes	**PSO1**- To build in candidates a strong foundation in interdisciplinary sciences such as Computer Sciences and Biological Sciences, to develop accelerated and precise technologies for industrial problems, and prepare them for productive careers in fields of biotechnology, pharmaceutical, bioinformatics, Research, and healthcare industries. **PSO2-** Strengthening ongoing university research in the area of bioinformatics, in particular and life science in general. Further it will be helpful in creating an advanced research facility to carry out research in frontier areas of bioinformatics, biotechnology, and molecular modelling.
DIPLOMA IN BIOINFORMATICS	
Paper I Sequence Analysis and Prediction Methods of Protein	**CO1 –** After completion of this course many career opportunities are available for the students as Scientific Curator, Gene Analyst, Protein Analyst, Phylogenetist, Molecular Modeller, Database Programmer and Structural Analyst.

	CO2- Students will be able to understand the concept protein structure prediction. **CO3-** Students learn about basics of Sequence Analysis, Phylogeny, Protein Structure Prediction, Genome Mapping, Data bases used for mapping and its applications in bioinformatics. **CO4-** At the end of this course students understand how multiple sequence alignment has done.
Paper II Functional Genomics and Application	**CO1-** Students will be able to understand about genetic maps and types of maps with genomic mapping. **CO2-** Students understood the concept of prediction of ORF, Genes and Prediction algorithms. **CO3-** After completion of this course students understood genomic databases and it's working. **CO4-** Students will be able to understand what is microarray technology and applications.
Paper III Data Models and Algorithm	**CO1-** After completion of this diploma course in bioinformatics students will be able to understand the basics of DBMS along with definition of data, components, architecture, representation of data, access of data and view. **CO2-** Students will understand the concept related to data, Meta data, Algorithms used for Analysis of the Data and representation of data using different data models. **CO3-** Students understand how to analyze data using different algorithms and brief about data bases like BLAST and FASTA **CO4-**Students understood about derived databases and difference between primary and secondary databases.

CERTIFICATE COURSES DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN, RTM NAGPUR UNIVERSITY, NAGPUR

CERTIFICATE COURSE IN FRESH WATER FISH CULTURE

Department of Zoology	After successful completion of Certificate Course in Freshwater Fish Culture in the subject Zoology the students are able to:
Program Outcomes	**PO1:** Students know about fundamentals of inland fisheries practices so as to increase fish production to meet protein malnutrition as well as providing job opportunities **PO2:** Impart knowledge for developing proficiency and management practices in food fishes **PO3:** It can help for getting self-employment through different farming schemes **PO4:** It provide detail knowledge about tools and techniques in freshwater fish culture **PO5:** Develop organizational capabilities in fisheries workers for assisting fishermen
Program Specific Outcomes	**PSO1:** It help to get Train manpower for the development of inland fisheries **PSO2:** It increase knowledge regarding the fish varieties used for culturing **PSO3:** It help to maintain production and supply demand regularly. **PSO4:** Understand good laboratory practices related to water parameters which must be check regularly. **PSO5:** This sector can help to get commercial valuable by-products.
Course Outcomes of certificate course in vermicomposting and vermiculturing	
PAPER:	**CO1:** Study of Classification, general characteristics of freshwater fishes **CO2:** pond preparation and its maintenance **CO3:** To know Biology and importance of fish seed production **CO4:** To learn method of fish harvesting and other operational techniques **CO5:** Study of various pest and diseases.
Lab Work:	• Identification of fishes • Identification of Developmental stages in fishes • Water parameters • Physicochemical analysis of pond soil to determine its texture • Qualitative and quantitative study of Zooplankton • Crafts and gears used in fresh water fish capture • Visit to Fish breeding center

CERTIFICATE COURSE IN 'IOT DEVICES'

Electronics	After successful completion of 43 Hrs. certificate course in IoT Devices the students are able to:
Program Outcomes	PO1: Students will be able to understand the application areas of IoT · PO2: Students will be able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. PO3: Students will be able to understand the building blocks of Internet of Things and characteristics
Program Specific Outcomes	PSO1: After completing this program, interested students can design and construct automation project . PSO2: Students can become entrepreneur and can work on multidisciplinary projects.
Course Outcomes	
Unit 1	CO1: To enrich the students with the basic requirement of for Internet CO2: To familiarize them about the internet and IoT Protocols and Addressing Layers CO3: To explore them with different development board and their specifications.
Unit 2	CO1: To enrich the students about the basic concept of sensor. CO2: To familiarize with different types of sensors and their uses in different applications.
Unit 3	CO1: To enrich the students about the basic concept of Actuators. CO2: To familiarize with different types of Actuators and their uses in different applications.
Unit 4	CO1: To familiarize the students with interconnection and integration of the physical world and the cyber space. CO2: To learn how to design programs for various IoT application.

CERTIFICATE COURSE IN BASIC SKILLS IN COMPUTER

Course Outcome for Basic Skills in Computer	
Course I Basic Skills in Computer	**CO1 -** Recognize when to use each of the Microsoft Office programs to create professional and academic documents. **CO2-** Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards. **CO3-** Apply skills and concepts for basic use of computer

	hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.

CERTIFICATE COURSE IN BASIC OF JEWELLERY DESIGN AND MAKING

	After successful completion of 43 Hrs Certificate Course in
Program Outcomes	**PO1:**To Produce jewellery designers and creators to the increasing demands and for the better prospects of this industry which is growing jewellery industry, which has transformed itself from a traditional small scale operation to a segment, which has tremendous future potential. **PO2:** .To introduce students of the Nagpur to the vast and promising field of jewellery designing and making. **PO3:** Provide Basic knowledge of jewellery designing and making to generate interest of students for opting this field as their carrier.
Program Specific Outcomes	**PSO 1:** Provide Basic knowledge of jewellery designing and making to generate interest of students for opting this field as their carrier. **PSO 2:**To impart basic entrepreneurship skills and professionalism in the students. **PSO3 :**Exhibit the knowledge and understanding of contemporary jewellery as well as history of jewellery designing. **PSO 4:**Demonstrate aesthetic qualities of jewellery and various jewellery components as well as develop the aesthetic skills of students .
Course Outcomes	
JEWELLRY DESIGNING	**CO1** :Student learn Elements and principles of design Students will be able to create simple manual designs (mini port folio) of their own. Students will have basic knowledge about raw material required for jewellery making as well as finishing.

	CO2: Motif development : Analytical and Methodical approach **CO3** : Rendering Jewellery : Metal finishes, Stone rendering, light, shades, Textures **C04:** Students know theVarious cuts of gemstones with measurements. Students will be able to create simple manual designs (mini portfolio) of their own. Students will have basic knowledge about raw material required for jewellery making as well as finishing.
JEWELLERY MAKING	**CO5:** Students learn the iintroduction To Beading Process **CO6:** Students learn actual process of making articles like Studs, bracelets

CERTIFICATE COURSE IN BASICS OF PUBLIC HEALTH AND NUTRITION

	After successful completion of 43 Hrs Certificate Course in Basics of public Health & Nutrition the students are able to:
Program Outcomes	**PO1:** To define vast and promising field of Nutrition and Public Health to the students of the Dharampeth Science College, Nagpur and also to Recognize current and emerging global concerns in public health nutrition. **PO2:** Provide Basic knowledge of Public Health & Nutrition & generate interest of students for opting this field as their carrier. **PO3:** Exhibit the knowledge and understanding of Public Health and Nutrition. **PO4:** Public health nutrition is the promotion of good health through primary prevention of nutrition-related illness in the population.
BASICS OF NUTRITION	**CO 1**: Students will learn Basic concepts of Nutrition, Macro &micro nutrient, concept of balanced diet **CO2**: Food Nutrition & Health (meaning, functions, concept, status, interrelationship between Nutrition & health) **CO3**: Role in Nutritional & Prevention (Healthcare worker, concept

BUDGETING STORING FOOD PRESERVATION **FOOD &HEALTH** **COMMUNITY HEALTH**	**CO**4: Deficiency in brief- (PEM, Kwashiorkar, marasmus, marasmus & kwashiorkor, nutritional anemia, iodine defi, B-Complex defi, Vit C, Vit D, Flourosis, Lathyrism, Measles, Diarrhoea, CVD, DM, Obesity, Maternal Malnutrition,) brief-overview/nature/clinical features/causes/treatment/prevention/nutri management/imp of healthcare & kitchen Planning. **CO5**:Students learnBudgeting (factors/principles/preparation),Selection (Macro/Micro/Protective foods/Accessories/Beverages/Regulatory foods) &Role of grades/brands/labels/in food purchasing **CO6**:Food spoilage(Factors/classification),storage)along withPreservation(principles/methods/home-scale/at low cost max of nutritional benefits/ prevent nutrient loses/ avoid wastage),contamination,adulteration **CO7**:Consumer protection/standards/quality control agencies/ certification/law's Nutritionalprogrammes/concept/components/organizations/assessments(In Brief-anthropometric/clinical methods/biochem/diet survey/growth monitoring charts/tools/techniques) **CO8**: Students learn Population dynamics & Epidemiology along with Family planning programmes and Personal hygiene/cleanliness/rest/exercise/mental health ,Food borne diseases along with Healthcare concept &organisation responsibility. **CO9:** Students healthcare programmes- intro/types of programmes/ other Income generated programme- special prog/ minimum needs/development prog/employment programmes/anti poverty programmes,Learning working with community/individuals/groups/agencies,Factors influencing community health & nutri(intro/determinants of community health, food behaviour) And Present nutrition prog(intro/concept/nutri prog/feeding prog/MDMP/ICDS/Evaluation) **CO10**: Learning working with community(intro/learning/working with community/identifying/evaluation),Community strategies in nutri and health education(intro, learning, working with community, identifying , evaluation)Factors affecting Community nutrition & health

CERTIFICATE COURSE IN COMMUNICATION SKILL AND PERSONALITY DEVELOPMENT

English	After successful completion of 43 Hrs. certificate course in Communication Skills and Personality Development the students are able to:
Program Outcomes	PO1: To learn about the components of effective communication skills like reading, writing, speaking and listening. PO2: To help the students to learn the barriers of communication and how to overcome them. PO3: To make them aware of the non-verbal communication that will help them to crack Group discussion and personal Interviews.
Program Specific Outcomes	PSO1: To provide knowledge regarding the understanding soft skills related techniques for communication for both personal situation (development) and at work place (for your professional career development). PSO2: To develop more confidence in expressing one's ideas and opinions by building trust in others.
Course Outcomes	
Unit 1	CO1: To introduce students with the methodology and different types of communication. CO2: To familiarize the students with Career Building and inter-personal communication. CO3: To acknowledge students with the barriers of communications and the strategies of overcoming them.
Unit 2	CO1: To provide the students with the concepts of non-verbal communication skills. CO2: To guide them about the techniques to improve non- verbal communication skills. CO3: To acknowledge students with the importance of Listening Skills and the major differences between Hearing and Listening
Unit 3	CO1: To enrich the students about the basic concept of Group Discussions. CO2: To provide the training regarding the Interview techniques of both Offline and Online Mode.
Unit 4	CO1: To familiarize the students about the methods and manners of online communication. CO2: To teach the learners the procedure of e-mail writing.

CERTIFICATE COURSE IN COMMUNICATION SKILLS

English	**After successful completion of 43 Hrs. certificate course in Communication Skills and Personality Development the students are able to:**
Program Outcomes	PO1: To be able to Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment. PO2: To emphasize the essential aspects of effective written communication necessary for professional success. PO3: To develop communicative skills and sustain comprehension of an extended discourse.
Program Specific Outcomes	PSO1: The main emphasis of this course is to enable students to learn the dynamics of social communication and to demonstrate the ability to learn the nuances of informal communication. PSO2: The Course is designed to enhance vocabulary skills and make students fluent, thereby improving receptive and expressive skills.
Course Outcomes	
Unit 1	CO1: Students will understand the process and nature of communication. CO2: Students will become masters of Formal and Informal Communication.
Unit 2	CO1: To develop the writing skills of the students so that they are capable of communicating efficiently. CO2: To be able to write a business communication given a specific audience and purpose
Unit 3	CO1: To identify other common methods of professional communication CO2: To discuss appropriate ways to communicate to an audience outside of the company
Unit 4	CO1: To discuss the different types of reports and their purposes CO2: To compose emails and memos intended for an audience within the same company or team as the writer

CERTIFICATE COURSE IN DEVELOPING COMPUTATION SKILLS USING SOFTWARE PACKAGES AND ONLINE GOOGLE TOOLS

	Course Outcome for Developing Computational Skills Using Software Packages & Online Google Tools
Course IV Developing Computational Skills Using Software Packages & Online Google Tools	Upon completion of the course students will be able to: **CO1-** . Recognize when to use each of the software packages to create professional and academic documents. **CO2-** Develop the computational skills and concepts using software packages and Google tools for the use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards. **CO3**- It helps to enhance their computational Skills. **CO4** - Students can enhance their employ-ability skills at the end of the course.

CERTIFICATE COURSE IN DIGITAL MARKETING

	Course Outcome for Digital Marketing
Course II Digital Marketing	**CO1 –** At the end of the course students can understand the impact of technology on the traditional marketing mix and become familiar with the elements of the digital marketing plan. **CO2-** After completion of the course students can develop their skill which helps to digital marketing to increase sales and grow their business. **CO-3** Students can help to understand how to reach your online target market and develop basic digital marketing objectives. **CO-4** Students can analyze the confluence of marketing, operations, and human resources in real-time delivery and comprehend the importance of conversion and working with digital relationship marketing. **CO-5** Demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs.

CERTIFICATE COURSE IN EXCEL FOR BANKING AND ACCOUNTS

Department of Computer Science	After successful completion of 60 hours. Certificate Course in Excel for Banking and Accounts the students are able to:
	PO1: Organize data in an easy-to-navigate way **PO2:** Do basic and complex mathematical functions **PO3:** Turn piles of data into helpful graphics and charts **PO4:** Analyze data and make forecasting predictions
Program Specific Outcome	**PSO1:** After the program completion, students will be able to work in the field of banking sector, in the CA office etc. **PSO2:** This program provides students to work in any office where Excel is used.
Course Outcomes Certificate Course in Excel for Banking and Accounts	
Unit I: Basic of MS-Excel & Conditional Formatting	**CO1:** Understands the working with Formulas, Functions, Operators **CO2:** Understand Conditional Formatting Rule: -rule, clear rules, manage rules, Top 10 items rule, Bottom 10 items Top 10%, Bottom 10%, Above Average, Below Average **CO3:** Able to sort and filter the huge data in the Excel Sheet. **CO4:** Understand the large and rich set of operators used in the Excel.
Unit II: Pivot Tables and Pivot Charts	**CO1:** Able to understand how to create pivot table and insert data in pivot table **CO2:** Understand to filter, group, ungroup and adding rearranging data in the pivot table **CO3:** Able to create pivot charts and understand difference between standard charts and pivot charts. **CO4:** understands all keyboard shortcuts used in Excel.
Unit III: Graphs and Statistical Analysis	**CO1:** Understands all statistical functions used in Excel Spreadsheet. **CO2:** Able to represents all data in graphical analysis. Understands different types of graphs and also which type of data should be represent in which type of chart. **CO3:** Able to use formulas which are used in Banking sector mainly in loan departments. **CO4:** Understands Correlation and Regression with Excel.
Unit IV: Advanced Excel	**CO1:** Able to understand role of management accounting and generation of MIS reports in Excel. **CO2:** Able to link number of worksheets in a single workbook and also to link number of workbook.

	CO3: Understands Automation in excel through Macros, VBA code, Macro Settings **CO4:** Understands all lookup functions like VLOOKUP, HLOOKUP, LOOKUP

CERTIFICATE COURSE IN FULL STACK DEVELOPER

	Course Outcome for Full Stack Developer
Course III Full Stack Developer	**CO1-** After the completion of the course students can develop /craft a portfolio of websites to apply for junior developer jobs. **CO2-** Students will be able to build ANY website. **CO3-** At the end of the course students can develop a hybrid Mobile APPS (iOS, APK) **CO4-** Students can enhance their employability skills in various areas like Code games & animations with CSS3 and jQuery of technology after the end of the course

CERTIFICATE COURSE IN LATEX

	After successful completion of 43 Hrs Certificate Course in LaTeX the students are able to:
Program Outcomes	**PO1:** Typesetting of journal articles, technical reports, thesis, books, and slide presentations. **PO2:** To control over large documents containing sectioning, cross-references, tables and figures. **PO3:** Typesetting of complex mathematical formulae. **PO4:** Typesetting of mathematics with AMS-LaTeX
Program Specific Outcomes	**PSO 1:** To understand LaTeX, a document preparation system for high - quality typesetting. **PSO 2:** To understand features of LaTeX. **PSO 3:** To have hands on experience to become a user of LaTeX.
Course Outcomes	
LaTeX.	**CO1:** Typesetting of complex mathematical formulae using LaTeX. **CO2:** Use tabular and array environments within LaTeX.

	CO3: Use various methods to either create or import graphics into a LaTeX document. **CO4:** Typesetting of journal articles, technical reports, thesis, books, and slide presentations. **CO5:** Automatic generation of table of contents, bibliographies and indexes.

CERTIFICATE COURSE IN PATTERN MAKING & EMBELLISHMENT

	After successful completion of 43 Hrs Certificate Course in Pattern Making & Embellishment the students are able to:
Program Outcomes	**PO1:** This certificate will teach the enrolled students the Basics of pattern making. PO2: Grading gives commercial value to garment industry. By introducing grading concept, we focus the commercial view point creating professionalism. PO3: It will generate self-employability. Students will learn knowledge of fabric embellishment which can be related to fashion designining
Program Specific Outcomes	**PSO 1:** Students can sell the different patterns of motifs and designs prepared by them. **PSO2**: Students will learn polymer clay art, the purpose of which is also embellishment of fabric. **PSO3**: With polymer clay art they can also design Jewellery (bracelets, earrings). **PSO4:** Traditional art of Maharashtra State i.e., WARLI will be introduced. Student will be able to use Polymer clay art on WARLI. **PSO5:** Students will learn the concept of Basic and Regional embroidery. **PSO6**: With the knowledge gained students can also engaged Hobby Classes and Tailoring.
Course Outcomes	
BASICS OF PATTERN MAKING	**CO1**: Introduction of Pattern making, Definitions, Advantages & Disadvantages, what is Commercial Pattern, Body types & measurements, essential & symbols of pattern pieces,

	Identification of Grain lines, Darts as well as cutting lines, stitching lines
	Pattern Layout with it's types
PATTERN GRADING	**CO2**: Students learn the meaning of Pattern Grading along with Grading Sizes
	CO3: Students gain the concept of Pattern grading in different sizes (concept necessary for starting self-employability & Textile Industry to manage any industry unit.
	CO4: Making of pattern Envelope
EMBROIDERY AND EMBELLISHMENT	**CO5**: Embroidery types: Basic & Regional embroidery (used to embellish the garment) **CO6**: Concept of **Polymer art its** steps in process and making (all together a new concept of embellishment) **CO7**: Concept of Traditional Art & Embroidery Students learnt **WARLI ART** (Concept of traditional & regional importance, can also be used as fabric Embellishment (popularity of that State) **CO8**: Structuring & making Designs Students prepare Portfolio for various Designs & Embroidery

CERTIFICATE COURSE IN R-CONSOLE SOFTWARE

CERTIFICATE COURSE IN SKILL DEVELOPMENT IN COMPETITIVE EXAM

English	**After successful completion of 43 Hrs. certificate course in Skill Development for Competitive examinations the students are able to:**
Program Outcomes	PO1: To develop understanding and problem-solving skills of students for Competitive examination. PO2: To develop their ideas and concepts about Competitive Aptitude. PO3: To develop their time management skill for Competitive examination

Program Specific Outcomes	PSO1: To help them to decide which specific Competitive Examinations can be shortlisted according to their aptitude. PSO2: To give them opportunity to appear for various Competitive Examinations for entry in services.
Course Outcomes	
Unit 1	CO1: To provide them knowledge about different topics covered in quantitative aptitude in various examinations. CO2: To familiarize them with short tricks to solve questions in lesser time. CO3: To introduce the students with the various methods to solve questions.
Unit 2	CO1: To enrich them with the concepts of critical thinking skills. CO2: To provide them knowledge about different topics covered in logical reasoning in various examinations. CO3: To guide them about the techniques to solve verbal and non-verbal reasoning questions.
Unit 3	CO1: To familiarize them with the concepts of English grammar & error detection from competitive examinations point of view. CO2: To provide them the training of reading comprehension and finding the answers of questions on it.
Unit 4	CO1: To introduce them different topics covered in general knowledge. CO2: To enrich them with most important topic current affairs.

CERTIFICATE COURSE IN VEDIC MATHEMATICS

	After successful completion of 43 Hrs Certificate Course in Vedic Mathematics the students are able to:
Program Outcomes	**PO1:** To increases speed and accuracy. **PO2:** To improved academic performance and instant results. **PO3:** To sharpens the mind, increases mental agility and intelligence **PO4:** To Increases visualization and concentration in children Increases speed and accuracy. Become a mental calculator
Program Specific Outcomes	**PSO 1:** To develop Analytical thinking through Vedic maths. **PSO 2:** To enhance computational skills in maths. **PSO 3:** To crack entrance of competitive exams. **PSO 4:** To Promote Vedic culture.

Course Outcomes	
Vedic Mathematics	**CO 1**: Develop the understanding of objectives and features of Vedic Arithmetic. **CO 2**: Recognize the meaning of mathematical sutras of vedic arithmetic in Sanskrit. **CO 3**: Understand the concept of addition using completing the whole Method. **CO 4**: Manage to solve the multiplication using vertically and crosswise and one more than the previous one method and demonstrate multiplication by 11, 12 and 13 by using Vedic sutras of multiplication. **CO 5:** Distinguish between squaring numbers ending in 5 and squaring numbers near the base and subbase and manage to perform squaring by Duplex Method and Cubing by Anurupyen Sutra.

CERTIFICATE COURSE IN VERMICULTURING AND VERMICOMPOSTING

Department of Zoology	After successful completion of Certificate Course in Vermicomposting and Vermiculturingin the subject Zoology the students are able to:
Program Outcomes	**PO1:** It help to protect environment and management of waste in sustainable way. **PO2:** Vermicomposting is eco-friendly activity as it does not contain chemical elements, to develop awareness among the people about vermicomposting and increase use of organic product. **PO3:** It helps to avoid the use of hazardous chemicals and its adverse effect on the environment, soil, and plants. **PO4:** Understanding the role of earthworm in modern farming **PO5:** The potential of vermicompost as an alternative to chemical fertilizers
Program Specific Outcomes	**PSO1:** Students know about of Earthworm and its varieties. **PSO2:** It develops student's interest in research activities. **PSO3:** Vermicomposting is eco-friendly activity and can be easily adopted by everyone. **PSO4:** Students are able to work for oneself or develop business **PSO5:** Students will also turn towards organic farming and also convince local farmers about vermicomposting

	importance.
Course Outcomes of certificate course in vermicomposting and vermiculturing	
PAPER:	**CO1:** Importance of Vermiculture/ Vermicompost **CO2:** Earthworm Biology and Rearing **CO3:** Methods of vermicomposting technology and its Application **CO4:** Vermicompost comparison with other fertilizers
Lab Work:	• Identification of different types of earthworms • Study of Systematic position and External characters of Eisenia foetida • Study of Life stages Eisenia foetida • Morphology and development of Earthworm. • Study of Vermicompost • Study of Vermiwash • Study of equipment and devices used in vermicomposting • Preparation vermibeds • Maintenance of vermibeds • Harvesting, packaging, transport and storage of Vermicompost • Separation of Earthworms from Vermicompost

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE,
North Ambazari Road, Near Ambazari Lake, Nagpur

NAAC ACCREDITED GRADE 'A' WITH CGPA 3.01 (Third Cycle)

CRITERION-II

Teaching- Learning and Evaluation

YEAR-1

2017-18

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

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Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

List of Documents(2017-18)

Sr. No.	Name of Document
1.	Link of Core Courses Subject Syllabi in UG and PG Programme.
2.	List of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
3.	Syllabi of Diploma/ Certificate Courses i. UGC Approved Courses ii. IIT Spoken courses Sanctioned by MHRD Mission Under NNEICT GOI iii. Certificate courses Department of Lifelong learning and Extension under Jeevan Shikshan Abhiyan
4.	Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution

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Dr. Akhilesh Peshwe
Principal

Principal
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Science College, Nagpur.

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2.6.1

Link for RTMNU syllabus for UG and PG

Graduation (UG)

Compulsory English
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Comp_Eng.pdf
Supp. Eng
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Supp_Eng.pdf
Hindi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/Hindi_Syllabus.pdf
Marathi
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.Sc_Languages/marathi_syllabus.pdf
Statistics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/B.A_%20B.Sc_Statistics_Semester_Pattern2013.pdf
Botany
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Botany_Semester_Pattern.pdf
Zoology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Zoology_semester_Pattern_2013.pdf
Microbiology
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Microbiology_revised_syllabus_23092020.pdf
Physics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_for_B.Sc_Physics_Semester_Pattern2013.pdf
Chemistry
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Chemistry_Semester_Pattern2013.pdf
B.Sc. Chemistry

B.Sc. Chemistry I Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry I Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_I_paper_II_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-I Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSC_Chem_sem_II_paper_I_revised_syllabus_080920.pdf
B.Sc. Chemistry II Semester Paper-II Revised Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_Chem_sem_II_paper_II_revised_syllabus_080920.pdf
Revised Complete U.G. Chemistry Syllabus
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Revised_Complete_U.G.ChemistryRYSyllabus2018-19.pdf
Electronics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Electronics_Semester_Pattern2013.pdf
Mathematics
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Mathematics_Semester_Pattern2013.pdf
Computer Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/Syllabus_of_B.Sc_Computer_Science_Semester_Pattern2013.pdf
Home Science
https://www.nagpuruniversity.ac.in/links/Syllabus/UG/Faculty_of_Science/BSc_home_science_syllabus_scheme_29092020.pdf

Post-Graduation (PG)

Mathematics
https://nagpuruniversity.ac.in/writereaddata/fckimagefile/MSc_Mathematics_Revised_Syllabus__CBCS____22nd_October_2021.pdf

Chemistry

https://www.nagpuruniversity.ac.in/links/Syllabus/Faculty_of_Science/006_CBCS_Syllabus_M.Sc.Chemistry.pdf

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2.6.1

2017-18

LIST OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

Sr. No.	Course Name
1.	C and CPP

LIST OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

Sr. No.	Course Name
1.	Certificate Course in Bioinformatics

DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

2.6.1

2017-18

Syllabi of Diploma / Certificate Courses

SYLLABUS OF IIT SPOKEN TUTORIAL CERTIFICATE COURSE

1. C and CPP

Sr.No.	Topic Name	Contents
1	First C program	How to ● Write a simple C program. ● Compile it. ● Execute it. Some common errors and their solutions.
2.	First CPP program	How to ● Write a CPP program. ● Compile it. ● Execute it. Some common errors and their solutions.
3.	Tokens	How to define and use tokens. With the help of an example. Some common errors and their solutions.
4.	Functions in **C and CPP**	What is Functions? Syntax of function Significance of return statements. Examples on functions Some common errors and their solutions.
5	Scope of Variables in C and C++	Scope of Variables. Types of variables Global Variables. Local Variables. Example. Some common errors and their solutions.
6	Conditional Statements in **C and CPP**	How to execute a single statement? And a group of statements. Examples on it Some common errors and their solutions.

7.	Nested if and switch statement	Nested if statement Switch statement Some example on it
8.	Increment and Decrement Operators	Increment and Decrement Operators Some examples. Typecasting.
9.	Arithmetic Operators	Arithmetic Operators its types ● Additions. ● Subtraction. ● Division. ● Multiplication. ● Modulus.
10.	Relational Operators	Relational Operators ● Less Than < ● Greater Than> ● Less Than or equal to<= ● Greater Than or equal to >= ● Equal to== ● Not equal to !=
11.	Logical Operators	Logical AND. Logical OR. Logical MOT.
12.	Loops in **C and CPP**	For loop While loop Do….. while loop Through examples Some common errors and their solutions.
13	Array in **C and CPP**	Array. Declaration of an array. Initialization of an array. Through examples Some common errors and their solutions.
14.	2- Dimensional Array	What is a 2D array Through examples Some common errors and their solutions.
15.	String in **C and CPP**	What is string? Declaration of string. Initialization of a string. Through examples Some common errors and their solutions

16.	String Library Functions	String Library Functions. Some Examples.
17.	Structures in C	What is a structures? Declaration of structures. Through examples.
18.	Pointers in **C and CPP**	Pointers. To create pointers. And operations on pointers. Through examples.
19.	Functions call in **C and CPP**	Call by value. Call by reference. Through examples.
20.	Files in C	How ● To open a file. ● To read data from a file. ● To write data into a file. Through examples.

SYLLABUS OF UGC SANCTIONED CERTIFICATE COURSE AND DIPLOMA

1. Certificate Course in Bioinformatics

Paper 1 : Computer Aided Bioinformatics.

UNITS	Detail Syllabus of the Unit
1	**Communicating Electronically: Email and Web Sites:** Using Email, Observe the email conventions where you work, Keep your messages brief, Make your messages easy to read on screen, Provide an informative, specific subject line, Take time to revise, Remember that email isn't private, Creating Web Site, Begin by defining your site's objectives, Provide quick and easy access to the information your readers want, Design pages that are easy to read and attractive, Design your site for international and multicultural readers, Enable readers with disabilities to use your site, Help readers find your site on the Internet, Test your site on multiple platforms and browsers before launching it, Keep your site up to date, Ethics Guideline: Respect intellectual property and provide valid information, Exercises **website creation.**

2	Fundamentals of Computing: Introduction to operating Systems: WINDOWS, NT, UNIX/Linux operating systems. Comparative Advantages of Security (hacking9, cracking) Installation. Portability and Programming of these operating systems. Computer Viruses
3	Computer Networking: LAN, WAN, MODEM. Optical Vs. Electronic Networking. Security of the network, Fire-walls. Network Goals, Applications Network, Network structure, Network architecture, Hierarchical networks, Ethernet and TCP / IP family of protocols, Transport protocol design
4	Programming Language: what is program, algorithms, introduction to various programming languages like C, C++, Python, cobra java, Bioprogramming languages Perl, Bioperl, biojava, etc, markup languages. XML,HTML

Paper II Basics of Bioinformatics

UNITS	Detail Syllabus of the Unit
1	Basics of Bioinformatics, nature and diversity of biological data, Bioinformatics: emergence and growth, bioinformatics Scenario in India, world. ***International Nucleotide Sequence Database Collaboration***
2	**Browsing Genomic Resources:** Genome Assembly overview Related data resources (EST, STS, GSS, HSS) etc. Genomic databases at EBI and NCBI Genomic databases for human, mouse, yeast and other model organisms Genomic databases for plant, microbial, parasite and viral genomes Challenges in development of genomic databases & resources
3	**Structure visualization:** Factors Affecting Structure of Molecules Principles of Structure: Bonds, bond angles, et. dihedral angles, Anatomy structures: primary, secondary angles, e structural elements (alpha, beta, coil, turns) Tertiary & quaternary structure organization, **visualization tools** for nucleic acid as well as protein.
4	**Use of Bioinformatics:** Agriculture, Pharmacy , Human Health, Biotechnology, Molecular Biology, Drug Discovery.
5	assignments

Paper III Basics of Bioinformatics

UNITS	**Detail Syllabus of the Unit** This paper describes how to acquire information from public domain: biological databases by using computers and internet.
1	What is data? biological data, database classification of biological databases. data base operating system like mysql, oracal. data base management Systems. public domain resources in biology. search engines, Wikipedia. ***In silico LITERATURE MINING/LITERATURE DATABASES Pub Med, Medline, PubMed Central*:** Entrez: search engine to search and retrieve references, concepts in keyword based searches and MeSH terms, other literature databases & Open

	source journals in the area of Bioinformatic. Searching & retrieval of data: concepts Database search engines: Entrez & SRS Keyword-based search and retrieval, use of wild card characters, narrowing and broadening the search, using history feature, use of Boolean operators, learning use the limits feature, curation and processing of search results, extraction of sequences in various formats, online and batch processing.
2	**NUCLEIC ACID DATABASES** Organization of data, Contents and format of entries, sequence format, submission of data in following databases: o GenBank o EMBL o DDBJ 3 Biological databases II:
3	Biological databases II: Protein sequence database Organization of data, Formats and contents of entries, submission of data in following databases: o SwisProt o PIR PSD o UniProtKB
4	Protein 3d structure databases: protein data bank FSSP, DSSP, CATH, SCOP Metabolic pathway database.
5	Assignments

Dharampeth Education Society's
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North Ambazari Road, Near Ambazari Lake, Nagpur-440033

Program Outcome, Program Specific Outcome & Course Outcome

For B. Sc. (Science & Home Science) and M. Sc. (Mathematics)

Internal Quality Assurance Cell (IQAC)

CONTENTS

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY NAGPUR AFFILIATED UG & PG COURSES

IIT SPOKEN TUTORIAL CERTIFICATE COURSE

UGC SANCTIONED CERTIFICATE AND DIPLOMA COURSES

DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN, RTM NAGPUR UNIVERSITY AFFILIATED CERTIFICATE COURSES

BOTANY

Department of Botany	After successful completion of three years degree program in the subject Botany the students are able to:
Program Outcomes	**PO1:** Students know about different types of lower & higher plants their evolution in from algae to angiosperm &also their economic and ecological importance. **PO2:** Cell biology gives knowledge about cell organelles & their functions. **PO3:** Molecular biology gives knowledge about chemical properties of nucleic acid and their role in living systems. **PO4:** Genetics provides knowledge about laws of inheritance, various genetic interactions, chromosomal abrasions & multiple alleles. **PO5:** Structural changes in chromosomes. **PO6:** Student can describe morphological & reproductive characters of plant and also identified different plant families and classification. **PO7:** They know economic importance of various plant products & artificial methods of plant propagation. **PO8:** Various concepts in ecology and phytogeography. **PO9:** Use modern Botanical techniques and decent equipment. **PO10:** To inculcates the scientific temperament in the students and outside the scientific community.
Program Specific Outcomes	**PSO1:** Students acquire fundamental Botanical knowledge through theory and practical. **PSO2:** To explain basis plant of life, anatomy, reproduction and their survival in nature. **PSO3:** Helped to understand role of living and fossil plants in our life. **PSO4:** Understand good laboratory practices and safety. **PSO5:** To create awareness about cultivation, conservation and sustainable utilization of biodiversity. **PSO6:** To know advance techniques in plant sciences like tissue culture, plant disease management, artificial gene transfer etc. **PSO7:** Students understand about the phytogeography of India, ethnobotanically important plants and their use.
Course Outcomes B. Sc Botany	
Course Outcome for Semester-I	
PAPPER-I: **VIRUSES, PROKARYOTES, ALGAE & BIOFERTILIZERS**	**CO1:** Study of Microbes and algae to understand their Diversity. **CO2:** Know the systematics, morphology and structure of Viruses, bacteria, Mycoplasma and algae. **CO3:** To know life cycle pattern of microbes and their economic importance.

	CO4: To know evolution of microbes and algae. **CO5:** To learn skill of preparation and use of biofertilizers for sustainable development.
PAPPER-II: **FUNGI, LICHEN, PLANT PATHOLOGY, BRYOPHYTA & MUSHROOM CULTIVATION**	**CO1:** Study of Fungi, Lichens, plant pathology and Bryophyta. **CO2:** To know the systematics, morphology and structure of fungi, Lichens, plant pathogens, hosts and Bryophytes **CO3:** To know life cycle pattern of fungi, lichens, plant pathogens and bryophytes. **CO4:** To know economic importance of fungi, lichens and Bryophytes. **CO5:** To know evolution of fungi, lichens and Bryophytes. **CO6:** To learn skill of cultivation and importance of mushrooms for human consumption.
Lab Work:	• To get acquainted with ultrastructure of viruses and bacteria, to study staining method of bacteria • To study structure and reproduction of *Nostoc* • To study the structure and reproduction in Algae, like *Chara, Vaucheria, Ectocarpus* and *Batrachospermum* • To learn the method of identification and characterization of bacteria useful in biofertilizers • To learn staining method of fungi and bryophytes. • To get acquainted with different plant pathogens and lichens • To learn the technique of mushroom cultivation
Course Outcome for Semester-II	
PAPPER-I: **PALAEOBOTANY, PTERIDOPHYTA, GYMNOSPERMS & SOIL ANALYSIS**	**CO1:** Study of Palaeobotany, geological time scale and morphology of angiosperms. **CO2:** To know life cycle pattern of Pteridophyta and Gymnosperms. **CO3:** To know the systematics, morphology and structure of Pteridophyta and Gymnosperms. **CO4:** To know economic importance of Pteridophyta and Gymnosperms. **CO5:** To know evolution of Pteridophyta and Gymnosperms. **CO6:** To learn the skill of soil analysis for cultivation of variety of plants.
PAPPER-II: **MORPHOLOGY OF ANGIOSPERMS & FLORICULTURE**	**CO1:** To study the morphology of angiosperms with respect to evolution of plants. **CO2:** To the evolution of different floral organ for sexual reproduction in angiosperms. **CO3:** To know the variation among the reproductive organs of the angiosperms. **CO4:** To know the systematics, morphology and structure of angiosperms. **CO5:** To know the adaptive pollination and reproductive biology of angiosperms. **CO6:** To learn the skill of floriculture and its tools and techniques.

Lab Work:	• Observation and study of types of fossils • Study of structure and reproduction pteridophytes like, Selaginella & Equisetum and gymnosperms like, Cycas & Pinus • To get acquainted with types, physical and chemical properties of soil • Study of morphology of angiosperms, • Study of identification and commercial aspects of cut flowers
Course Outcome for Semester-III	
PAPPER-I: **ANGIOSPERM SYSTEMATICS, EMBROLOGY & INDOOR GARDENING**	**CO1:** To Study vegetative and floral characters of angiosperms. **CO2:** To know the preparation of floral formulae and floral diagrams of angiosperms. **CO3:** To know economic importance of angiosperms families. **CO4:** To know the pattern of embryogenesis in various angiosperms plants. **CO5:** To learn the skill for development of indoor gardening and its importance.
PAPPER-II: **ANGIOSPERM ANATOMY & HORTICULTURE**	**CO1:** To gain knowledge of different plant tissue and tissue systems. **CO2:** To understand structure and type of cells and tissues in plants, type of vascular bundles and stellar systems. **CO3:** To know the simple and complex tissues and its functions. **CO4:** To know the process of secondary growth and its role in formation of wood and periderm **CO5:** To learn the skill for horticultural practices used.
Lab Work:	• To Study fossil angiosperms • To learn the anatomy of dicot and monocot • To study embryology of angiosperms • To get acquainted with the techniques used in landscaping and indoor gardening • To study various horticultural crops
Course Outcome for Semester-IV	
PAPPER-I: **CELL BIOLOGY, PLANT BREEDING, EVOLUTION & SEED TECHNOLOGY**	**CO1:** Gain knowledge about cell and its function. **CO2:** Learn the scope and importance of Cell and Molecular biology. **CO3:** To understand ultrastructure of cell wall, plasma membrane and cell organelles **CO4:** To understand the morphology and structure of chromosomes. **CO5:** To understand the different techniques used in plant breeding. **CO6:** To know the process of evolution of plants in universe **CO6:** To learn the skill used in seed technology
PAPPER-II: **GENETICS, MOLECULAR**	**CO1:** To study structure, biochemical nature and role of nucleic acids.

BIOLOGY & PLANT NURSERY	**CO2:** To understand the type and applications of mutations. **CO3:** Understand the Mendelian and neo-Mendelian genetics. **CO4:** Know about interaction of genes, multiple alleles and linkage and crossing over. **CO5:** To learn the skill for preparation of plant nurseries and its importance for nature conservation
Lab Work:	• To study ultrastructure of cell organelles • To study cell division, mitosis and meiosis with use nuclear stain • To learn the different biostatistics methods • To study seed dormancy, viability and percentage of germination • To prove Mendel's laws of inheritance with the help of coloured beads • Study of interaction of genes through different genetics problems • To study sterilization for plant nursery and methods of propagation
Course Outcome for Semester-V	
PAPPER-I: **PLANT PHYSIOLOGY, MINERAL NUTRITION & HYDROPONICS**	**CO1:** To know the scope and importance of plant physiology. **CO2:** To understand plant & water relation and mineral nutrition. **CO3:** Understand process of photosynthesis, C_3, C4, CAM pathways. **CO4:** Understand the process of respiration, nitrogen metabolism and plant movement **CO5:** To learn the technique of development of hydroponics.
PAPPER-II: **PLANT ECOLOGY & ORGANIC FARMING**	**CO1:** To study concept of ecology and ecosystems. **CO2:** To understand climatic and edaphic factors. **CO3:** To know physiographic factors and interrelations among the living organisms. **CO4:** To understand the components of ecosystems, autecology, synecology and plant succession. **CO5:** To know the adaptations of plants. **CO6:** To learn the skill and importance of organic farming for healthy life.
Lab Work:	• To study the plant physiology experiments, like photosynthesis, respiration, permeability, RQ, photoperiodism, plant movements, etc. • To get acquainted with mineral nutrition and hydroponics • Study of different qualitative and quantitative methods used in plant ecology • To learn the techniques used in organic farming
Course Outcome for Semester-VI	
PAPPER-I: **BIOCHEMISTRY, BIOTECHNOLOGY &**	**CO1:** To study carbohydrates, lipids, amino acids and enzymology. **CO2:** To know the plant tissue culture techniques and

HERBAL TECHNOLOGY	applications. **CO3:** To understand tools and techniques used in genetic engineering. **CO4:** To know the artificial gene transfer techniques. **CO5:** To learn the skill used in formation of dye and cosmetics from plants. **CO6:** To know the basic concept of herbal technology.
PAPPER-II: **PHYTOGEOGRAPHY, UTILIZATION OF PLANTS, TECHNIQUES & PHARMACOGNOSY**	**CO1:** To know the phytogeography of India and world **CO2:** To know the natural resources and various types of pollutions and its impact on living organism. **CO3:** To study the natural resources and its conservation strategies. **CO4:** To know the economic importance of plants and ethnobotany. **CO5:** To study microscopy, electrophoresis, centrifugation and chromatography. **CO6:** To learn the basics of pharmacognosy and skill for used of plants in pharmacognosy.
Lab Work:	• To study the biochemical experiments • To study the different instruments and equipment used in biotechnology • To study the different techniques used in herbal technology • To learn types of pollution parameters. • To get acquainted with ethnobotany and economic botany with suitable examples • To study the techniques used in pharmacognosy

CHEMISTRY

Department of Chemistry	After successful completion of three years degree program in the subject Chemistry the students are able to:
Program Outcomes	**PO1:** The Programme enables the students to understand basic facts and concepts in Chemistry. **PO2:** To develop the ability to apply the principles of Chemistry, to develop problem solving skills, to become familiar with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies. **PO3:** Students know about importance of Qualitative and Quantitative analysis used for different samples like soil samples, alloys estimation, water analysis. New technological world using nanomaterials, properties of nano materials magnetic properties of materials. **PO4:** Thermodynamic and Thermochemistry useful in our daily life and related with our surrounding atmosphere. **PO5:** Nuclear Magnetic resonance spectroscopy allows the molecular structure of a material to be analyzed by observing the measuring the interaction of nuclear spins when placed in a powerful magnetic field and extensively used in medicine in the form of magnetic resonance imaging and for analysis of chemicals. **PO6:** Bioinorganic chemistry provides knowledge about significant role of metal ions in biological system which is required for the maintenance of life. **PO7:** Student can describe the process It also develops skills in the proper handling of apparatus and chemicals and also gets exposure to the different processes used in industries and their applications. **PO8:** Use modern techniques used in analysis of materials and handling of the new equipment during the practical. **PO9:** To inculcates the scientific temperament in the students during the experiments and how to corelate with outside the scientific community.
Program Specific Outcomes	**PSO1:** The B.Sc. programme enabled the students to enhance their critical thinking, during the three years period of study and the curriculum motivates the mental thoughts and suppositions of the students. This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and validity of the practical knowledge. This Analysis leads to take decisions at intellectual, directorial and personal from different perspectives of life.

	PSO2: Understand the basic principles and concepts underlying the inorganic, organic and physical chemistry. **PSO3:** Comprehend the applications of chemistry in various walks of life. **PSO4:** Students gained functional knowledges of the fundamental theoretical concepts and experimental methods of Chemistry. **PSO5:** The students will be benefited to equip themselves to job requirements in the quality control, analytical laboratory or production wing of any Chemical or Pharmaceutical industry. **PSO6:** Able to use instrumental methods of chemical analyses. Students acquire fundamental Botanical knowledge through theory and practical.
Course Outcomes B. Sc. Chemistry	
Course Outcome for Semester-I	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** Basic knowledge of atomic structure, inorganic fundamental of a periodic property. **CO2:** Conceptualization of Valence bond theory (VBT) and Molecular Orbital theory (MOT), and VSPER theory. **CO3:** Differentiation in ionic and metallic bond, and S-block elements. **CO4:** A study of P-block elements, oxyacids of Sulphur, hydride of Phosphorus, and noble gases. **CO5:** Food adulteration process and detection, test for detection physical adulteration and chemical adulteration and how to identify the food adulterant which are used various food products
PAPPER-II:PHYSICAL CHEMISTRY	**CO1:** Basic knowledge of thermodynamics and calculations of problems related to Thermo-chemistry. **CO2:** Difference between Ideal gas and Real gas and their related equation. **CO3:** Understanding of Liquid State with emphasis on properties of liquid. **CO4:** Concept of adsorption isotherm and principles of catalysis. **CO5:** Types of colloidal, electrophoresis and electro-osmosis, emulsion and gels
Course Outcome for Semester-II	
PAPPER-I: ORGANIC CHEMISTRY	**CO1:** Understand the concept structure, bonding in organic compounds and different types of reaction mechanisms. **CO2:** Understand the concept of stereochemistry in detail. **CO3:** Understand the nomenclature, synthesis, chemical and physical properties of alkanes, cycloalkanes and alkenes **CO4:** Understand the nomenclature, synthesis, chemical and physical properties of dienes, alkynes and also the concept of aromaticity of organic compounds. **CO5:** Fuels and its calorific values properties and uses application of lubricants in industries

PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** CO1: Second law of thermodynamics and free energy work functions. **CO2:** CO2: Understanding of Phase rule and liquid-liquid mixture. **CO3:** Insight into Nuclear Chemistry and Molecular Structure. **CO4:** laws of Chemical kinetics. **CO5:** Types of pollutions and its control measures, types of pollutants, adsorption techniques
Course Outcome for Semester-III	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** Diagrammatic representation of molecules according to MOT, and properties of interhalogen compounds **CO2:** Chemistry of first transition elements and non-aqueous solvents **CO3:** Comparative study of the second and third transition series and error in chemical analysis **CO4:** Chemistry of lanthanides and actinides, and lanthanide contraction
PAPPER-II: ORGANIC CHEMISTRY	**CO1:** Understand nomenclature, synthesis, chemical properties of alkanes in aryl, alkyl halides. **CO2:** Understand nomenclature, synthesis, chemical properties of dihydric, trihydric alcohols and phenols in detail **CO3:** Understand nomenclature, synthesis, chemical properties of aldehydes and ketones and mechanisms of nucleophilic addition **CO4:** Understand nomenclature, synthesis, chemical properties of carboxylic acids and their derivatives along with reactive mechanisms.
Course Outcome for Semester-IV	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** A detail study of coordination compounds and its applications. **CO2:** Isomerism and redox process in inorganic compounds. **CO3:** The concept organometallic and metal carbonyl compounds. **CO4:** Applications of inorganic macromolecules in the biological concept, and acid-bases principles.
PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** Insight into laws of crystallography and Bravais lattices **CO2:** Debye-Huckel theory and concepts related to electrochemistry **CO3:** Introduction to Rotational and Vibration Spectroscopy. **CO4:** Basics of Quantum Chemistry, Operators and Schrodinger wave function
Course Outcome for Semester-V	
PAPPER-I: ORGANIC CHEMISTRY	**CO1:** The students will understand some fundamental aspects of organic chemistry. They will learn mechanism of some organic reactions, classification of polymers, structure and uses of some commercial and natural polymers. **CO2:** To know stereochemistry and various possible conformations of organic compounds and how it affects

	the reaction outcome. **CO3:** To be familiarize with the important photochemical reactions in Organic Chemistry. **CO4:** To understand the functions and applications of bioorganic compounds.
PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** To study the basic postulates of quantum mechanics. **CO2:** To enable the students to solve the simple quantum mechanical models such as simple harmonic oscillator, particle in a 1D- box, rigid rotor, H atom etc. **CO2:** To understand the quantum mechanical aspect of angular momentum and spin. **CO3:** Enable the students to predict the point group of important molecules and to know how they are classified **CO4:** To understand the idea of space groups and to learn the theory of molecular symmetry. **CO5:** To gain skill to apply group theory to vibrational and electronic spectroscopy.
Course Outcome for Semester-VI	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** To know the structure and bonding of important coordination compounds. **CO2:** To understand the magnetic properties of complexes and to know how magnetic moments can be employed for the interpretation of their structure **CO3:** To get an overview about the stereochemistry of coordination compounds **CO4:** To get an idea about the basic coordination chemistry of Lanthanides and Actinides. **CO5:** Ability to prepare inorganic complexes. Ability to prepare inorganic complexes. **CO6:** To know about VBT, CFT and MOT of co-ordination complexes
PAPPER-II: ORGANIC CHEMISTRY	**CO1:** To impart the students a thorough knowledge about the mechanisms of reactions of some selected functional groups in organic compounds **CO2:** To give an outline of applied organic chemistry and the applications of organic chemistry in various spheres of chemical sciences. **CO3:** To give an elementary idea of chemotherapy, organic spectroscopy and photochemistry. **CO4:** To analyze organic compound using UV, IR and NMR spectroscopic techniques, which provides platform for students to work in industries.

COMPUTER SCIENCE

Department of Computer Science	After Successful completion of three year degree program in Computer Science a student should be able to know:
Program Outcomes	**PO1:** To develop problem solving abilities using a computer. **PO2:** To build the necessary skill set and analytical abilities for developing Computer based solutions for real life problems. **PO3:** To implement quality software development practices. **PO4:** To create awareness about process and product standards. **PO5:** To train students in professional skills related to Software Industry. **PO6:** To prepare necessary knowledge base for research and development in Computer Science **PO7:** To help the students to build-up a successful career in Computer Science.
Program Specific Outcomes	**PSO1:** Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems. **PSO2:** Design, implements, test, and evaluate a computer system, Component or algorithm to meet desired needs and to solve a computational problem. **PSO3:** To Enhance skills and adapt new computing technologies for attaining professional excellence and carrying research. **PSO4:** Apply fundamental principles and methods of Computer Science to a wide range of applications. **PSO5:** Impart an understanding of the basics of our discipline. **PSO6:** Practice for continued professional development.
Course Outcomes B. Sc Computer Science	
Course Outcome for Semester-I	
Paper-I: (Programming in C)	**CO1:** To illustrate the flowchart and design an algorithm for a given problem. They understand the basic concept of programming structure. **CO2:** Students learnt the knowledge of fundamentals of writing C program which include data types, keywords, tokens, variables, and operators. Develop conditional and iterative statements to write C programs **CO3:** To solve user defined functions with real time problems. **CO4:** Students developed their concepts to write C program that uses Pointers, Arrays, and Strings. **CO5:** Understand the knowledge of user defined data types that include structure and union to solve problems. **CO6:** Students can write the programs which includes file concept to show input and output of files in C.
Paper-II: (Fundamentals of IT)	**CO1:** Bridge the fundamental concepts of computers with the present level of knowledge of the students. **CO2:** Familiarize operating systems, programming languages, peripheral devices, networking, multimedia and internet **CO3:** Understand binary, hexadecimal and octal number systems and their arithmetic.

	CO4: Understand how logic circuits and Boolean algebra forms as the basics of digital computer **CO5:** Demonstrate the building up of Sequential and combinational logic from basic gate.
Course Outcome for Semester-II	
Paper-I: (Object Oriented Programming Using 'C++')	**CO1:** To understand the object-oriented methodology which involves elements and features of object-oriented programming. **CO2:** Students developed the concept of class, object and structure of class which includes definition of class members and also, they learned how to write the programs using class. **CO3:** Students learnt the basic concept of constructor and destructor. Also, they were able to overload the unary and binary operators using the concept of operator overloading. **CO4:** Understand how to reuse code by implementing the OOPs Inheritance concept in C++. Also, they got knowledge of dynamic objects. **CO5:** Students were able to understand how inheritance and virtual functions implement dynamic binding with polymorphism. **CO6:** Students learnt how to use exceptional handling in C++ programs
Paper-II: (System Analysis and Design)	**CO1:** Identify various types of information systems concepts and terminologies **CO2:** Discuss the initial phase of system Development Life Cycle (SDLC) using analytical tools and quantitative technique used to identify problem **CO3:** Define problem and opportunities that initiate projects **CO4:** Evaluate information systems projects to identify various aspects of feasibility of these projects **CO5:** Apply at least one specific methodology or tool for analyzing business situation by modeling using a formal technique.
Course Outcome for Semester-III	
Paper-I: (Data Structures)	**CO1:** To be able to implement the abstract data type list as a linked list using the node and reference pattern. **CO2**: Select appropriate data structures as applied to specified problem definition. Analyze run-time execution of previous learned sorting methods, including selection, merge sort, heap sort and Quick sort and also calculates the complexity of all sorting and searching methods. **CO3:** To understand the abstract data type stack and notation like prefix infix and postfix expression formats. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures and design applications based on it. **CO4:** Determine and analyze the complexity of given Algorithms. **CO5:** Ability to have knowledge of tree and graph concepts.
Paper-II: (Operating Systems)	**CO1:** Describe and explain the fundamental components of a computer operating system **CO2:** Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems. **CO3:** Describe and extrapolate the interactions among the various

	components of computing systems. **CO4:** Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems.
Course Outcome for Semester-IV	
Paper-I: (Java Programming)	**CO1:** Explain the Use of java programming language Concept and programming technologies in software development. **CO2:** Demonstrate the Concepts of Thread and Applets **CO3:** Identify classes, objects, members of the class and relationships among them needed for a specific problem. **CO4:** Able to understand basic Concepts of java like variables, operators and tokens etc. **CO5:** Design and Develop Applications using AWT controls in Java.
Paper-II: (Linux Operating System)	**CO1:** To understand the basic commands and directory structures use in Linux OS and explain the use of all these commands to make the effective use of the environment to solve problems. **CO2:** Design and develop applications using Vi Editor in Linux OS. **CO3:** Able to identify the differences between processes and shells use in Linux OS. **CO4:** Able to Understand the basic set of Communication utilities commands and other commands use in Linux OS. **CO5:** To learn Graphical user Interfaces like KDE and GNOME.
Course Outcome for Semester-V	
Paper-I: (Visual Basic Programming)	**CO1:** Explain the basic Concepts of Program building block control statements and the basic concepts of function and procedure. **CO2:** Discuss about graphics handling related control and properties and Develop a Graphical User Interface (GUI) based on problem description. **CO3:** Discuss about the fundamental functions and properties of Advanced ActiveXControl. **CO4:** Design and Develop the programs which are based on events that retrieve input from a file as opposed to input only provided by user. **CO5:** Explain the procedure of creating menus and how to use these menus while designing applications in VB. (Menu Editor). **CO6:** Describe the concepts of database handling using DAO, ADO and RDO control with data report concepts.
Paper-II: (Database Management System)	**CO1:** To learnt the fundamental elements of traditional file processing system, objective of database system. **CO2:** Students learnt the basic concept of different data models which includes Hierarchical, Network, and E-R and Relational model. **CO3:** Students are able Design E-R model to represent simple database application **CO4:** Students developed the concept of how to convert E-R model into relational tables and how to perform relational operation on tables through relational algebra. **CO5:** Students developed the concept of functional dependency and improve the database design by the concept of Normalization.
Course Outcome for Semester VI	

Paper-I: (Compiler Construction)	**CO1:** Students learnt the major concept areas of language translation and compiler design **CO2:** Students got an awareness of the function and complexity of compilers. **CO3:** Students were able to understand the role of Lexical analyzer, its design, and implementation. Students got knowledge of context free grammars, Derivation and parse trees. **CO4:** Students are able to identify the similarities and differences among various parsing techniques and grammar transformation techniques
Paper-II: (SQL and PL/SQL)	**CO1:** Able to Understand the basics of SQL with control structure and sublanguages like DDL, DML and DCL/TCL. **CO2:** Able To identify the differences between integrity constraints and value constraints. **CO3:** Explain how functions, triggers, cursors and stored procedure work in PL/SQL**.** **CO4:** Compare SQL with PL/SQL and integrate the concept of procedural language with SQL to build advance applications. **CO5:** Able to understand the basics of PL/SQL Programming: PL/SQL Data Types, Identifiers, Operators and Expressions, Iterative Statements, Conditional Statements,

ELECTRONICS

Department of Electronics	After successful completion of three years degree program in the subject Electronics the students are able to:
Program Outcomes	**PO1:** Ability to design and conduct electronics experiments, as well as to analyze and interpret data. **PO2:** Utilize the basic knowledge of science Electronics and Communication. **PO3:** To provide opportunity to students to learn the latest trends in Electronics. **PO4:** To satisfy the needs of the core Electronics Industry useful for the society in all walks of life. **PO5:** To provide opportunities to the students to formulate, analyze and resolve the problems in Electronics Industry.
Program Specific Outcomes	**PSO1:** After completing the program, interested students can pursue in research field or in development field. **PSO2:** Students can become entrepreneur and can work on multidisciplinary projects.
Course Outcomes for B. Sc. ELECTRONICS	
Course Outcome for Semester-I	
PAPER-I: BASIC CIRCUIT COMPONENTS & NETWORK ANALYSIS	**CO1:** To enrich the students with the basic requirement of electronic circuits. **CO2**: To describe the theorems useful for circuit operation. **CO3:** To explore the use of energy sources for circuit operations. **CO4:** To familiarize about the use of transducers in instrumentation systems
PAPER-II: FUNDAMENTALS OF DIGITAL ELECTRONICS	**CO1:** To enrich the students with the basic requirement of digital electronics. **CO2:** To describe the use of Boolean Algebra for circuit operations. **CO3:** To elaborate the use of flip flops as memory in data processing system. **CO4:** To explore the use of binary circuits in digital system. **CO5:** To familiarize about the basic building blocks required for digital system.
Course Outcome for Semester-II	
PAPER-I: SEMICONDUCTOR DEVICES	**CO1:** To explain about semiconductors used for the fabrication of semiconductor devices. **CO2:** To acquire the knowledge of transistor used in many electronic circuits. **CO3:** To familiarize about the field effect transistor and its operation. **CO4:** To explore the use of power devices required in electronics circuits. **CO5:** To familiarize about the applications of diode, transistor and power devices.
PAPER-II:	**CO1:** To enrich the students with the digital ICS used in

ADVANCED DIGITAL ELECTRONICS	electronics circuits. **CO2:** To enhance the use of Flip-Flops in the construction of counters. **CO3:** To familiarize the use of Counters & Registers in data processing system. **CO4:** To explore the use of binary memory in digital system. **CO5:** To disseminate about the building blocks required for digital system.
Course Outcome for Semester-III	
PAPER-I: ANALOG CIRCUITS	**CO1:** To illustrate applications of diode as clippers, clamper and rectifier. **CO2:** To describe the role of transistor in amplification, signal analysis and two port hybrid circuit for testing amplifier parameters. **CO3:** To elaborate the concept of feedback and construction of feedback amplifier and oscillators. **CO4:** To explore the use of power amplifier in electronics circuits. **CO5:** To familiarize about the applications of diode and transistor.
PAPER-II: LINEAR INTEGRATED CIRCUITS	**CO1:** To study DC & AC characteristics of operational amplifier. **CO2:** To elucidate and design linear and nonlinear circuits of OP-AMP. To study timer IC and its applications. **CO3:** To elaborate the role of filters in electronics circuits. **CO4:** To explore the knowledge of linear integrated circuits and its uses.
Course Outcome for Semester-IV	
PAPER-I: BASIC COMMUNICATION ELECTRONICS	**CO1:** To understand functioning of basic processes in communication systems. **CO2:** To understand analogue modulation & demodulation techniques. **CO3:** To Understand transmission and reception systems. **CO4:** To understand propagation of radio waves in communication systems. **CO5:** To understand the process of analogue signal communication system.
PAPER-II: ANALOGUE AND DIGITAL CIRCUITS	**CO1:** To study DAC and ADC used for data conversions in electronics system. **CO2:** To elucidate and design regulated DC power supply for operating electronic devices. **CO3:** To study PLL IC 565 and its applications. **CO4:** To elaborate the role of transducers in Bioelectronics circuits. **CO5:** To explore the knowledge of Analogue and Digital circuits and its uses.
Course Outcome for Semester-V	
PAPER-I: Modern Communication Systems	**CO1:** To understand the concept optical communication and its operation **CO2:** To understand various digital modulation and

	demodulation techniques. **CO3:** To analyse the performance of digital communication system in terms of error rate and spectral efficiency. **CO4:** To understand the telecommunication traffic, channel and cellular capacity **CO5:** To understand various application of cellular technology.
PAPER-II: INTRODUCTION TO MICROPROCESSOR	**CO1:** To understand importance of Microprocessors as a programmable digital system element in computer system. **CO2:** To understand architecture and features of 8085 Microprocessor. **CO3:** To explore some basic concepts of microprocessors through assembly language programming. **CO4:** To augmented the knowledge of interfacing the peripheral to increase the flexibility of microprocessor. **CO5:** To grown-up the in-depth understanding of the operation of microprocessors and machine language programming & interfacing techniques.
Course Outcome for Semester-VI	
Paper-I: Programming in "C"	**CO1:** After completion of course, Students are able to Develop their programming skills **CO2:** Familiar with elements of C language **CO3:** Understand operators, Expression and Preprocessors **CO4:** Understand different decision making and concept of looping in C **CO5:** Understand Array, Structure, Function and Pointers, their declaration and use
Paper-II: MICROCONTROLLER 8051 AND ITS APPLICATIONS	**CO1:** To understand architecture and features of 8051 Microcontroller. **CO2:** To learn Programming of 8051 microcontroller. **CO3:** To learn interfacing of 8051 Microcontroller with real world input and output devices. **CO4:** To understand the coding and interfacing of 8051 with various IO devices. **CO5:** To understand importance of Microcontrollers in atomization and control system

COMPULSORY ENGLISH
SUPPLEMENTARY ENGLISH
ENGLISH AND COMMUNICATION SKILLS

Department of English	**After successful completion of three years degree program in the subject English the students are able to:**
Program Outcomes	**PO-1:** Students will be able to develop Life skills through the different life lessons incorporated in the prose and characterisation. **PO-2:** Students will be able to make sensible and ethical decisions and inculcate moral values those that are demonstrated in the literature. **PO-3**: Comprehensive skills are developed through reading and writing exercises. **PO-4:** Students will learn effective use of formal and informal use of English language **PO-5:** Students will be able to learn their critical faculties required in personal and professional life. **PO-6:** Students will be able to tap the intrinsic and extrinsic motivational theories through the text prescribed. **PO-7:** Students should be able to write business communication and other formal writings required in their professional life. **PO-8:** Students will be able to understand the concepts and strategies of communication skills with special reference to writing and listening skills. **PO-9:** Students will be able to write and appreciate different types of prose such as essay, paragraph writing, dialogue writing etc. **PO-10:** Students will be able to understand the different state of minds for example humour, struggle, resilience, success, innovation and the strategies to deal in such situations through motivational and inspiring stories.
Program Specific Outcomes	**PSO1:** Students will acquire fundamentals of formal writing skills required in a workplace. **PSO2:** Students will be able to use correct grammar to improve their writing and speaking skills. **PSO3:** Students will review and inculcate moral and ethical values as discussed in the prescribed prose. **PSO4:** Students will improve their analytical power through reading and writing exercises. **PSO5:** Students will learn important business communication through accurate use of language and formats. **PSO6:** Students will be able to demonstrate concepts of creative skills and innovative presentation skills
Course Outcomes B. Sc Compulsory English	
Course Outcome for Semester-I	

UNIT-I: **PROSE** **1. My struggle for an Education: Booker T Washington** **2. Florence Nightingale: Lytton Strachey**	**CO1:** To motivate student to understand the importance of education in one's life. **CO2:** To inspire students through the real-life examples of struggle and success. **CO3:** To inculcate the concept of community service and philanthropy among the youth. **CO4:** To set examples of benevolence and strength through self- worth, self -image and self -identity.
UNIT-II: **PROSE** **1. The Birth of Khadi: Mahatma Gandhi** **2. Go, Kiss the World: Subroto Bagchi**	**CO1:** To integrate and revive the idea of swadeshi moment as a contribution to the development of Indian nationalism. **CO2:** To extend the concept of self-generation and self-reliance and considering clothing as a power changing mechanism in freedom struggle. **CO3:** To introduce the model of Child -Parent Relationship in shaping the life of an individual. **CO4:** To help students identify their role models to learn life skills through them.
UNIT-III: **POETRY** **1. Ulysses: Alfred Tennyson** **2. Yussouf: James Russel Lowell** **3. If: Rudyard Kipling**	**CO1:** To extend the idea of resilience, vigor and self-determination in the youth. **CO2:** To help students understand and incorporate life skills such as bravery, fearlessness, heroism in the times of struggle and hardships. **CO3:** To make students learn the importance of forgiveness and moving ahead in their lives. **CO4:** To help students to evolve as Samaritans and spread the word of fraternity among individuals. **CO5:** To help students to have determination in the face of failure. **CO6:** To provoke students in the direction of sportsmanship in the competitive world.
UNIT-IV: **1. Comprehension of Unseen Passage** **2. Prepositions** **3. Subject-Verb Agreement** **4. Summarizing**	**CO1:** To improvise the comprehension skills through reading and writing. **CO2:** To revise the use of grammar in day-to-day life. **CO3:** To make students explain the idea briefly in their own words.
Course Outcomes B. Sc Compulsory English	
Course Outcome for Semester-II	
UNIT-I: **PROSE** **1.Grassroot innovation and Social Enterprise: Changing Lives** **2. The Two Gentlemen of Verona**	**CO1:** To introduce the students about inventions through innovations. **CO2:** To inspire students towards innovation through real time success stories. **CO3:** To teach students the life-skills such as focus and self-control, facing challenges, making connections etc. **CO4:** To inculcate the habit of hard-work and diligence

	irrespective of their age.
UNIT –II: **PROSE** 1. **The Verger** 2. **Synthesis of Science and Spirituality**	**CO1:** To involve students in understanding the basic principles of value education. **CO2:** To impart reasoning of conventional and non-conventional education in one's life. **CO3:** To institute the concept of science and spirituality in the minds of youth. **CO4:** To foster the young minds with connection between science and spirituality.
UNIT -III: **POETRY** 1. **Richard Cory** 2. **Allow sanity a little space** 3. **Refugee Blues**	**CO1:** To share the idea of resilience in face of adversity. **CO2:** To unveil the learners about the evil and dark forces prevalent in this millennial and how one should deal with it. **CO3:** To bring forth the stories of refuges focusing on their accommodating and tolerant behaviors.
UNIT-IV: **WRITING SKILLS** 1. **Paragraph Writing** 2. **Application and C.V. Writing** 3. **Phrasal Verbs**	**CO1:** To inculcate writing skills through idea development strategies. **CO2:** To teach students the skill of writing applications and C.V. **CO3:** To make appropriate use of phrasal verbs to improve language skills.
Course Outcomes B. Sc Supplementary English	
Course Outcome for Semester-I	
UNIT-I: **PROSE** **Short Stories**	**CO1:** To revise the learners with the concepts of compassion, love and care. **CO2:** To convey the students the purpose of life through enlightenment and wisdom. **CO3:** To promote the importance of humour
UNIT -II: **Short stories**	**CO1:** To revise the concepts of wisdom and knowledge in the constant changing world. **CO2:** To expand and explore on the idea freedom and responsibility. **CO3:** To share the views on duality concept of real and fake.
UNIT-III: **Vocabulary Expansion**	**CO1:** To introduce the varied words used in English Language. **CO2:** To maximize the use of different use of vocabulary in reading and writing.
UNIT -IV: 1. **Essay writing** 2. **Email**	**CO1:** To develop the critical thinking and writing among students on various current issues. **CO2:** To develop email writing skills as a part of formal communication.
Course Outcomes B. Sc Supplementary English	
Course Outcome for Semester-II	
UNIT-I: **Short Stories**	**CO1:** The stories teach how healthy sense of humour can help one deal with tough times. **CO2:** The students learn the pros and cons of having and lacking integrity in one's life. **CO3:** To teach the learners the meaning of 'Luxury' and

	connotations attached to it.
UNIT- II: **Short stories**	**CO1:** To teach the learners how the serious things can also be leant through dark humor. **CO2:** To impart philosophical lessons through the technique of storytelling. **CO3:** To impart that reading can also be an experiential learning process.
UNIT-III: **1. Writing Advertisements** **2. Letter writing**	**CO1:** To make students aware of strategies of Advertisement writing. **CO2:** To guide students how to write different types of formal letters.
UNIT-IV: **1. Story writing based on given outline** **2. Reporting an event**	**CO1:** To develop the creative writing skills through development of story. **CO2:** To develop critical thinking and decision making of the students. **CO3:** To improve report writing skills of the students. **CO4:** To develop comprehension skills of any situation.

HOME SCIENCE

Department of Home Science	After successful completion of three years degree program in the subject Home Science the students are able to:
Program Outcome	**PO1:** Develop sensitivity towards the needs of family and society and cater to them. **PO2:** All round development of the personalities of the members in home & family. **PO3:** Ddevelop in the learner an understanding of the need for healthy environment and skills. **PO4:** Efforts are taken to create and maintain the above attributes amongst students. **PO5:** Develop in them the ability to take care of the nutritional needs of the family members and ensure good, 'Food handling practices **PO6:** Impart in the learner the basic knowledge related to textiles used in the home and develop skills for their optimum utilization **PO7:** Make learners aware of the rights of consumers and instill in them wise purchasing habits **PO8:** Foster understanding of human developmental process and use it to strengthen interpersonal relationships. **PO9:** Orientation with the educational and vocational scope of Home Science and the need to practice/develop entrepreneurship **PO10:** Sensitivity towards some of the major psychological and health problems of the community and the programs of the government to overcome these.
Program Specific Outcomes	**FOOD SCIENCE AND NUTRITION** **PSO1:** Enable to pursue higher education **PSO2:** Understand the role of food and nutrition for the welfare of the community **PSO3:** Excel in the area of personal & public health nutrition **PSO4:** Apply skill-based knowledge in food industry **PSO5:** Acquire entrepreneurial skills in the field of food science & nutrition **PSO6:** Public health nutrition for employment in state & central government **HUMAN DEVELOPMENT** **PSO1:** Describe how individuals change from Womb to Tomb **PSO2:** Relate principles of human development with self, family & society **PSO3:** Apply methods of teaching and training towards administration of early learning centers **PSO4:** Appraise & identify life situations in need to referral services **PSO5:** Manage life crisis at every life span **PSO6:** Demonstrate skills to assess human behavior

	PSO7: Advocate domain specific programs& policies **PSO8:** Become Entrepreneurs in establishing learning center **TEXTILES & LAUNDRY** **PSO1:** Gain knowledge in Textile Production Techniques **PSO2:** Acquire skill in textile dyeing and printing **PSO3:** Equipped with skill as a designer **PSO4:** Acquire dexterity in Surface Design & Apparel Construction **PSO5:** Acquire entrepreneurial skills in textiles & fashion **FAMILY RESOURCE MANAGEMENT** **PSO1:** Students exhibit efficient resource use at home & work as they learn management of resources **PSO2:** Act as proactive agents of change **PSO3:** Career options like Hotel Management, Event Management, Front Office Management, Designing Interiors **PSO4:** Role of able designers **PSO5:** Achieve social advancement through value education and family management concept. **PSO6:** Acquire professional skills in financial management and control, designing of interiors and work places and equipment, institutional management and rendering consumer services. **PSO7:** Develop entrepreneurship skills and self-employment potential. **EXTENSION EDUCATION** **PSO1:** Competency in Rural Development Practices Impart skill training programmes **PSO2:** Get sensitized on issues of society **PSO3:** Acquire skill and attitude to work with communities
Course Outcome for Semester-I	
PAPER-I: FUNDAMENTALS OF FOOD SCIENCE AND NUTRITION-1	**CO1:** To study the introduction of food and nutrition, basic terms used in Food and Nutrition. Definitions-Foods, Nutrition, Optimum nutrition, Nutritional status, Nutrients and Health **CO2:** To know the functions of food-Physiological, psychological and social **CO3:** To learn characteristics of basic food groups and their contribution to the diet **CO4:** To know about nutrients and their type (Macronutrient / Micronutrient) **CO5:** To study thermodynamic effect of food (SDA) and Scope of Nutrition. **CO6:** To study definition, Concept and factors affecting balanced diet **CO7:** To learn Recommended Dietary Allowances (RDAs) of the ICMR for the different food groups for various life stages. **CO8:** To understand the term Energy: Definition and factors affecting BMR. Units of measuring food energy: Calorie, kilo-calorie, joule, kilo-joule and mega- joule **CO9:** To study Energy measurement of food (Bomb calorimeter) **CO10:** To study Carbohydrates – Definition, classifications,

	functions, sources, digestion and absorption and deficiency states. **CO11:** To learn about Fiber- Definition, Types of dietary fiber and sources. Role of fiber in prevention of diseases **CO12:** To study Protein- Definition, classifications, functions, sources, digestion and absorption and deficiency states Protein sparing action of carbohydrates **CO13:** To learn Fats - Definition, classifications, functions, sources, digestion and absorption and deficiency states.
PAPER-II: FUNDAMENTALS OF HUMAN DEVELOPMENT	**CO1:** Students learn basic concepts, meaning and definitions to study the relevance &scope of the subject of Human Development. **CO2:** Acquire the knowledge of Governmental level projects, schemes and centers where the Human Developmentalist can apply and use knowledge. **CO3:** Concept of child and family welfare Schemes. **CO4:** children with special needs **CO5:** Students learn the twin processes namely growth and development to understand how human beings undergo changes. **CO6:** theoretical perspective and biological and environmental aspects responsible for the developmental changes. **CO7:** Students gain the Knowledge of important life span and stages **CO8:** Importance of prenatal stage, imp of prenatal care, factors governing the prenatal Development. **CO9:** Concept of WHO concept of Child friendly hospitals. **CO10:** Students understand the term neonatal Stage of Development. CO11: Concepts like caring the new born, health and well- being are dealt with special emphasis and relevance.
PAPER-III: FUNDAMENTALS OF TEXTILES AND CLOTHING	**CO1:** To study the basic knowledge ofTextiles **CO2:** To know the scope and importance of clothing. **CO3:** To learn more about classification of textiles fiber manufacturing process. **CO4:** To know different factors affecting clothing. **CO5:** To study the various tools required for garment construction and drafting methods **CO6:** To learn different parts, functions and care of sewing machine. **CO7:** To acquire knowledge for preparation of cloth for clothing construction.
PAPER-IV: FUNDAMENTALS OF FAMILY RESOURCE MANAGEMENT	**CO1:** Exercise and demonstrate use and mastery of the elements of design, recognize elements of design in works of art **CO2:** Develop aesthetic sense and to be good art consumer, selecting appropriate concepts and forms of art **CO3:** Understand the significance of management **CO4:** Develop the ability to evaluate the management efficiency and effectiveness in the family and other organizations. **CO5:** Successful integration of the three objectives of aesthetic

	planning which are beauty, expressiveness and functionalism
PAPER-V: FUNDAMENTAL OF HOMES CIENCE EXTENSION	**CO1:** To gain the knowledge regarding types of education **CO2:** To understand the field of extension education& objectives principle, fields & essential links in the chain of Rural Development. **CO3:** To know Philosophy of Home Science & it's scope **CO4:** To understand Home Science Extension Objectives and Characteristics **CO5:** To learn Rural Sociology - Meaning of sociology and Rural Sociology, Scope of Rural Sociology **CO6:** To know Rural Society - Characteristics of Rural Society, rural social groups, Classification of Social groups. **CO7:** To know Social Problems, studying social problems. **CO8:** To understand Social Problems like poverty, Problems of population explosion, Caste tension, Problem of Unemployment, Poor Health & sanitation, Problems of tribal and solutions to the problems faced.
PAPPER-VI: ECOLOGY AND ENVIRONMENT-I	**CO1:** To get acquainted with the physical environment and its components. **CO2:** To know the methods to protect the environment and conserve natural resources **CO3:** To know the ecosystem, ecology, food chain, food web and ecological pyramids. **CO4:** To get acquainted with various biogeochemical cycles, like oxygen cycle, carbon cycle, nitrogen cycle, hydrological cycle, etc. **CO5:** To know the renewable and non-renewable natural resources, national parks and sanctuaries and conservation of wild life. **CO6:** To know the various types of pollutions and its control measures.
Lab Work:	• To understand the determination of hydrogen ion concentration (pH) and DO • To study the estimation of acidity and chlorosis of water • To get acquainted with the lay-out and plan of a garden
PAPER-VII: BASIC CHEMISTRY-I	**CO1:** To know the importance of pure water, impurities present in water, sources of water pollution, ions responsible for hardness of water **CO2:** Methods used for purification of water for domestic purpose and commonly used methods are sterilization: boiling, chlorination **CO3:** To understand the use of Alloy: Classification of alloy (ferrous and Non-ferrous), purpose of making an alloy **CO4:** To gain knowledge of Effect of alloying various elements on properties of steel, composition and uses of stainless steel and brass. **CO5:** To know how to prepared Solutions during practical's: Types of solutions, different ways of expressing concentration of

	solution (equivalent weight, molecular weight, normality and molarity) **CO6:** To understand Physical Properties of Liquids: Surface tension (definition, determination of surface tension by Stalagmometer method). Viscosity (definition, determination by Ostwald‟s Viscometer). **CO7:** To gain knowledge about the Colloids: Definition, types of colloidal systems, Types of colloidal solution, methods of preparation, properties (Tyndall Effect, Brownian Movement, Electrophoresis, Electro-osmosis) and colloids in daily life (applications) **CO8:** To know the Emulsion and gel: definition, types, methods of preparation, properties and its applications.
Lab Work:	• To know the • Types of analysis used in chemistry analysis • A) Volumetric analysis: 1. Single acid base titration, Determine the Normality and weight per litre 2. Determination of total and permanent hardness of water by EDTA titration. B) Physical Experiments 1) Determination of viscosity of given liquid by Ostwald‟s Viscometer. 2) Determination of Surface tension of given liquid by Stalagmometer. 3) Preparation of colloidal solution of starch
Paper –VIII: Applied Physics and Basic Computer-I	**CO1:** Measurements, system for measurements, basic concepts and least count of any instrument, scalar and vector quantities. **CO2:** To know the fundamental and derived quantities and their units. **CO3:** Basic Newtonian mechanics, concept of centripetal and centrifugal forces and their uses. **CO4:** Concept of friction and related applicability. **CO5:** Computer basics and its characteristics. Unit of memory, working of individual computer peripherals and related concepts.
Paper-IX: English and Communication Skills	**CO1:** To prepare the students to communicate effectively and fluently in English. **CO2:** To enable students listening, speaking reading and writing. **CO3:** To strengthen grammatical accuracy **CO4:** To prepare the students to deal with customers, professional, counselors in correct grammatical, idiomatic English. **CO5:** To provide personality development training through situational role play, interview techniques, group discussions, seminar presentation etc.
Course Outcome for Semester-II	
PAPER-I: FUNDAMENTALS OF FOOD SCIENCE AND	**CO1:** To study Vitamins - Classification of Vitamins **CO2:** To learn Fat Soluble Vitamins: Functions, Sources and Deficiency

NUTRITION-II	**CO3:** To learn Water Soluble Vitamins: To study their Functions, Sources and Deficiency **CO4:** To study Minerals, Functions, Sources and Deficiency **CO5:** To learn about Major Mineral and trace elements **CO6:** Learn functions of water in human body, water balance, sources of water, effect of dehydration and its prevention. **CO7:** Methods of Cooking: Objectives of cooking food, advantages of cooking food, different cooking methods and different cooking media and effect of different cooking methods on nutritive value of food
PAPER-II: DEVELOPMENT IN EARLY YEARS	**CO1:** Concept of Early years of child development as important years of life, Infancy stage of development - students understand the terms development tasks &milestones in reference with different developmental aspects. **CO2:** Students gain the knowledge of the growing capacities of infants and the overall developmental changes. **CO3:** Students gain the knowledge of norms and associated changes in physical, social, cognitive, language, emotional, intellectual capacities with change in moral aspects. **CO4:** Students gain the concept of ECCE, objectives and importance cognitive & language growth and conditions facilitating for healthy growth & development.
PAPER-III: SEWING TECHNIQUES	**CO1:** To understand the importance and necessity of various construction techniques for different fabrics. **CO2:** To acquire knowledge the skills to apply those construction techniques in a sample from. **CO3:** To acquire knowledge and skill regarding stitching techniques for various garment components such as plackets, pockets, cuffs, collars and fasteners which are ultimately used for stitching of any garments. **CO4:** To learn different fashion accessories like headgears, footwear, Handbags. **CO5:** To study types and use of jewelry.
PAPER-IV: INTERIOR DECORATION & DESIGN	**CO1:** Develop skill in using colour to create different effects in pace, with the use of various colour schemes. **CO2:** Gain knowledge of flowers / floral decoration and arrangement. **CO3:** Development of efficient and cost-effective room and floor plans that meet the needs of residential and/or commercial clients. **CO4:** Create a space that is stylish and is comfortable. A functional space that ticks off the ergonomic requirements of us and also looks pleasant. **CO5:** Learners will develop skills that will enable them to plan or assist in the planning of their own living space area and décor, or may provide a foundation for a career in this field.
PAPER-V: SOCIALSURVEY AND COMMUNITY	**CO1:** To learn about History of Community Development **CO2:** To understand elements of community development: Role of community development worker **CO3:** To know Community development programmes:

DEVELOPMENT	Shriniketan rural reconstruction Gurgaon experiment & Etawah pilot project b) Indian village service **CO4:** To understand the term Social Survey & its importance **CO5:** To gain knowledge regarding Social Research. **CO6:** To learn Gender and Development meaning of Sex ratio. **CO7:** To understand Poverty Alleviation Programmes: Efforts taken by Government agencies. **CO8:** To understand eradication of poverty-a) National Rural Health Mission b) Integrated Child Development scheme
PAPPER-VI: ECOLOGY AND ENVIRONMENT-II	**CO1:** To know the development of gardens and nurseries, its importance and entrepreneurship. **CO2:** To study the different ornamental plants used in gardens, nurseries and kitchen gardens **CO3:** To study the different plant propagation techniques and garden implements & accessories **CO4:** To know the method of vermiculture and vermicomposting
Lab Work:	• To get acquainted with methods of gardening and methods of plant propagation • To study the technique of mushroom cultivation and vermicomposting.
PAPER-VII: BASIC CHEMISTRY-II	**CO1:** To know which type of Fuels: Definition, classification, characteristics of good fuel, calorific value, preparation of Gober gas. **CO2:** To know the concept, importance, and process of Crude petroleum and its refining by fractional distillation, cracking of petroleum, composition and application of LPG, Precautions while using LPG **CO3:** To Know Acid and base: Concept of acid, base and salt, (Arrhenius theory and Lowry and Bronsted Theory), Conjugate pair, neutralization reaction. **CO4:** To know pH and pH scale, (Numerical on pH scale) Buffer solution and its applications in everyday life. **CO5:** To know Organic Compounds: Definition, saturated and unsaturated hydrocarbon, classification of organic compounds based on their structure and functional groups. Definition of alkane, alkene and alkyne with examples. **CO6:** To Understand Homologous series, IUPAC nomenclature of alkane, Laboratory preparation, chemical properties and uses of methane and ethylene. **CO7**: Corrosion: Definition, atmospheric corrosion (Corrosion by oxidation and by other gases). Factors causing atmospheric corrosion, **CO8:** Methods for protection of metals from corrosion (Galvanizing, tinning and electroplating).
Lab Work:	• To estimate the Haemoglobin percentage. • To understand the life cycles of parasites. (*Entamoeba histolytica*, Roundworm, *Plasmodium vivax* and *Plasmodium falciparum*, *Wuchereria bancrofti*)

Paper-VIII: Applied Physics and Basic Computer - II	**CO1:** Concept of basic electricity, ohm's law, resistance measurements in different combinations, simple calculations therein. **CO2:** Light and electromagnetic wave. Concept of reflection, refraction and absorption, Physical phenomenon related to natural phenomenon such as reflection, transparency, opaqueness etc. **CO3:** Lens and related optics, use of these principles for human eye assistance. **CO4:** X-rays, their principle, generation and applicability. Harmful radiations such as alpha, beta and gamma rays, their characteristics and properties including their applicability. Computer hardware and peripherals of computer system with details of different types of printers.
Course Outcome for Semester-III	
PAPER-I: COMMUNITY NUTRITION	**CO1:** To understand malnutrition, its types, causes, symptoms, prevalence and nutritional problems due to malnutrition. **CO2:** To understand the basic principles of nutritional assessment as applied to the study of community nutrition. **CO3:** To understand the role of National organizations and international organizations (ICAR, ICMR, NIN, CFTRI) and (FAO, WHO, UNICEF, CARE) in community nutrition and health. **CO4:** To understand the importance, objectives and methods of evaluation of nutrition education. To know the problems and develop solutions in organizing nutrition education programme. **CO5:** To become familiar with the ongoing schemes and programmes for combating nutrition-related problems in the country – National Nutrition Programme. **CO6:** To develop an understanding of the principles underlying Food Preservation, Food Fermentation, Leavening Agents and Food Additives.
PAPER-II: DEVELOPMENT IN LATE CHILDHOOD AND ADOLESCENCE	**CO1:** Students learn the significant Developmental Changes & aspects of development in terms of Physical attainments, Motor Skills, Changing CO1: Emotions with importance of Emotional self-regulation, changes in self-concept & importance of Self Esteem, need for attaining basic growth &building self-confidence through their capacities they master during Childhood. **CO2:** Students also learn the media with its influence on child's development. Relationships within family & outside influencing the child & his potentialities **CO3:** Students learn the pattern of cognitive & language growth within the conditions & factors facilitating development & theoretical implications & perspective supportive to it. Students gain the growth in terms of morality & moral reasoning acquired during this phase of life. **CO4:** Students learn the physical changes that occur during the

	Puberty phase of life & the effect of puberty changes. They learn the term & meaning of Adolescence with the growth spurt during this period of life & concepts like attaining Physical maturity Sexual maturity & Adolescent as a transitional Period. Need of Sex Education. **CO5:** Students learn the pattern of changes in respect to intellectual growth, Cognitive abilities, creative accomplishments & factors for developing creative mind. Adolescent and language accomplishments, also the concept of need of identity, search for identity with parental & factors to determine it. Students get to understand the importance of healthy parent adolescent relationships, Peer relations & it's positive advantages & adjustments.
PAPER-III: TEXTILE DESIGN	**CO1:** Study natural dyes and its importance **CO2:** Study synthetic dyes and their uses **CO3:** Study methods of dyeing **CO4:** Study common dyeing defects their remedies **CO5:** Study dye application **CO6:** Study the concept of dyeing and printing, Study different methods of printing, Study common printing defects and remedy **CO7:** Study preparation of cloth for printing, Study after treatment of printing goods. **CO8:** Study paint textile of India &Study traditional print textile of India **CO9:** Study traditional woven textile of India, Study techniques used in woven textile, Study colour, yarn and motif used in a saree & shawls of India. **CO10:** Study costumes of different states of India. **CO11:** Study draping style of traditional costumes of India.
PAPER-IV: **HOUSING AND INTERIOR DECORATION**	**CO1:** Learners understand regarding housing needs, Principles, Planning of house **CO2:** Experimenting with space, Preparing house plans. **CO3:** Develop graphic skills to express ideas in design, forms, and economic use of space. **CO4:** Implement Decision about applicable design principles in Interior Decoration. **CO5:** Implement decisions about Furniture selection and arrangement in available space.
PAPER-V: EXTENSION COMMUNICATION TECHNIQUE	**CO1:** To understand Extension teaching: Definition of extension teaching, principles of extension teaching. **CO2:** To know Extension teaching process: Teaching plan, Role of teacher in different levels, **CO3:** To study Extension learning process: Definition of extension learning, Learning experience, **CO4:** To gain knowledge on Psychology of learning Types of learning. **CO5:** To know Extension teaching methods **CO6:** To gain Approaches in Extension: Meaning, Strong and weak points of interpersonal.

	CO7: To study Interpersonal approach: Home visit, office call, personal letter and telephone. **CO8:** To understand Art of Presentation: Meaning, five basic steps of presentation and equipment ofcampaign work. **CO9:** Devices useful for effective communication: Over Head projector, opaque projector, DVD, LCD.
PAPER-VI: APPLIED PHYSIOLOGY	**CO1:** Students are able to get knowledge of the cell structure and function, histology, gross anatomy, and physiology of several organ systems. **CO2:** Students are able to understand structure and function of various organs and organ systems like nervous system of human body. **CO3:** It provides basic knowledge of first aid.
Lab Work:	• Students are able to know about bones and joints • Application of triangular bandage and roller bandage. • Artificial respiration
PAPER-VII: APPLIED CHEMISTRY	**CO1:** To know Carbohydrates: Definition, classification, open chain structure of glucose and fructose. **CO2:** To know Manufacture of cane sugar, optical isomerism of asymmetric carbon atom, plane polarised light, dextro and leavo rotatory compounds. **CO3:** To know Fermentation: Definition, ideal conditions for fermentation, application of fermentation. **CO4:** To know Preparation of vinegar and ethanol by fermentation process. **CO5:** To know Oils and Fats: Definition, difference between oils and fats, saponification value, iodine value, rancidity and hydrogenation of oils, refining of edible oil, naturally occurring fatty acids (saturated and unsaturated), essential and non-essential fatty acids. Omega names of MUFA and PUFA. **CO6:** To know Soap and Detergents: Definition, types of soap, Industrial method of preparation of soap, cleansing action of soap. **CO7:** To know Difference between soap and detergents, composition of detergent., Liquid detergents.
Lab Work:	• Preparations of cosmetics: i) Shampoo (Simple and herbal) ii) Perfumes • Preparation of dyes and drug: • Methyl salicylate from salicylic acid. • Orange dye from beta naphthol and aniline or p- toluidine compare the cleansing action of detergents/ shampoo by Stalagmometer • To know How to use of physical balance. • Preparation of standard solution for titration. Identification of Carbohydrates: Glucose, fructose, sucrose and starch • Determination of total fatty acid present in given sample of soap. • Determination of total alkali present in given sample of soap

Paper-VIII: APPLIED PHYSICS AND COMPUTER APPLICATIONS-1	**CO1:** To learn about electricity related basic parameters, electrical safety and related devices. **CO2:** Principle of heat, its conduction, Conversion of electricity into heat, heat-based appliances. **CO3:** Computer system and its operating, word processing software (MS WORD) and database creation and management software (MS EXCEL)
Course Outcome for Semester – IV	
PAPER-I: COMMUNITY NUTRITION	**CO1:** To learn principles of meal planning. To plan and calculate balanced diets for family members **CO2:** Concept of RDA, Recommended set- up, Reference persons and RDA **CO3:** Principles and advantages of meal planning Diet planning with reference to special individual requirements **CO4:** Nutrition during adulthood: a) Balanced diet for adult man and women. b) Nutritional requirements c) Dietary guidelines for adults **CO5:** To know Nutrition during pregnancy and lactation a) Physiological changes during pregnancy b) Desirable weight gain c) Nutritional requirements and their importance d) Diet during pregnancy e) Dietary guidelines for pregnancy **CO6:** Nutrition during infancy: a) Growth and development during infancy and Nutritional requirements b) Advantages of breast feeding **CO7:** Importance of Weaning & Supplementary foods **CO8:** Understand Nutrition during: 1. Preschool children 2. School going children, a) Growth and development b) Nutritional requirements c) Dietary guidelines for children **CO9:** Nutrition during Adolescence: a) Growth and Development during adolescence b) Nutritional requirements c) Dietary guidelines for adolescent **CO10:** Geriatric nutrition
PAPER-II: DEVELOPMENT IN ADULTHOOD	**CO1:** Concept of who is an adult? adulthood stage - biological and physiological perspective, diversity in adult lifestyle, cultural variations in roles & expectations **CO2:** Adult life span changes namely physical & cognitive. adult development of self-identity – psycho-social changes within the framework of work, career, parenthood, family marriage. **CO3:** Middle age changes concept of physiology; health. cognitive changes in cognitive skills, middle age as time of crisis students understands the importance of age as age of

	generativity, expertise and experience. concept of aging-approaching retirement, changes and adjustment needed. society and community attachment with an effective social role. **CO4:** Concept of aging, demographic status, sensitizing towards age related issues and adjustments. importance of recreation and wellness in late adulthood. understanding age specific needs: specific problems of elderly concept of retirement homes and dwelling. **CO5:** Governmental policies and welfare schemes for senior citizens
PAPER-III: SURFACE ORNAMENTATION TECHNIQUES	**CO1:** Study natural dyes and their importance, study of synthetic dyes and their uses. **CO2:** Study methods of dyeing **CO3:** Study common dyeing defects their remedies. **CO4:** Study dye application **CO5:** Study the concept of dyeing and printing. **CO6:** Study different styles of printing. study different methods of printing. **CO7:** Study new methods of printing. **CO8:** Study common printing defects and remedy. **CO9:** Study preparation of cloth for printing. **CO10:** Study types of printing used in printing **CO11:** Study after treatment of printing goods. **CO12:** Study painted textile of india. **CO13:** Study traditional printed textile of india. **CO14:** Study traditional woven textile of india. **CO15:** Study techniques used in woven textile. **CO16:** Study colour, yarn and motif used in sarees, shawls of india. **CO17:** Study costumes of different states of india. **CO18:** Study draping style of traditional costumes of india.
PAPER-IV: HOUSING AND HOME FURNISHING	**CO1:** Implement decisions about housing and furnishings. **CO2:** Learner gain knowledge about the role of internal amenities in contributing for satisfying family living. **CO3:** Learn techniques that will help one to construct some furnishing items, relative to their function and decorative purposes. **CO4:** Learn concept of natural and artificial lighting in relation to housing and its plan. **CO5:** Learn concept of waste management and its techniques.
PAPER-V: MEDIA IN EXTENSION	**CO1:** To understand communication techniques **CO2:** To gain knowledge on mass communication andmedia. **CO3:** To know media in extension: meaning of media,electronic media, print media, and folk media. **CO4:** To study electronic media: radio as mass medium, **CO5:** To learn print media - types of print media, impactof print media **CO6:** To gain knowledge on folk media. folk forms as mass media, Indian folk forms.

	CO7: To understand advertisement as mass media. **CO8:** To gain knowledge journalism in extension.
Paper-VI: APPLIED PHYSIOLOGY-II	**CO1**-Students get knowledge about structure and function of heart, valves blood vessels **CO2**-students are able to understand about digestive system, respiratory system and excretory system **CO3**-students also know about endocrine system and reproductive system.
PAPER-VII: APPLIED CHEMISTRY-II	**CO1:** To know Polymers: Definition, addition and condensation polymerization, preparation and uses of polyethylene, PVC, Nylon-6, Nylon-66 and polyester. **CO2:** To know Rubber: Definition, chemical nature and vulcanization, synthetic rubber (Buna-S) and uses. **CO3:** To understand, Textile Chemistry: Definition, Requisite of a true dye, Types of fibres: structure features of fibres (Cotton, wool, silk, cellulose acetate, polyaminde, polyesters), Basic operations in dyeing process (preparation of the fibre, preparation of dye bath, application of dye and finishing), Various methods of dyeing (direct dyeing, vat dyeing, Mordant Dyeing, and disperse dyeing). **CO4:** To know Witts theory of colour and constitution, classification of dyes based on their functional group- i) Nitro ii) Nitroso and iii) Azo, pollution problem due to dye industry **CO5:** To know Cosmetics: Definition, functions and ingredients of shampoo, face powder, cold cream, lipstick, hazards of cosmetics. **CO6:** To Know Drugs: Preparation and uses of following drugs: i) Aspirin ii) Paracetamol and iii) oil of winter green. **CO7:** To know Essential oils: Definition, occurrence and methods of extraction of essential oils. Eucalyptus oil, Rose oil, Lavender essential oil **CO8:** To know Perfumes: Definition, characteristics of perfume, composition of perfumes, formulation of any two perfumes.
Lab Work:	• Titration of strong acid vs strong base (Acid-base double titration) • Determination of pH of different solutions by using pH paper Detection of functional group Acids, Alcohols, Aldehydes and Ketones. • Preparation of acidic and basic buffer solution
Paper-VIII: APPLIED PHYSICS AND COMPUTER APPLICATIONS-II	**CO1:** To learn about electricity, effects of electric current, electromagnetism principle and devices based on it such as transformer and motors, their working. **CO2:** Motor based electrical appliances, chemical effect of electric current, conversion of chemical energy into electric energy, batteries and electrochemical platting. **CO3:** MS power point and internet related knowledge.
Course Out Come for Semester - V	

PAPER-I: DIET THERAPY- I	**CO1:** To provide knowledge about causes And Symptoms Of Various diseases. **CO2:** Understand the role of diet. **CO3:** To plan, calculate and prepare diets for various diseases, to learn principles of diet therapy **CO4:** Diet counselling, role of dietician in health care, dietetic care in hospital patients and its importance, Understanding of therapeutic adaptations of the normal diet: A) Soft Diet B) Clear Liquid Diet C) Liquid Diet D) Bland Diet E) Low Fibre Diet F) High Fibre Diet To understand modes of feeding: A) Enteral B) Parental **CO5:** To know concept of weight management: overweight and obesity causes, symptoms and principles of dietary management of overweight and obesity, concept of underweight **CO6:** Understanding and importance of various gastrointestinal disorders -dietary management of gastro-intestinal disorder, peptic ulcer, diarrhoea, constipation & ulcerative colitis **CO7:** Liver disorders and gall bladder disorders: dietary disorders – viral hepatitis, liver cirrhosis, hepatic coma
PAPER-II: FAMILY DYANAMICS AND DEVELOPMENTAL ASSESSMENT	**CO1:** Students learn the concept of marriage, changing concept of marriage, forms of marriage, eugenics and other considerations in mate selection. Concepts like preparation and readiness for marriage. Pre-marriage Counseling – Need and Importance. **CO2:** Family as a nuclear unit of society. Changing trend, changing concept of family in terms of structure, constitution, roles, demands and responsibilities, students become aware of functions and conceptualize the need of healthy interpersonal relationships, parental techniques, rearing pattern, need of child disciplinary methods. Students are trained to understand the possibilities of crisis situation within a family with a need to crisis resolution. Students learn the expected adjustments within the family stage namely establishing, expanding and contracting stage. **CO3:** Students acquire the knowledge of assessment, need and purpose along with the concept of developmental milestone as benchmarks to development. Acquire the skills to perform certain tests understanding tools techniques of infant testing need of neurological assessment; need for assessing auditory & visual impairment. **CO4:** Students get acquainted with the need of role of early stimulation developmental activities for raising social, cognitive, emotional physical motor skills, language behavior. Home intervention; concept of early intervention in developmental delay. Ngo's and governmental level programmes, policies of early stimulation (birth to six years of age) with its application for normal and children with special needs.

PAPER-III: ADVANCE PATTERN MAKING	**CO1:** Develop skilled pattern making **CO2:** Study commercial pattern envelope **CO3:** Study important marking in pattern making. **CO4:** Study different layouts and their uses. **CO5:** Methods of fabric estimation. **CO6:** Study different methods of pattern designing. **CO7:** Study grading, its principles. **CO8:** Study draping and its importance in designing. **CO9:** Study different layouts and their uses. **CO10:** Study flat pattern and its uses. **CO11:** Study darts and its manipulation and methods. **CO12:** Study types of figures and its defects. **CO13:** Study principles of design and its effect. **CO14:** Study of fitting problems and their remedy. **CO15:** Study of different texture on different type of figure. **CO16:** Study different plackets and its application. **CO17:** Study skirts and waist band its application. **CO18:** Study collars, classification and types. **CO19:** Study different fabric construction techniques. **CO20:** Designing garment by using different types of fabric.
PAPER-IV: ADVANCED RESOURCE MANAGEMENT II	**CO1:** Learners gain knowledge about different types, scope, role and Management of resources in relation to Human Life. **CO2:** Learners recognize the importance of wise use of resources in order to reach personal and family goals. **CO3:** Learners understand the importance of motivating factors in management –values, goals and standards. **CO4:** Develop ability to take rational decisions. **CO5:** Develop the ability to evaluate the management efficiency and effectiveness in the family and other organizations.
PAPER-V: PROGRAMME PLANNING & BUILDING IN EXTENSION	**CO1:** To learn Program planning for extension work. **CO2:** To study Program building in extension **CO3:** To understand Community organization: **CO4:** To gain knowledge about innovations in communication, The SMCRE model, Diffusion, Relation between Communication **CO5:** To learn Innovation Decision Process, Innovativeness, and stages involved in adoption process. **CO6:** To gain knowledge on Information from communication media. **CO7:** To understand Group Mobilization, Definition of social groups, occasions of group association, groups in rural communities. **CO8:** To understand the concept of change agent, Meaning & traits of change agents, role of change agents.
PAPER-VI: NUTRITIONAL BIOCHEMISTRY-I	**CO1:** Develop an understanding of the principals of biochemistry (as applicable to human nutrition) **CO2:** Obtain an insight into the chemistry of major nutrients like carbohydrates, proteins and lipids and physiologically important compounds.

	CO3: Understand the biological processes and systems as applicable to humannutrition. **CO4:** Understanding the basic Sources, structure, physical properties and uses of macro nutrients **CO5:** To know about the importance of nucleic acids, Structure of a mononucleotide. Bases found in nucleic acids. Difference between RNA and DNA and their functions. Structures of DNAs & RNAs and also understanding the concept of Base pairing rule. **CO6:** Apply the knowledge acquired to human nutrition and dietetics **CO7:** To understand the concept of High Energy compounds ATP & ADP **CO8:** To understand the aspects like Inborn errors of metabolism like Sickle cell anemia &Gout.
Lab Work:	• To know the color reactions of carbohydrates and proteins • To understand the procedure of Preparation of Potato Starch andidentify with solubility test and color Reactions • To understand action of Ptyalin (Salivary Amylase) on Starch.
PAPER-VII: HEALTH SCIENCE AND HYGINE	**CO1:** To understand the concepts of Infection, contamination, host, communicable and non-communicable diseases, source of infection, and Incubation period. **CO2:** To know the types of communicable and non-communicable diseases. **CO3:** To understand the modes of transmission of disease- Direct and Indirect. **CO4:** To gain knowledge of measures taken for the prevention and control of diseases. **CO5:** To understand the aims, objectives, principles of Health Education and to know the role of communication in Health Education **CO6:** To understand the concepts of disinfection, sterilization, disinfectant, antiseptic, and deodorant and to know about the types of disinfectants. **CO7:** To gain knowledge about the principles and work of WHO and UNICEF. **CO8:** To understand the implication of drug addiction, Narcotics, Alcoholism, smoking, their control, and prevention. **CO9:** To understand the definition, necessity, advantages, and methods of family planning. **CO10:** To understand the concepts of Birth rate, Death rate, and Census. **CO11:** To understand the various aspects of Geriatrics
Lab Work:	• To know the different commonly used insecticides and disinfectants. • To identify and determine the count of different blood cells.

Course Outcome for Semester - VI	
PAPER-I: DIET THERAPY-II	**CO1:** Dietary management in a) Fever b) Anaemia c) Surgery d) Burns e) Cancer f) Food Allergy **CO2:** Diabetes Mellitus: dietary management of diabetes mellitus a) Role of diet in the management of IDDM and NIDDM b) Complications of diabetes mellitus **CO3:** Food exchange list-use of food exchange list in meal planning of diabetic people, hypertensive people **CO4:** Dietary management of coronary heart diseases **CO5:** Renal Disorders - dietary management in special conditions
PAPER-II: CARE AND WELL BEING IN HUMAN DEVELOPMENT	**CO1:** Students understand the relevance of care & concept of holistic well-being understand the need of care giving for attaining wellness with special attention to vulnerabilities (age specific). How to draw meaning of subjective wellbeing? its implication in understanding quality of life. **CO2:** Students are taught the need to understand Critical Issues in Infancy period, childhood adolescence. concept of wellness with the role & importance of health care, nutritional psychological counseling. **CO3:** Concept of care & well-being in adulthood with understanding the needs of elderly concept of wellness at different stages of work domains in adulthood, health care. **CO4:** Students acquire the need of facilities provisions & amp; policies at community, state and national level for promoting wellbeing. Important need-based health programme for the holistic approach to wellbeing under the broad spectrum of care
PAPER- III: FASHION DESIGING	**CO1:** Study fashion terminology **CO2:** Fashion movement **CO3:** Study theories of fashion adoption, trends in India. **CO4:** Study fashion classification, fashion cycle. **CO5:** Study factors influencing fashion. **CO6:** To learn process of fashion design **CO7:** To know the origin of fashion and clothing theories. **CO8:** To study clothing theories. **CO9:** To study different silhouettes in fashion. **CO10:** To know international fashion centers and fashion categories. **CO11:** To study fashion leaders, followers. **CO12:** To learn role of clothing in social, cultural scenario. **CO13:** To know the clothing and gender differentiation. **CO14:** To study different departments in apparel production and their working **CO15:** To know the marketing and merchandizing of fashion **CO16:** To study fashion forecasting. **CO17:** To learn different style and methods of fashion advertisement.
PAPER-IV: ADVANCED	**CO1:** Learners develop ability to manage various resources. Developing ability to apply management principles in

RESORCE MANAGEMENT-II	experimental house and in day today life experience and various small events. **CO2:** Learn the concept and application of entrepreneurship skills in Management. **CO3:** Learners develop ability to apply work simplification techniques. **CO4:** Creating awareness regarding intelligent choices of consumer goods.
PAPER-V: COMMUNITY DEVELOPMENT AND MANAGEMENT	**CO1:** To understand leadership in extension, motivation for extension work, to study extension training, to understand the concept of coordination in extension work. **CO2:** To gain knowledge regarding community development, Participatory Approach in community development, To understand Extension Administration **CO3:** To gain knowledge on Extension monitoring evaluation Meaning of monitoring evaluation.
PAPER-VI: NUTRITIONAL BIOCHEMISTRY-II	**CO1:** To understand the concept of Anabolism and Catabolism & its relation tonutrition. **CO2:** To know the concept of Carbohydrate, protein and lipid Metabolism**:** Absorption, transport and assimilation. **CO3:** To introduce definition and significance of intermediary metabolism like Glycolysis, Kreb's cycle (Detail process of energy and energetics), Glycogenesis and Gluconeogenesis **CO4:** To understand the concept of blood sugar regulation: hypoglycemia, hyperglycemia and renal threshold andGlucose Tolerance Test **CO5:** To introduce, definition, process and importance of: Transamination, Oxidative Deamination and Urea Formation. **CO6:** To know the classification of Enzymes according to IUB system. Effect of temperature and pH on the activity of enzymes. **CO7:** To understand the concept of Lipidprofile (Cholesterol, Bile acids, Triglycerides) & Health status. **CO8:** To know the definition of: Lipogenesis and Hyperlipidemia. Formation of Ketone bodies in diabetics. Elementary idea of Beta Oxidation.
Lab Work:	• To know the color reactions ofcarbohydrates and proteins • To understand the procedure of Preparation of Potato Starch and identify with solubility test and colorReactions • To understand action of Ptyalin(Salivary Amylase) on Starch.
PAPER-VII: PUBLIC HEALTH	**CO1:** To understand the basic concept, structure, and classification of bacteria and viruses. **CO2:** To know the concept, importance, and process of Gram Staining. **CO3:** To understand aspects like etiology, diagnosis, treatment, and prevention of non-communicable diseases – Diabetes mellitus and Nephrotic Syndrome **CO4:** To know the aspects like the causative agent, mode of transmission, epidemiology, diagnosis, treatment, prevention,

	and control of communicable diseases - Hepatitis, Cholera, Typhoid, Dysentery, Tuberculosis, Poliomyelitis, Measles. **CO5:** To understand the aspects like the causative agent, mode of transmission, epidemiology, life cycle, diagnosis, treatment, prevention, and control of parasitic infections (Amoebiasis & Ascariasis) and diseases spread by insects (Malaria & Filaria). **CO6:** To understand the classification and mechanism of immunity. **CO7:** To understand the concept of vaccines and to know the routine immunization schedule. **CO8:** To understand antibiotics and their classification
Lab Work:	• To understand the morphology and structure of different microorganisms- *Staphylococci, Streptococci, Mycobacterium Tuberculosis, E. coli*, Malarial Parasite, Filarial Parasite. • To know about the physical & chemical examination of Urine. • To estimate the Haemoglobin percentage. • To understand the life cycles of parasites. (*Entamoeba histolytica, Roundworm, Plasmodium vivax* and *Plasmodium falciparum, Wuchereria bancrofti*)

MATHEMATICS

PROGRAM OUTCOME FOR B. SC. MATHEMATICS

Department of Mathematics	After successful completion of three years degree program in the subject Botany the students are able to:
Program Outcomes	**PO1:** To develop creative and critical thinking. **PO2:** To develop effective communication. **PO3:** To build strong leadership qualities and develop team spirit. **PO4:** To learn to become better and effective citizens of the country. **PO5:** To develop moral maturity and ethical behavior. **PO6:** To learn about the environment and sustainability process. **PO7:** To self-direct a life-long learning system. **PO8:** To learn knowledge application. **PO9:** To learn analytical, scientific reasoning and problem solving. **PO10:** To gain Information / Digital Literacy.
Program Specific Outcomes	**PSO1:** Construct mathematical arguments, proofs and develop mathematical as well as analytical thinking **PSO2:** Critically interpret numerical data, graphical data and develop models **PSO3:** Apply mathematical knowledge to a career and research related to mathematical sciences PSO4: Apply critical thinking skills to solve problems which can be modelled mathematically.
Course Outcomes B. Sc . Mathematics	
Course Outcome for Semester-I & II	
Sem. I & II Paper-I: Algebra & trigonometry, Differential and difference equations	**CO1:** Understand the applications of De Moiver's theorem, properties of groups and subgroups **CO2:** Learn basic properties of first order, higher order differential equations and solve them with different methods. **CO3:** Understand to find unknown solution by using known solution, the formation of difference equation, solution of homogeneous and non-homogeneous linear equation. **CO4:** Understand the concepts of rank, Eigen values of matrices, solution of homogeneous and non-homogeneous system of equations.
Sem I & II Paper-II: Calculus, Vector calculus & improper integrals	**CO1:** Understand basic properties of limit, continuity and derivability of functions, expansion of functions in terms of infinite series by using different methods. **CO2:** Find indeterminate forms and partial differentiation of functions with two or more variables **CO3:** Understand basics of directional derivatives, gradient, divergence and curl **CO4:** Evaluation of double and triple integral, improper

	integrals and their convergence.
Course Outcome for Semester-III & IV	
Sem III & IV Paper-I: Advanced calculus, Partial Differential equations & calculus of variations	**CO1:** Understand concept of limit and continuity of functions of two variables, application of Mean value theorems **CO2:** Study of convergence, divergence of sequences and series using various tests. **CO3:** Understand ordinary differential equation in more than two variables and methods of finding solution **CO4:** Study Lagrange's method, Charpit's method, Jacobi's method to solve PDE, homogeneous and non-homogeneous PDE with constant coefficients
Sem III & IV Paper-II: Differential equations & group homomorphism, Mechanics	**CO1:** Understand basic properties of Laplace transforms, inverse Laplace transforms and solution of ordinary differential equation using Laplace transform. **CO2:** Study of group homomorphism, isomorphism in details. **CO3:** Understand kinematics in two dimensions, mathematical exposition and geometrical representation of simple harmonic motion. **CO4:** Study mechanics of system of particles and Lagrange's equations.
Course Outcome for Semester-V & VI	
Sem V & VI Paper-I: Analysis, Abstract algebra	**CO1:** Study Fourier series and it's convergence, existence of Riemann-Stieltjes integral, construction of analytic function, harmonic function etc. **CO2:** Understand conformal mapping, bilinear transformation. **CO3**: Study Group automorphism, inner automorphism, vector spaces and it's properties, subspaces, basis, dimensions etc. **CO4:** Understand algebra of linear transformation and its inverse, matrix associated with linear map and vice versa, properties of inner product space.
Sem V & VI Paper-II: Metric space, complex integration & Algebra, Special theory of relativity	**CO1:** Understand concepts of countable, uncountable sets, completeness, compactness, connectedness of metric space. **CO2:** Calculation of zeros and different types of singularities of analytic function, application of Cauchy's residue theorem to evaluate integral. **CO3:** Study geometrical interpretation, group properties of Lorentz transformations and basics of tensors, metric tensors etc. **CO4:** Understand equivalence of mass and energy, transformation formulae for mass, momentum and energy, relativistic equations of motion, Maxwell's equations etc.

MICROBIOLOGY

PROGRAMME OUTCOME FOR B. SC. MICROBIOLOGY	
DEPARTMENT OF MICROBIOLOGY	**After successful completion of three years degree program in the subject Microbiology the students will be able to:**
PROGRAM OUTCOMES	**PO1:** Demonstrate laboratory skills applicable to Microbiological and Clinical methods including laboratory safety. **PO2:** Acquire skills for accurately reporting observations and findings through oral, written and digital formats. **PO3:** Apply the knowledge of microbiology from multiple fields to critically analyse and evaluate microbiological, environmental and health related issues and to create awareness and impact of microbiology outside the science community. **PO4:** Practice flexible professional skills needed for careers in microbiology & related professional and scientific fields like-Health sector, medical laboratory technology (MLT), Water testing labs, Dairy and food Industry as quality assurance and quality control professional etc, can opt for either post graduate study program, research, or for various competitive exams and professional courses. Exposure provided to the students during the add-on bioinformatics certificate course would help students gain awareness of career options in the software industry too. **PO5:** Students will be able to expand their learning horizons through use of multidimensional learning resources to keep themselves at par with the pace of scientific and research development worldwide.
PROGRAM SPECIFIC OUTCOMES	**PSO1:** The subject helps to gain knowledge about all types of microbial world, living as well as non-living, its harmful & useful interactions with human, animals, plants, bacteria and the environment **PSO2:** Students will be able to recognize structural & functional relationship of all living beings at molecular & cellular level. **PSO3:** They will get acquainted with importance of microorganisms as model systems in Genetics & Molecular Biology. **PSO4:** Students will be able to demonstrate basic microbiological techniques & acquire experimental and quantitative skills encompassing preparation of laboratory reagents, media, conducting experiments, handling different instruments, analysing samples& interpreting results.

COURSE OUTCOME FOR B SC MICROBIOLOGY	
Title of the Paper	**COURSE OUTCOME FOR SEMESTER -I**
Paper-I: FUNDAMENTALS OF MICROBIOLOGY (New Syllabus)	**By the end of this course, the students will be able to:** **CO1:** Get knowledge about basic branches of microbiology, they will understand the contribution of eminent scientists in the development of microbiology. **CO2:** Acquainted with the ultrastructure of bacterial cell, concepts of prokaryotic and eukaryotic cell's, their differences with examples. **CO3:** They will acquire the knowledge about nutritional requirements, classification of bacteria on the basis of nutritional habits. **CO4:** Learn about the growth of microbes, cell cycle and reproduction processes, various environmental parameters affecting their growth & different techniques used for their detection & quantification.
Paper-II: BASIC TECHNIQUES IN MICROBIOLOGY (New Syllabus)	**CO1:** Understand the basic principles and applications of various types of microscopic techniques. **CO2:** The students learn different techniques of Cultivation and preservation of bacteria, yeast and fungi. They are acquainted with various culture collection centres in India and abroad. **CO3:** Understand different staining techniques, role of reagent and dyes principles involved in these staining techniques. **CO4:** Get acquainted with various disinfectants, antiseptic and antimicrobial agents used in microbial control. They come to know about its mode of action and mechanism involved in microbial control.
Lab Work:	**By the end of this semester students will be able to demonstrate:** • Trained for handling various basic as well as advanced instruments used in microbiology laboratory. • Know about preparations of different types of media and methods to cultivate the microbes. • Able to demonstrate different staining procedures, stains & reagents used and microscopic observations of various types of bacteria. • Able to isolate different types of bacteria from samples of milk, water, soil etc. • Able to demonstrate sensitivity of bacteria to antibiotics, and UV radiation effect
COURSE OUTCOME FOR SEMESTER -II	
Paper-I: MICROBIAL	**By the end of this course, the students will be able to:** **CO1:** Know about the Prokaryotic microbial diversity with

DIVERSITY	examples, general characters & their life cycle. **CO2:** Get acquainted with Eukaryotic microbial diversity with examples, general characters & their life cycle. **CO3:** Understand the general characters, morphology and classification of viruses, mode of replication and methods of cultivation. **CO4:** Conceptualize various kind of positive and negative microbial interactions.
Paper-II: FOOD MICROBIOLOGY & MILK MICROBIOLOGY	**CO1:** Get acquainted with various food and milk products, their production techniques, various diseases caused, prevention of spoilage and its preservation. **CO2:** Gain knowledge about food safety and food standards
Lab Work:	**By the end of this semester students will be able to demonstrate:** • Demonstrate Slide culture techniques for the cultivation and study of mould. • Get Acquainted with SPC method to determine quality of food. • Learn to visualize under Microscope different characteristics of Fungi (*Aspergillus, Penicillium* and *Mucor*) Protozoa *(Plasmodium vivax, Trypanosoma* and *Amoeba*) & Algae (*Spirullina, Anabena* and *Euglena*), *Mycoplasma, Rickettsia* and *Chlamydia*. • Know the method of Coliform detection in food as per BIS. • Enumeration of total aerobic viable count from raw and pasteurized milk by serial dilution method. • Can demonstrate MBRT and Phosphatase test. • Know the technique to study the Effect of salt and sugar on microbial growth. • Demonstrate to find out MIC of preservative compound.
COURSE OUTCOME FOR SEMESTER III	
Paper-I: CHEMISTRY OF ORGANIC CONSTITUENTS AND ENZYMOLOGY (Old syllabus)	**By the end of this course, the students will be able to:** **CO1:** Acquire knowledge about classification of organic compounds like Carbohydrates and lipids and get acquainted with their structures and various bonds involved in them. **CO2:** Understand classification & structures of amino acids& proteins. **CO3:** Concept building about classification, structures and functions of enzymes, their mode of action and reaction mechanism. Understand steady state kinetics. **CO4:** Gain knowledge about nucleic acids, structures and their differences. Can describe importance of vitamins to human body and their deficiency syndrome.
Paper-II: INDUSTRIAL	**CO1:** Know the scope of industrial microbiology and

MICROBIOLOGY	screening methods used for isolation of industrially important microbes. **CO2:** Gain knowledge about different Fermenter configurations& designs. **CO3:** Scale up and DSP. **CO4:** Concept building about industrial production of SCP, Baker's yeast, ethanol, penicillin and semisynthetic penicillin, citric acid, Vit B12, beer and wine.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate and Identify carbohydrates and lipids from unknown samples. • Demonstrate enzyme activity by bacteria (amylase, catalase, gelatinase, lipase) • Estimate proteins, DNA and RNA by spectrophotometric method • Get knowledge and hands on training on- production of ethanol and methods of estimation. • Get acquainted with the isolation procedure of amylase producer from soil. • Demonstrate Leavening capacity of yeast and Immobilization of yeast for invertase activity.
COURSE OUTCOME FOR SEMESTER IV	
Paper-I: METABOLISM	**By the end of this course, the students will be able to:** **CO1:** Understand the general strategy of metabolism and conceptualize various metabolic processes operating in living cells. **CO2:** Gain knowledge about methods of DNA replication, models of replication, enzymes involved and Prokaryotic transcription process and mechanism. **CO3:** Acquainted with deamination processes, Urea cycle, glucogenic and ketogenic amino acids Genetic code and Prokaryotic translation **CO4:** Understand the mechanism by which energy is generated.
Paper-II: APPLIED MICROBIOLOGY	**CO1:** Get acquainted with multiple tube dilution technique, IMViC classification and understand the significance of bacteriological analysis of drinking water. **CO2:** Gain knowledge about various methods applied for treatment of water and waste water & understand the importance of disposal of industrial wastes and techniques used in its disposal. **CO3:** Understand the techniques of air analysis, various samplers used & methods involved. Know the role of soil microbes and methods involved in biofertilizer & biopesticide productions. Conceptualize PSB, mycorrhiza & microbial leaching process. **CO4:** Gain knowledge about Food spoilage, pathogens involved and methods of preservations. Food borne diseases and food intoxications.

Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate the techniques to isolate microbes from water and waste water. • Know the techniques to find out MPN, DO, COD, BOD, alkalinity of water and IMViC tests. • Understand the methods of chlorination of water and Chlorine demand. • Hands on Knowledge about MBRT and Phosphatase test
COURSE OUTCOME FOR SEMESTER V	
Paper-I: **MEDICAL MICROBIOLOGY**	**By the end of this course, the students gain knowledge about:** **CO1:** Concept building about various epidemiological concepts and definitions. Various modes by which infections spread in community, portal of entry& exit and their control. **CO2:** Microbial mechanism of Pathogenicity and virulence, exaltation and attenuation methods, MID, MLD, ID 50, LD50. **CO3:** Acquire knowledge about methods used in isolation and identification of various pathogenic organisms, based on their morphology, cultural characteristics, biochemical characteristics, serology and lab diagnosis. **CO4:** Understand the Basic principles of drug designing, the role of these drugs and antimetabolites in disease control.
Paper-II: **MOLECULAR BIOLOGY AND BIOINSTRUMENTATION**	**CO1:** Acquainted with various concepts – related to gene, different types of mutation and its regulation. **CO2:** Concept building about various processes by which gene transfer occurs amongst microbes **CO3:** Understand the principles, methodology and application of various bio instruments like spectrophotometer, electrophoresis, chromatography, centrifuge etc **CO4:** Get acquainted with Isotopic tracer technique and its applications.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate bacterial and plasmid DNA isolation techniques. • Gain knowledge and hands on training on restriction digestion technique. • Demonstrate spectrophotometrically creatinine estimation. • Demonstrate gel filtration, paper chromatography and TLC. • Knowledge and hands on training on isolation and identification of pathogenic bacteria (*E coli, S aureus, Salmonella, Proteus*).

COURSE OUTCOME FOR SEMESTER VI	
Paper-I: IMMUNOLOGY	**By the end of this course, the students will be able to:** **CO1:** Concept building about defensive mechanism of host against diseases, various terminologies used and definitions of epidemic, endemic, pandemic, nosocomial infection, zoonotic infection, vector, types and role of vectors, portal of entry portal of exit of pathogens. **CO2:** Knowledge about Haematopoiesis, Cells of immune system, general characters of B and T cells, cellular and humoral immunity. **CO3:** Understand the structures, properties, types and importance of Antigens and Immunoglobulins, Ag-Ab reactions in Diagnostic immunology. **CO4:** Gain knowledge about ELISA test, its application and various Hypersensitivity reactions and their types.
Paper-II: BIOTECHNOLOGY	**CO1:** Know the tools and techniques of genetic engineering **CO2:** Knowledge about DNA, fingerprinting and its application in forensic science **CO3:** Acquainted with the methods of production of insulin, interferon. Vaccines, monoclonal antibody. Understand the applications of biotechnology in agriculture **CO4:** Acquire knowledge about the advantages /disadvantages of genetic engineering for humans & comprehend the production and importance of genetically modified foods and animals, know about the ethics to be followed.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate VDRL test, Widal test, immunodiffusion technique And Western blot technique. • Perform PCR • Development of spheroplast • Get the knowledge of lab production of biofertilizer and soya sauce

PHYSICS

Department of Physics	After successful completion of three years degree program in the subject Physics the students are able to:
Programme Outcome:	**PO1:** Gain a thorough understanding of the subject. **PO2:** Lay the groundwork for future learning. **PO3:** Learn the fundamentals of research. **PO4:** Instill good moral and ethical ideals in yourself. **PO5:** Recognize your societal and environmental responsibility. **PO6:** Develop communication and professional skills. **PO7:** Acquire the ability to accept a wide range of ideas and points of view. **PO8:** Empower yourself to meet the demands of a changing universe.
Program Specific Outcomes	**PSO1:** Understand the principles of physics, matter characteristics, and electrodynamics, as well as the basic notions of scientific process. **PSO2:** Understanding the theoretical foundations of quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, astrophysics, statistical physics, photonics, and thermodynamics. **PSO3:** Understand and apply electrical ideas in the design of various analogue and digital circuits. **PSO4:** Understand the fundamentals of computer programming and numerical analysis with PSO4. **PSO5:** Use laboratory experiments to test and apply theoretical principles.
Course Outcomes of B.Sc. Physics	
B. Sc. Semester-1	
Paper – I: Properties of Matter and Mechanics: Learning Outcomes:	**CO1:** The curriculum covers general characteristics of matter, which include solid and liquid. Elasticity is a solid property that offers a notion of material strength in three forms, as well as liquid viscosity and its relevance. Surface tension in a liquid's geometrical form. **CO2:** Mechanics covers the fundamentals. Newton's laws of motion and how they're used. Students' imagination is improved by geometrical descriptions of rules, and the study of restrictions leads to the area of physics known as classical mechanics. The relationship between M.I. and body movements is given by rotational motion.
Paper-II: Electrostatics, Time varying fields & Electric Currents:	Students will be able to: **CO1:** State and express Coulomb's law in vector form and apply it to solve for E due to stationary charges, Electric potential due to point charge, owing to dipole, and field due to dipole at any place after finishing this course.

	CO2: Able to establish that potential is force per unit charge and to describe V and its link to energy conceptually. **CO3:** Able to explain the similarities and differences between a conductor and a dielectric, the action of an electric field, dielectric polarisation, polar and non-polar molecules, and the Classius-Mossoti equation. **CO4:** When given epsilon and the free charge on the dielectrics, be able to determine the E field inside the dielectric. **CO5:** Able to grasp the fundamental concepts of parallel plate capacitors, including capacity derivation with or without the use of a calculator. When given epsilon and the free charge on the dielectrics, it is possible to determine the E field inside the dielectric. **CO6:** Able to grasp the fundamental concepts of parallel plate capacitors, including capacity derivation with and without dielectrics, as well as solve numerical issues. **CO7:** Able to articulate and explain Faraday's laws of electromagnetic induction, self and mutual induction, transformers and their operation, transformer losses and applications, and Kirchhoff's laws. **CO8:** Able to study series resonance, frequency derivation, power in an ac circuit, and solve mathematical problems.
B. Sc. Semester- II	
Paper-I: Oscillations, Kinetic theory of gases and Thermodynamics:	**CO1:** Students will be able to grasp linear and angular S.H.M., as well as the S.H.M. differential equation and its solution. Also capable of developing damped oscillation differential equations and energy dissipation via damped oscillations. **CO2:** The basics and applications of forced vibrations, resonance, and its energy and quality factor will be understood by the students. Also included are gas laws and their applications. **CO3:** Students will learn about gas transportation phenomena and the thermodynamics that underpin it. Also, the role of thermodynamic laws in engine efficiency.
Paper-II: Gravitation, Astrophysics, Magnetism and Magneto statics:	**CO1:** The students get an understanding of the fundamental rules of classical mechanics, which improves their understanding of planetary motion and interactions. **CO2:** An introductory course in astrophysics piques students' curiosity in space science. **CO3:** Studying atomic magnets at a microscopic level improves students' intellectual abilities in material research and provides insight into the relationship between electric and magnetic fields as a future key to power consumption.
B. Sc. Semester-III	
Paper-I: Sound waves, Applied acoustic, Ultrasonic and Power supply Learning	**CO1:** Students learn about the many types of waves and their properties. They also learn about harmonics, sound quality, and the human ear's reaction and audibility to sound. Students may learn about sound intensity measurement and the influence of temperature on sound. **CO2:** Students are familiar with various sound measurement

	instruments such as transducers, sound recording, and sound reproduction. **CO3:** Students learn about ultrasonic waves, their characteristics, ultrasonic wave generating methods, and research applications. **CO4:** Students learn about the necessity of voltage, current, and load management, as well as power supply and conversion from alternating current to direct current.
PHYSICS - Paper-II: Physical optics and Electromagnetic waves:	**CO1:** Students are able to explain how light behaves as a wave. **CO2:** Examine how light intensity varies owing to interference and diffraction. • Understand Michelson and Fabry-Parot Interferometer Applications **CO3:** Examine the concept of polarisation and how it is used. **CO4:** Understand electromagnetic waves, Maxwell's field equations, and their transverse nature. **CO5:** Explain Poynting's theorem and its significance.
B. Sc. Semester IV	
PHYSICS - Paper-I: Solid state physics, X-ray and Laser:	**CO1:** Students will have a fundamental understanding of crystal systems and spatial symmetry, Miller indices, and how different diffraction methods are used to study crystalline materials. **CO2:** Be familiar with the notion of a reciprocal space lattice and the meaning of Brillouin zones. **CO3:** Students will be able to identify the different types, characteristics, and uses of X-rays. **CO4:** Students explain the fundamentals of lasers, how they are made, and how they are used.
PHYSICS - Paper-II: Solid state electronics, and Molecular physics:	**CO1:** Students will learn the fundamentals, manufacturing, and applications of LED, Solar Cell, and BJT in everyday life, as well as the concepts, applications, and special characteristics of FET, JFET, and MOSFET. **CO2:** Students will be able to explain and quantify vibrational and rotational energy, kinds of molecules, diatomic molecules as harmonic and anharmonic oscillators, rotational-vibrational spectra, and the Born Oppenheimer approximation. **CO3:** Students who understand the relevance and applicability of Raman spectroscopy in molecular physics are also familiar with the Frank-Condon principle, the fundamentals of NMR and ESR, and their spectroscopic applications.
B. Sc. Semester –V	
Paper-I: Atomic physics, free electron theory and Statistical physics:	**CO1:** Students comprehend the many theories of the atomic model, as well as the various quantum numbers. The student also investigates how the momentums and magnetic moments associated with various electron motions are orientated, as well as their interactions. **CO2:** Students learn about electron conduction, both electrical and thermal. Fermi temperature band, Fermi energy. Free

	electron theory: different theorems, models, and experiments Material classification is also important. **CO3:** The student gains an understanding of - space, Gamma space, probability distribution, and thermodynamic probability, Principle of a priori probability, Boltzmann's entropy relation, different states, Maxwell Boltzmann distribution law, and its application; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann' Students will also study Bose-Einstein statistics, as well as the Fermi Dirac distribution and how to use it.
Paper-II: Quantum mechanics, Nanomaterials and Nanotechnology:	Students will be able to: **CO1:** Understand the major components of quantum mechanics' historical evolution, as well as wave characteristics of matter, after finishing this course. **CO2:** Capable of relating classical mechanics to quantum mechanics. **CO3:** Able to solve Schrodinger equations in one to three dimensions and understand them physically. **CO4:** Familiarity with the fundamentals of nanoscience and nanotechnology, as well as their relevance in everyday life.
B. Sc. Semester VI	
Paper-I: Relativity, Nuclear physics and Bio Physics	**CO1:** Students comprehend frame of reference, special theory of relativity postulates, and relativistic variation in length, time, mass, velocity addition, and mass energy equivalence. **CO2:** They can design radiation detectors, charge accelerators, and nuclear reactions, as well as the many types of nuclear processes and their significance in modern technology. **CO3:** Students are able to describe and grasp the essential ideas of decay particles. **CO4:** Students will be able to understand bio physics and its significance in the medical profession.
Paper-II: Electronics, Fiber optics, Communication and Digital electronics	**CO1:** Students will understand the construction and operation of amplifiers and oscillators, as well as their applications. **CO2:** Students will be able to understand the fundamental principles and operations of fiber optics, as well as the importance of optical fibre, light wave propagation in optical fiber, and its role in communication. **CO3:** They will also be familiar with communication kinds such as AM and FM, as well as their core theory and how television is broadcast using these methods. **CO4:** The students will be able to understand how large amounts of data are kept in current times utilizing technologies such as Number Systems, as well as the theory behind it.

STATISTICS

Department of Statistics	After successful completion of three years degree program in Statistics a student should be able to:
Programme Outcomes	**PO1:** Demonstrate, solve and an understanding of major concepts in all disciplines of statistics **PO2:** Solve the problem and also think methodically, independently and draw a logical conclusion. **PO3:** Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of statistical experiments. **PO4:** Create an awareness of the impact of statistics on the society, and development outside the scientific community. **PO5:** Use modern techniques and different Statistical software
Programme Specific Outcomes	**PSO1:** Make aware and handle the sophisticated data. **PSO2:** Gain the knowledge of Statistics through theory and practical. **PSO3:** To learn about basic principles of design of experiment. **PSO4:** To gain knowledge about official statistics; purpose and functions of CSO, NSSO **PSO5:** Understand basic concepts of Statistical Quality Control and Uses of SQC **PSO6:** To study applications of statistics in the field of industrial statistics, operation research, survey sampling technique etc. **PSO7:** Use modern statistical tools, Models, Charts and Equipment. **PSO8:** Develop research-oriented skills.
Course Outcomes B. Sc I Statistics Semester-I	
Paper-I: Probability Theory	**CO1:** Understand the Theory of Probability. **CO2:** Able to apply additive and multiplicative laws of probability **CO3:** Obtain the various results on theorems in probability CO-4. Distinguish between measures of location and measure of dispersion. **CO4:** Identify Conditional Probability, Bayes theorem, and Chebyshev's inequality **CO5:** Concept of Random variable, pmf, pdf, pgf, distribution function, mgf and its uses
Paper-I**: Descriptive Statistics-I**	**CO1:** Able to plan, execute and analyze a data **CO2:** Use and understand basic concepts of Descriptive statistics **CO3:** Analyze data and understand concept of population census

	CO4: Analysis of categorical data using various techniques and draw conclusions. **CO5:** Apply statistics to draw different types of diagrams and graphs
Course Outcomes B. Sc I Statistics Semester-II	
Paper-I: Probability Distribution	**CO1:** Understand various Discrete and Continuous distributions. **CO2:** Able to have the knowledge of Discrete Distributions such as Bernoulli, Binomial, Poisson, Uniform, Hyper geometric and Geometric, Negative Binomial with their properties and applications **CO3:** Able to have the knowledge of Continuous Distributions such as Uniform, Beta, Gamma, Normal and their properties **CO4:** Distinguish between Bernoulli distribution and Binomial distribution **CO5:** Understand concept of Lack of memory property of Geometric distribution.
Paper-I**: Descriptive Statistics-II**	**CO1:** Able to plan, execute and analyze a data. **CO2:** Use and understand concepts of central tendency and location. **CO3:** Understand different concepts and measures of dispersion **CO4:** Analysis the concept of bivariate data and correlation coefficient as well as regression. **CO5:** Apply different types of partition values and the concepts of skewness and kurtosis The concepts of central tendency and location.
Course Outcomes B. Sc II Statistics Semester-III	
Paper-I: Statistical Methods	**CO1:** Drawing random samples from uniform and normal distribution. **CO2:** Able to find moments and correlation coefficient of bivariate probability distribution. **CO3:** Obtain a joint probability distribution of random variable (one or two dimensional) in the given situation. **CO4:** Distinguish between t- distribution and F- distribution. **CO5:** Identify the type of Statistical situation in which different Transformation of variable technique can be applied.
Paper-II: Economics Statistics	**CO1:** Construction of Price and Quantity index number by simple aggregative method **CO2:** Construction and uses of Wholesale Price Index number. **CO3:** Able to determine concept of purchasing power of money **CO4:** Fitting of Pareto curve to income data. **CO5:** Analyze data pertaining to seasonal Indices and to interpret the results. **CO6:** summarize and analyze the data using Economic time series.

	CO7: Apply statistics in the various fields.
Course Outcomes B. Sc II Statistics Semester-IV	
Paper-I: Statistical Inference	**CO1:** To solve problems on chi-square for testing independence of attributes. **CO2:** To solve problems on t-tests and construction of confidence intervals for single mean and difference of two means, paired t-test. **CO3:** Identify the characteristics properties of good estimator. **CO4:** Identify the type of statistical situation to which central limit theorem can be applied. **CO5:** Understand the construction of confidence interval.
Paper-II: Applied Statistics	**CO1:** Explain the sources of demographic data. **CO2:** Calculation of Percentile scores and T-scores for a given frequency distribution of raw scores. **CO3:** Comparison of raw scores on the basis of (i) Percentile, (ii) Z scaling, (iii) T scaling. **CO4:** Able to solve numerical problems on construction and use of life tables. **CO5:** Can do computation of CDR and Standardized death rates by direct and indirect methods. **CO6:** Be able to compute and interpret Gross Domestic rates
Course Outcomes B. Sc III Statistics Semester-V	
ST-301: Paper-! - Statistical Quality Control and Linear Programming Problem	**CO1:** Use tools of SQC, draw control charts for mean, standard deviation and range **CO2:** Able to draw conclusion about whether process is in statistical quality control or not. **CO3:** Obtain the optimum solution of Linear programming problem. **CO4:** Distinguish between Process and product control **CO5:** Identify the General form of LPP and Standard form of an LPP.
ST-302: Survey Sampling Techniques	**CO1:** Able to plan, execute and analyse a sample survey **CO2:** Use and understand basic concepts of sample survey, sampling and types of sampling and non-sampling errors **CO3:** Analyze data and understand concept of stratified sampling, systematic sampling and cluster sampling and compare various sampling techniques. **CO4:** Analyse data using various sampling techniques and draw conclusions.56 **CO5:** Apply statistics in the various fields of sampling techniques
Course Outcomes B. Sc III Statistics	

Semester-VI	
ST-311: Operations Research	**CO1:** To solve and understand different concepts of Network Analysis and Construct Network Diagram **CO2:** Able to understand concept of Duality in LPP, relationship between primal and dual problem and its economic interpretation **CO3:** Identify the balanced transportation problem and unbalanced transportation problem, **CO4:** Identify two-person zero sum game and solution of game. **CO5:** Understand concept of Duality in LPP, relationship between primal and dual problem and its economic interpretation
ST-312: -Experimental designs	**CO1:** Able to explain factorial experiments, Yates' method to calculate main effects and interaction effects in 2^2 and 2^3 factorial experiments **CO1:** Analyse data using various experimental designs CRD, RBD, LSD and draw conclusions. **CO1:** Comparison of theory of linear estimation, analysis of variance (ANOVA) **CO1:** Able to analyse data using various ANOVA techniques and draw conclusions. **CO1:** Understand basic principles of designs of experiments. **CO1:** Be able to compute and interpret ANOVA for one way and two-way classified data.

ZOOLOGY

Department of Zoology	After successful completion of three years degree program in the subject Zoology the students are able to-
Program Outcome	**PO1:** classification and Identification of organisms according to their characteristic features. **PO2:** Correlates the Morphology, physiology and biology of invertebrate and vertebrates. **PO3:** Gain the knowledge of Micro-technique for preserving tissue and specimens. **PO4:** Analyse interactions among the various organisms of different phylas, their distribution and relationship with the environment. **PO5:** Gain knowledge about economic importance and application of knowledge agro based small industries like sericulture, apiculture, aquaculture, fish breeding, pear-culture. **PO6:** Understand concept of genetics and its importance in human health. **PO7:** Understand the use of biotechnology, biostatistics and bioinformatics.
Program specific Outcome	**PSO1:** Students are able to understand the basic concept of cell biology, environmental biology, genetics, physiology, taxonomy and applied zoology. **PSO2:** Understand the application of biological sciences in aquaculture, sericulture, vermin-culture, pearl-culture and apiculture. **PSO3:** Perform procedures as per laboratory standards in the area of physiology, cell biology, environmental biology, genetics, entomology, Biotechnology fisheries. **PSO4:** Gain knowledge about research methodology i. e. skills of micro technique which consists of preservation of tissue and specimens, their staining techniques
Course Outcome of B.Sc. Zoology	
Zoology SEM I	
Paper-I: Life and Diversity of Animals – Non-chordates (Protozoa to Annelida)	**CO1:** Students get knowledge about unity and diversity of life on the earth. **CO2:** Students will be able to identify and classify non-chordates on the basis of their peculiar characteristics. **CO3:** students will be able to understand phylum wise structural features, morphology, anatomy, physiology, habit and Habitat. **CO4:** Students will be able to explain how organisms' function at different level of grade of Organization like cellular, tissue, organ and organ system. **CO5:** They will be able to give examples of the physiological adaptation, development, behavior of

	different forms of life. **CO6:** Students understand economic importance of non-chordates as well as life cycle of pathogenic organisms.
Paper – II: Environmental Biology	**CO1:** Students get knowledge and understand about different strata of atmosphere. **CO2:** Students able to understand /recognize biological, chemical, physical components of earths system. **CO3:** Students will also understand how natural system human designed system work together and conflict with each other. **CO4:** Students understood about environmental issues like water pollution, Air pollution, soil pollution and noise pollution. **CO5:** Students able to understand and gain knowledge about renewable and non-renewable energy sources.
Lab. Work	• Studied museum specimen (classification and structural features0 • Learn about estimation of Dissolved oxygen and carbon dioxide PH and hardness of water • Studied pond ecosystem • Learn about dissection and perform mounting of biological material
Zoology - SEM II	
Paper – III: Life and Diversity of Animals – Non-chordates (Arthropoda to Hemichordata)	**CO1:** Students understood role of insect vectors in spreading diseases, mode of infection and symptoms. **CO2:** Students also understood economic importance of molluscans. **CO3:** Students understood affinities of hemichordates with different phyla. **CO4:** Students get knowledge about indirect development through various larval stages.
Paper – IV: Cell Biology	**CO1:** Students will be able to understand structure and functions of cell and cell organelles. **CO2:** Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells and cell organelles **CO3:** Students will understand how these cellular components are used to generate and utilize energy in cells **CO4:** Students will understand types of cell division that is mitosis and meiosis **CO5:** Students will apply their knowledge of cell biology to study environmental or physiological responses of cell
Lab Work:	• Studied Museum specimen (classification and structural features) • Studied permanent slides of larva of different animals and sections through different organs

	• Perform cell biology experiments, mounting and studied dissection.
Zoology - SEM III	
Paper-V: Life and diversity of Animals - Chordates (Protochordata to Amphibia	**CO1:** Students are able to understand diversity of earlier chordate from Protochordata to amphibian. **CO2:** Students are also studied about growth and development, evolution of different system of chordates. **CO3:** Students also get knowledge about adaptations, parental care and sexual dimorphism in chordates
Paper – VI: Genetics	**CO1:** Students are able to understand Mendel's laws of inheritance, basic concepts of gene, transmission of hereditary characters. **CO2:** Students also understand about interaction of genes. **CO3:** Students also understand concept of lethal genes, chromosomal disorder and syndrome caused due to abnormal chromosomal no. **CO4:** Students also understand about population genetics and application of genetics
Lab Work:	• Studied museum specimen of chordates (classification and structural features) • Observed and studied permanent slides of developmental biology and sections through different organs • Perform genetic experiments and studied karyotype of genetic traits.
Zoology - SEM IV	
Paper - VII: Life and Diversity of Animals – Chordates(Reptilia, Aves and Mammals)	**CO1:** Students understand about classification of reptiles, Aves and mammals based on structural variation. **CO2:** Get knowledge about Biting mechanism in snakes, adaptations in Aves and mammals. **CO3:** Get information about modern evolution theories, genetic basis of evolution **CO4:** Understand comparative study of development of heart and aortic arches in birds, Aves and mammals. **CO5:** Study different aspects of chick development
Paper - VIII: Molecular Biology and Immunology	**CO1:** Understand detail structure of DNA and RNA as a genetic material, structure of gene. **CO2:** Students are able to understand different processes like replication, transcription, protein synthesis. **CO3:** Able to understand concept of immunity, types of antigen antibody and their interaction **CO4:** Get information about types of immune response and about immune deficiencies.
Lab Work:	• Studied classification and identification of chordates • Studied skeleton of rabbit and fowl • Studied permanent slides of chick embryology and permanent slides. • Perform staining and immunology and molecular biology experiments.

Zoology - SEM V	
Paper-IX: General Mammalian Physiology I	**CO1:** It gives knowledge about structural features and functions of different systems like digestive, respiratory and circulatory. **CO2:** General properties of enzymes, enzyme activity **CO3:** Digestive glands, respiratory pigments, respiration mechanism and in detail circulatory system.
Paper-X: Aquaculture and Economic entomology and	**CO1:** This paper gives knowledge about-application of zoology and economic importance of zoology like fresh water aquaculture, prawn culture, pearl culture, apiculture, sericulture, and lac culture. **CO2:** Gives information about economic entomology and methods of pest control.
Lab Work:	• Perform physiology experiments i.e. estimation of carbohydrates, proteins, fats and vitamins. • Perform counting of red blood cells and white blood cells. • Studied histological slides • Perform mounting, • Collection and identification of local fishes. • Studied different insect pests.
Zoology - SEM VI	
Paper-XI: General Mammalian Physiology II	**CO1:** Get knowledge about nerve and muscle physiology, **CO2:** Studied in detail structure and function of different endocrine glands. **CO3:** Understood reproductive system, causes of infertility in male and female.
Paper-XII: Applied Zoology II (Bio-techniques ,micro techniques, Biotechnology, Bioinformatics and Biostatistics	**CO1:** Students are able to understand methods of separation of biomolecules, micro techniques (different staining methods **CO2:** Understand importance and role of bioinformatics **CO3:** Understand application of statistics in biology and biotechnology.
Lab Work:	• Detection of urea albumin sugar and creatinine in urine • Perform biotechnology experiments and micro-technique methods • Perform and studied application of bioinformatics and biostatistics. • Observed histological slides.

MATHEMATICS

PROGRAMME OUTCOME FOR M. SC. MATHEMATICS

Department of Mathematics	After successful completion of two years post-graduation degree program in the subject Mathematics the students are able to:
Program Outcomes	**PO1:** To acquire the strong foundation of basic concepts, this will benefit them to become good academicians. **PO2:** To apply the concept of mathematical tools to address real life problems. **PO3:** To pursue research in reputed institutions and solve the existing mathematical problems using the knowledge of pure and applied mathematics. **PO4:** To qualify various competitive exams like CSIR-UGC NET, SET, GATE, MPSC, UPSC, etc.
Program Specific Outcomes	**PSO 1:** To imbibe problem-solving and computational skills **PSO 2:** To understand the motivation behind the statements and proofs **PSO 3:** To enhance self-learning and improve own performance. **PSO 4:** To inculcate abstract mathematical thinking.
Course Outcomes M. Sc . Mathematics	
Course Outcome for Semester-I	
1T1 Algebra	**CO1:** To assimilate the concept of automorphism, conjugacy, G-set, etc. **CO2:** To analyse properties of solvable group, alternating group, etc. **CO3:** To study Sylow's theorem and related concepts. **CO4:** To understand maximal and prime ideals. Develop knowledge of R-homomorphism and quotient modules.
1T2 Real Analysis-I	**CO1:** To attain mastery in concept of uniform convergence, continuity, differentiation and integration. **CO2:** To understand theorems on inverse function, implicit function, and Rank theorem. **CO3:** To study Topological manifolds, Differentiable manifolds, Real Projective space, Grassman manifolds. **CO4:** To study in detail about Lie groups.
1T3 Topology-I	**CO1:** To understand basics of cardinality and Topological Spaces. **CO2:** To study open set, closed set, limit point, etc. **CO3:** To assimilate the concept of Connected set, Compact and countably compact spaces. **CO4:** To attain mastery in concept of and -spaces.
1T4 Ordinary Differential Equations	**CO1:** To solve first order linear differential equations. **CO2:** To understand second order equations with regular singular points and work out its applications. **CO3:** To study existence and uniqueness of solutions of first order differential equations.

	CO4: To analyse system of differential equations.
1T5 Integral Equations	**CO1:** To know the relation between differential and integral equations, and how to change from one to another. **CO2:** To understand different kinds of kernels and use techniques for solving problems on each kind. **CO3:** To explain types of Voltera equations and solve linear Volterra and singular integral equations using appropriate methods. **CO4:** To use Hilbert transform a general and finite one for solving a wide range of differential and integral equations.
Course Outcome for Semester-II	
2T1 Algebra -II	**CO1:** To understand the unique factorization domains, principal Ideal domains and Euclidean domains. **CO2:** To analyze properties of algebraically closed fields, splitting fields. **CO3:** To compute Galois groups in simple cases and apply the group-theoretic information to comprehend results about fields. **CO4:** To develop knowledge of Ruler and compass constructions.
2T2 Real Analysis -II	**CO1:** To gain knowledge of measurable sets and measurable functions. **CO2:** To acquire mastery on Lebesgue Integral. **CO3:** To study Convex functions, Lp-spaces. **CO4:** To learn Baire category theorem and its application. **CO5:** To understand Riesz-Fischer theorem and approximation in Lp-spaces.
2T3 Topology-II	**CO1:** To study continuous functions, product topology and metric topology. **CO2:** To gain knowledge of connectedness, compactness. **CO3:** To achieve the zenith in treating Countable Axioms, and Separable, Regular and Normal spaces. **CO4:** To understand theorems like The Urysohn's Lemma, Urysohn's Metrization Theorem.
2T4 Differential Geometry	**CO1:** To study the theory of curves and surfaces in three spaces. **CO2:** To analyse global properties of curves such as the four-vertex theorem. **CO3:** To understand the fundamental quadratic forms of a surface, intrinsic and extrinsic geometry of surfaces, and the Gauss-Bonnet theorem. **CO4:** To understand two dimensional Riemannian manifolds. **CO5:** To analyse problem of metrization and of continuation.
2T5 Classical Mechanics	**CO1:** To learn D-Alemberts principle and formulate Lagranges equation of motion. **CO2:** To understand Legendre transformations and solve different problems. **CO3:** To formulate Hamiltonian equation and understand its physical significance. **CO4:** To gain knowledge of Canonical transformations and solve problems on it.

Course Outcome for Semester-III	
3T1 Complex Analysis	**CO1:** To explain the concepts of Analytic Functions, and Elementary Functions. **CO2:** To understand Mobius Transformation and mappings of regions under some special transformations. **CO3:** To construct the proofs of Cauchy Integral Formula, Liouvellis Theorem, and solve problems related to Taylor and Laurent series. **CO4:** To identify different types of singularities, zeros of analytic function. **CO5:** To study the maximum principle and Schwarz's lemma.
3T2 Functional Analysis	**CO1:** To understand Banach Spaces, The Hahn-Banach Theorem. **CO2:** To study the open Mapping Theorem, Hilbert Spaces. **CO3:** To analyse different operators and their properties **CO4:** To understand Category theorem, uniform boundedness theorem, strong and weak convergence.
3T3 Mathematical Methods	**CO1:** To attain mastery in Fourier integral theorem and its application. **CO2:** To attain mastery in application of Laplace and Fourier transform. **CO3:** To study applications of finite Sturm-Liouville transforms. **CO4:** To study application of finite Hankel transform, finite Legendre transform and finite Mellin transform.
3T4 Core Elective General Relativity	**CO1:** To describe Riemannian geometry in tensor formalism. **CO2:** To define energy momentum tensor of various fluids and understand gravity due to curved spacetime. **CO3:** To obtain Einstein's field equations by different approach and Poisson's equations as an approximation to Einstein field equations. **CO4:** To solve Einstein's field equations for static spherically symmetric Schwarzschild space-time and calculate the advances of perihelion, relativistic frequency shifts for sources moving in a gravitational field, as well as the bending of light passing through a spherical mass distribution.
3T5 - Operational Research-I	**CO1:** To understand basics and formulation of linear programming problems and revised simplex method (with and without artificial variables). **CO2:** To apply simplex method to solve real life problems. **CO3:** To study integer programming and its application. **CO4:** To understand the concept of Bounded variable technique for L.P.P. and unconstrained optimization. **CO5:** To study of Queuing Theory and Poisson queueing models- M/M/1, M/M/C for finite and infinite queue length.
Course Outcome for Semester-IV	
4T1 - Dynamical Systems	**CO1:** To attain mastery in Dynamical systems, vector fields, its fundamental theorem, and Existence & uniqueness of a solution.

	CO2: To study of Stability and Liapunov function of dynamical system. **CO3:** To understand the Poincare Bendixson theorem and its applications. **CO4:** To analyze Autonomous equations and differentiability of flows.
4T2 – Partial Differential Equations	**CO1:** To classify partial differential equations and transform into canonical form. **CO2:** To solve linear partial differential equations of both first and second order. **CO3:** To solve boundary value problems for Laplace's equation, the heat equation, the wave equation by separation of variables, in Cartesian, polar, spherical and cylindrical coordinates.
4T3 – Advanced Numerical Methods	**CO1:** To obtain the solutions of Transcendental and polynomial Equations. **CO2:** To find solutions of system of equations using direct methods and Iteration methods. **CO3:** To attain mastery to solve problems using polynomial interpolation theory. **CO4:** To acquire knowledge of Numerical methods to find solution of integral Equations.
4T4 Core Elective-Cosmology	**CO1:** To study Einstein and de-Sitter static models and their comparison with actual universe. **CO2:** To study Cosmology, master the concepts of Cosmological principle, Hubble law, Weyl's postulate, deceleration parameter, etc. **CO3:** To understand the nature of Robertson-Walker metric in view of closed, open and flat models of the universe. **CO4:** To acquire knowledge about steady state universe and its viability vis-a-vis actual universe.
4T5 - Operations Research–II	**CO1:** To identify and develop operations research model describing a real-life problem. **CO2:** To understand the mathematical tools that are needed to solve various optimization problems. **CO3:** To solve various linear programming, transportation, assignment, queuing, inventory, and game problems related to real life.

CHEMISTRY

PROGRAMME OUTCOME FOR M.Sc. CHEMISTRY

Department of Chemistry	After successful completion of two years degree program in the subject Chemistry the students are able to:
Program Outcomes	PO1: The Programme enables the students to understand basic facts and concepts in Chemistry. PO2: To develop the ability to apply the principles of Chemistry, to develop problem solving skills, to become familiar with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies. PO3**:** Students know about importance of Qualitative and Quantitative analysis used for different samples like soil samples, alloys estimation, water analysis. New technological world using nanomaterial, properties of Nano materials magnetic properties of materials. PO4: Thermodynamic and Thermochemistry useful in our daily life and related with our surrounding atmosphere. PO5: Nuclear Magnetic resonance spectroscopy allows the molecular structure of a material to be analyzed by observing the measuring the interaction of nuclear spins when placed in a powerful magnetic field and extensively used in medicine in the form of magnetic resonance imaging and for analysis of chemicals. PO6: Bioinorganic chemistry provides knowledge about significant role of metal ions in biological system which is required for the maintenance of life. PO7: Student can describe the process It also develops skills in the proper handling of apparatus and chemicals and also gets exposure to the different processes used in industries and their applications. PO8: Use modern techniques used in analysis of materials and handling of the new equipment during the practical. PO9: To inculcates the scientific temperament in the students during the experiments and how to correlate with outside the scientific community.
Program Specific Outcomes	**PSO1:** The M.Sc. programme enabled the students to enhance their critical thinking, during the two years period of study and the curriculum motivates the mental thoughts and suppositions of the students. This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and

	validity of the practical knowledge. This Analysis leads to take decisions at intellectual, directorial and personal from different perspectives of life. PSO2: Understand the basic principles and concepts underlying the inorganic, organic, physical and analytical chemistry. PSO3: Comprehend the applications of chemistry in various walks of life. PSO4: Students gained functional knowledge of the fundamental theoretical concepts and experimental methods of Chemistry. PSO5: The students will be benefited to equip themselves to job requirements in the quality control, analytical laboratory or production wing of any Chemical or Pharmaceutical Industry. PSO6: Able to use instrumental methods of chemical analyses. Students acquire fundamental knowledge through theory and practical.
Course Outcomes M. Sc. CHEMISTRY	
Course Outcome for Semester-I	
PAPER-I: INORGANIC CHEMISTRY (1T1)	1. Predict the nature of bond and its properties through various electronic structural methods; bonding models. 2. Design new coordination compounds based on a fundamental understanding of their electronic properties. 3. Appreciate specialized and advanced topics in inorganic and coordination chemistry 4. Correlate structure and bonding with reactivity of boron clusters. 5. Analyze structures of various binuclear, trinuclear, tetranuclear, pentanuclear & hexa-nuclear compounds with reference to halide, oxide, alkoxide and acetate metal clusters.
PAPER-II: ORGANIC CHEMISTRY (1T2)	1. Implement rules of aromaticity to various organic molecules. 2. Sketch organic molecules in different projection formula and assign its configuration. 3. Apply their understanding about the organic reactions of industrial significance with respect to the chemo- selectivity, regioselectivity and enantioselectivity. 4. Analyze the product distribution and the stereochemistry of various organic products. 5. Evaluate the relationship between structure and reactivity of organic compounds.

PAPER-III: PHYSICAL CHEMISTRY (1T3)	4. Understand, analyze and exercise the principles of classical thermodynamics in various applications 5. Understand the concept of Gibbs free energy or Gibbs function and Phase equilibria. 6. Understand the concept of adsorption and its application in surface chemistry. 7. Analyze and understand the characterization techniques for polymer. 8. Understand the principles of chemical kinetics and their applications in chemical dynamics.
PAPER-III: ANALYTICAL CHEMISTRY (1T4)	3. Select a specific analytical technique based on sample and target analyte 4. Develop analytical ability and critical thinking in selection of statistics and their use in making interpretation meaningful and productive. 5. Understand the principles of chromatographic techniques. 6. Select proper chromatographic technique among the available techniques. 7. Explain the logic behind working of indicator used in each type of titration 8. Apply electro analytical techniques based on conductance and emf measurements.
PRACTICAL-I: INORGANIC CHEMISTRY (1P1)	1. To prepare various complex and carry out characterization of complex. 2. To understand the separation and determination of metal ion from alloy solution by using volumetric gravimetric, spectrophotometric analysis. 3. To understand qualitative analysis of radicals by using semi microanalysis. 4. To understand the micro scale techniques for detection of radicals.
PRACTICAL-II: PHYSICAL CHEMISTRY **(1P3)**	1. Understand various principles involved in small experiments and their interpretations. 2. To handle different apparatus and instruments with care and precision. 3. Interpret the results obtained and access the outcome. 4. Implement and relate the theoretical principles in experiments.

Course Outcome for Semester-II	
PAPER-I: INORGANIC CHEMISTRY (2T1)	1. Recollect the principles of electronic structure, bonding and reactivity of coordination complexes 2. understand the concept of synthesis and stability of transition metal organometallic complexes 3. develop the possible catalytic pathways leading to desired products 4. apply the principles of transition metal coordination complexes to derive reaction mechanisms. 5. identify the structural aspects of metal carbonyls and metal nitrosyls.
PAPER-II: ORGANIC CHEMISTRY (2T2)	1. Predict the orientation and stereochemistry of the product of addition and elimination reaction 2. Apply enolate chemistry to achieve molecular complexity 3. Design organic reactions in order to achieve the required product(s) 4. Formulate green chemistry synthesis to increase atom economy 5. Application of free radicals in functional group transformation
PAPER-III: PHYSICAL CHEMISTRY (2T3)	1. Understand the quantum mechanical applications in actual practice and in spectroscopy 2. Understand the states of solid various crystal structure and pattern in them 3. Understand the concept of ideal and non-ideal solutions 4. Understand the theories of electrolytes 5. Understand the thermodynamics of real processes 6. Understand the distribution laws and their applications 7. Understand the fundamentals of Nuclear sciences
PAPER-IV ANALYTICAL CHEMISTRY (2T4)	1. To understand and execute the techniques of sampling of gases, liquids, solids and particulates. 2. To understand various stoichiometric reactions and calculations. 3. Suggest most suitable modern chromatographic technique for separation of analyte from matrix.

	4. Explain various types of columns and detectors used in chromatography. 5. Discuss molecular absorption and molecular emission spectroscopy principle and applications. 6. Design experiments based on spectrophotometry and polarographic analysis. 7. Formulate experiments based on optical and electro analytical techniques.
PRACTICAL III: ORGANIC CHEMISRTY(2P2)	1. Design the methodologies to develop eco-friendly and green technology for industry and research. 2. Develop methods and remedies for reactions with environmental pollution. 3. Improve scientific practical information orally and in writing. 4. Get awareness about laboratory safety and handling of chemicals. 5. Apply different purification techniques recrystallization, distillation and solvent extraction.
PRACTICAL-IV: ANALYTICAL CHEMISTRY (2P4)	1. Carry out calibration of glassware available in the laboratory. 2. Analyze the data obtained through experiments using statistical analysis parameters. 3. Estimate quantitatively analyte present in different samples using classical and instrumental methods of analysis. 4. Design experiments based on classical and instrumental techniques. 5. Understand the principles involved in visual and instrumental volumetric techniques.
Course Outcome for Semester-III	
PAPER-I: ORGANIC CHEMISTRY (3T1)	1. Identify a pericyclic reaction and categorise it as a cycloaddition, a group transfer reaction, a sigmatropic rearrangement, or an electrocyclic reaction 2. Apply frontier molecular orbital (FMO) theory to rationalise selectivity and reactivity aspects of pericyclic reactions. 3. Understand the reaction mechanism of various common reagents employed in organic synthesis

	4. Understand the reactivity of sulphur, silicon and phosphorous elements. 5. Evolution of cross-coupling reactions in modern organic synthesis
PAPER-II: ORGANIC CHEMISTRY (3T2)	1. Learn the important aspects of steroids and terpenoids. 2. Understand the biosynthesis of natural products. 3. Analyze the enzyme reactions involved in various life processes 4. Illustrate the structure elucidation of unknown naturally occurring organic compound 4. Apply the knowledge of organic reactions for the total synthesis of useful natural products
PAPER-III: POLYMER CHEMISTRY (3T3)	1. Understand the principals involved Polymer design and development. 2. Get an idea about various polymers and their uses. 3. Explain the various methods of polymer preparation. 4. To provide an idea about various utilities and preparation of industrially suitable polymers
PAPER-IV: SPECTROSCOPY I (3T4)	1. Understand interaction between electromagnetic radiation with matter. 2. Calculate the energy of radiation in various units and interconvert them. 3. Discuss various types of sources and detectors used in different spectroscopies. 4. Summarize the principles involved in UV-visible and IR spectroscopy. 5. Apply proper spectral techniques depending on type of sample and required information
PRACTICAL-I: ORGANIC CHEMISTRY I(3P1)	1. Meticulously record physical constants 2. Perform qualitative estimation of functional groups 3. Monitor the progress of reaction 4. Recrystallize /distill the separated compounds 5. Extend these skills to organic synthesis
PRACTICAL-II: POLYMER CHEMISTRY **(3P3)**	1. To perform synthesis and characterization of different Polymers. 2. To monitor Thermal analysis, crystallinity, of Polymer 3. To understand kinetics of polymerization. 4. To understand magnetic and electrical properties of polymer

Course Outcome for Semester-IV	
PAPER-I: ORGANIC CHEMISTRY (4T1)	1. Understand the applications of enolates in C-C bond formation 2. Demonstrate stereochemical description of common organic reactions 3. Understand the use of resolution for separation of racemic mixtures. 4. Recognize the chemical reactions of carbonyl compounds and alkenes under photochemical conditions.
PAPER-II: ORGANIC CHEMISTRY (4T2)	1. Understands the reactivity of heterocyclic compounds in various reaction conditions 2. Understand the electrophilic, nucleophilic reactions and synthesis of various heterocycles. 3. Design the synthesis of drugs and natural products 4. Demonstrate the applications of organometallic reagents in C-C bond formation
PAPER-III: POLYMER CHEMISTRY (4T3)	1. Understand the principles involved in polymerization processes. 2. Classify the need of techniques required for polymerization. 3. To characterize the various polymers 4. Elaborate specific polymers and their utility at various places
PAPER-IV SPECTROSCOPY I (4T4)	1.Interprete the structures of simple molecules using physical methods of analysis 2. Understand and interprete the NMR data 3. Analyse X ray diffraction data 4. Develop the skills of analytical ability 5. Execute out the combined application of spectral method
PRACTICAL III: ORGANIC CHEMISRTY(4P1)	1. Meticulously record physical constants 2. Perform qualitative estimation of functional groups 3. Monitor the progress of reaction 4. Recrystallize /distill the separated compounds 5. Extend these skills to organic synthesis
PROJECT (4S1)	1. Carry out detailed literature survey on selected project topic. 2. Identify the gap in literature to design a project proposal. 3. Carry out experiments to obtain necessary information. 4. Put all the obtained results in systematic

	manner in the form of a project report. 5. Present the project report in front of audience in the form of PowerPoint presentation. 6. Write own research paper based on project

IIT SPOKEN TUTORIAL CERTIFICATE COURSE

Department of Computer Science	Successful completion of IIT Spoken Tutorial certificate Course a student should be able to know:
Program Outcomes	**PO-1** Students will learn different software's in short and simple steps. **PO-2** To build the necessary skills set and analytical abilities for developing Computer based solutions for real life problems. **PO-3** To train students in professional skills related to Software Industry. **PO-4** To help the students to build-up a successful career in Computer Science. **PO-5** To create new opportunities for the students to get better future job opportunities. **PO-6** To train the students in advance programming languages and handling Free open-source software's. **PO-7** Students those who have completed their training of the course will get participation certificate.
Program Specific Outcomes	**PSO1**-Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems. **PSO2-** To Enhance Programming skills, applications and adapt new computing technologies for attaining professional excellence **PSO3**- Practice for continued professional development. **PSO4**- Apply fundamental principles and methods of Computer Science to a wide range of applications. **PSO5**- Impart an understanding of the basics of our discipline.

CERTIFICATE COURSE IN ADVANCED CPP

Course Outcome for Advanced CPP	
Course X I Advanced CPP	**CO1**- After completion of the course students will develop the ability to make their own applications for business and industry using Advance CPP. **CO2-** Students will be able to enhance their reading, listening and programming Skills. They can also understand the Powerful features, simple syntax of these programming languages. **CO3-** Students can enhance their employability skills at the end of the course. **CO4-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN ARDUINO

Course Outcome for Arduino	
Course V Arduino	**CO1:** After completion of the course students will display the ability to write their own programs which help them for building digital devices and interactive objects that can sense and control physical devices. **CO2** - After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students will be able to enhance their reading, listening and programming Skills. **CO4-** Students can enhance their employability skills at the end of the course as hardware professional.

CERTIFICATE COURSE IN C AND CPP

Course Outcome for C and CPP	
Course II C and CPP	**CO1 -** After completion of the course students will be able to develop their own applications for business and industrial by the use of this language. **CO2-** After Completion of online assessment test students will get passing/completion certificate and participation certificate will get them after completion of their training **CO3-** Students will be able to enhance their reading, listening and programming Skills. They can also understand the powerful features, simple syntax of these programming languages. **CO4 -** Students can enhance their employability skills at the end of the course. **CO5-** Students can widely use this in the process of development of operating systems.

CERTIFICATE COURSE IN INKSCAPE

Inkscape	
Course III Inkscape	**CO1:** After completion of the course students can use Inkscape Graphics art and design software application for the editing and creation of original images, icons, graphical

	elements of web pages and art for user interface elements. **CO2:** At the end of this course student can work on desktop publishing like creating banners, posters, brochures, CD cover image, artwork for textiles, etc. **CO3:** Students can enhance their employ-ability skills after concluding the course. **CO4:** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN INTRODUCTION TO COMPUTERS

Course Outcome for Introduction to Computers	
Course I Introduction to Computers	**CO1 -** After the completion of this certificate course students can practically do setup the configuration of output devices like printer with the machine. Along with this they will also get the knowledge about the functioning of basic parts of a computer, connecting the parts using cables. **CO2-** Students will be able to work with the computer environment easily. They can enhance their communication computational skills. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO4 -** Students will be able to enhance their reading, listening Skills. **CO5-** Students can enhance their employability skills at the end of the course.

CERTIFICATE COURSE IN JAVA

Course Outcome for Java	
Course VIII Java	After successful completion of the course, the students are able to **CO1-** Develop reusable programs Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes. **CO2-** Students will be able to Design event driven GUI and web related applications which imitate the real word scenarios. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

	CO4- Enhance their reading, listening and programming Skills. **CO5-** They can also understand the Powerful features, simple syntax of these object oriented programming languages using the concepts of inheritance, polymorphism, interfaces and packages. **CO6-** Students can enhance their employability skills at the end of the course.

CERTIFICATE COURSE IN LATEX

Course Outcome for LaTex	
Course X LaTex	**CO1-** At the end of this course students can prepare reports, letters and presentations especially useful for persons engaged in writing/ publishing documents from science/ arts/ commerce fields. **CO2-** Students can enhance their knowledge about the functionality of typesetting software. **CO3-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO4-** Students will be able to enhance their reading, listening and programming Skills. **CO5-** Students can enhance their employability skills at the end of the course..

CERTIFICATE COURSE IN LIBREOFFICE SUITE [BASE]

Course Outcome for LibreOffice Suite [Base]	
Course IV LibreOffice Suite [Base]	**CO1-** At the end of this course student trains in computer usage skills in LibreOffice suite base. **CO2-** After the Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3**- Students will be able to enhance their reading, listening and programming Skills. **CO4** - Students can enhance their employ-ability skills at the end of the course. **CO5-** Students will be able to understand full-featured desktop database front end which is designed to meet the needs of a broad array of user's . They can represent and store their information using this in a systematic manner. .

CERTIFICATE COURSE IN LINUX

Course Outcome for Linux	
	CO1- Students will be able to understand the basic commands of Linux operating system and can write shell scripts. **CO2 –** Students will be able to create file systems, directories and understand how to operate them. **CO3-** Students will be able to create processes background and fore ground etc. by fork () system calls . **CO4-** Students can enhance their employability skills at the end of the course. **CO5-** Students can widely use this in the process of development of operating systems. **CO6–** After Completing the course final examination students will get passing certificate if they scored 40%marks and participation certificate to all those who were admitted for the course.

CERTIFICATE COURSE IN PHP AND MYSQL

	Course Outcome for PHP and MYSQL
Course VI PHP and MySQL	**CO1-** After completion of the course students develop their own applications and website. **CO2-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students learn to unleash the true power of dynamic page development with MySQL database integration. **CO4-** Students can enhance their employ-ability skills after concluding the course. **CO5** - Students are also taught how to create database connections and to execute SQL statements directly from PHP scripts

CERTIFICATE COURSE IN PYTHON

Course Outcome for Python	
Course XII Python	**CO1-** This course Explain the basic principles of Python programming language and Implementation of database and GUI applications. **CO2-** It help the students how to implement the concept of

	object oriented in python. . **CO3-** At the end of the course students understood how to create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. **CO4-** Students can enhance their employability skills at the end of the course. **CO5-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate.

CERTIFICATE COURSE IN RDBMS

Course Outcome for RDBMS	
Course VII RDBMS	**CO1-** After completion of the course students can with all modern database systems like MS SQL Server, IBM DB2, Oracle, MySQL, PostgreSQL and Microsoft Access. **CO2-** After Completion of online assessment test students will get passing/completion certificate as well as participation certificate. **CO3-** Students can work with industry database management after the successful execution of this course. **CO4-** Students can enhance their employ-ability skills at the end of the course. **CO5-** Design and Develop Applications using AWT controls in Java.

UGC SANCTIONED CERTIFICATE AND DIPLOMA COURSES
CERTIFICATE COURSE IN BIOINFORMATICS

Department of Computer Science	Successful completion of Certificate Course in Bioinformatics a student should be able to know:
Program Outcomes	**PO-1** This certificate course is targeted towards imparting theoretical as well as practical knowledge and required skills of Bioinformatics to its participants. **PO-2** It provides basic knowledge of fundamentals of computing & networking and various operating systems like WINDOW, LINUX and UNIX. **PO-3** To provide insights to programming languages like

	BioPerl and BioJava in developing Bioinformatics tools. **PO-4** To introduce the students to MarkUp languages like HTML and XML.
Program Specific Outcomes	**PSO1**- To build in candidates a strong foundation in interdisciplinary sciences such as Computer Sciences and Biological Sciences, to develop accelerated and precise technologies for industrial problems, and prepare them for productive careers in fields of biotechnology, pharmaceutical, bioinformatics, Research, and healthcare industries. **PSO2-** Strengthening ongoing university research in the area of bioinformatics, in particular and life science in general. Further it will be helpful in creating an advanced research facility to carry out research in frontier areas of bioinformatics, biotechnology, and molecular modelling.
for Certificate Course in Bioinformatics	
Paper I Computer Aided Bioinformatics	**CO1 –** Students will be able to learn computer networking its architecture and protocol types. **CO2-** Students gain knowledge about MarkUp languages to develop basic web page. **CO3-** Students learn about basics of programming languages like C, CPP, JAVA, Bioperl etc which would help them to develop different tools in bioinformatics. **CO4-** At the end of the certificate course students will be able understand the basic concepts of operating system and its working with applications.
Paper II Basics of Bioinformatics	**CO1 –** After Completion of this course students will be able to understand the basics of Bioinformatics and nucleotide sequence and its collaboration. **CO2-** Students learn about the databases like NCBI and EBI in details and its working. **CO3-**. At the end of this course students will be able to understand visualization tools which are used for nucleic acid as well as protein. **CO4-** Students understood the applications of bioinformatics in details and what are the future job opportunities in the market.
Paper III Public Domain Resources in Biology	**CO1** – Students will be able to understand how to acquire information from public domain biological databases by using computers and internet at the end of this course. **CO2-** Students will be able to understand how to organize

	data and submission of data in the data bases like GenBank , EMBL, DDBJ, Biological databases II: **CO3-.** Students will be able to understand the details of protein sequence databases and its organization. **CO4-** After Completion of this course students will learn protein sequence data structure and they also help to get better opportunities in IT industry.

DIPLOMA IN BIOINFORMATICS

Department of Computer Science	**Successful completion of Diploma in Bioinformatics a student should be able to know :**
Program Outcomes	**PO-1** This certificate course is targeted towards imparting theoretical as well as practical knowledge and required skills of Diploma in Bioinformatics to its participants. **PO-2** It provides basic knowledge of Sequence analysis, prediction methods of proteins, Functional Genomics and its applications. **PO-3** To provide insights to Derived Databases with its Sequence and Structure. **PO-4** To introduce the students to Various Data Models which are used for Data Storage.
Program Specific Outcomes	**PSO1**- To build in candidates a strong foundation in interdisciplinary sciences such as Computer Sciences and Biological Sciences, to develop accelerated and precise technologies for industrial problems, and prepare them for productive careers in fields of biotechnology, pharmaceutical, bioinformatics, Research, and healthcare industries. **PSO2-** Strengthening ongoing university research in the area of bioinformatics, in particular and life science in general. Further it will be helpful in creating an advanced research facility to carry out research in frontier areas of bioinformatics, biotechnology, and molecular modelling.
DIPLOMA IN BIOINFORMATICS	
Paper I Sequence Analysis and Prediction Methods of Protein	**CO1 –** After completion of this course many career opportunities are available for the students as Scientific Curator, Gene Analyst, Protein Analyst, Phylogenetist, Molecular Modeller, Database Programmer and Structural Analyst.

	CO2- Students will be able to understand the concept protein structure prediction. **CO3-** Students learn about basics of Sequence Analysis, Phylogeny, Protein Structure Prediction, Genome Mapping, Data bases used for mapping and its applications in bioinformatics. **CO4-** At the end of this course students understand how multiple sequence alignment has done.
Paper II Functional Genomics and Application	**CO1-** Students will be able to understand about genetic maps and types of maps with genomic mapping. **CO2-** Students understood the concept of prediction of ORF, Genes and Prediction algorithms. **CO3-** After completion of this course students understood genomic databases and it's working. **CO4-** Students will be able to understand what is microarray technology and applications.
Paper III Data Models and Algorithm	**CO1-** After completion of this diploma course in bioinformatics students will be able to understand the basics of DBMS along with definition of data, components, architecture, representation of data, access of data and view. **CO2-** Students will understand the concept related to data, Meta data, Algorithms used for Analysis of the Data and representation of data using different data models. **CO3-** Students understand how to analyze data using different algorithms and brief about data bases like BLAST and FASTA **CO4-**Students understood about derived databases and difference between primary and secondary databases.

CERTIFICATE COURSES DEPARTMENT OF LIFELONG LEARNING AND EXTENSION UNDER JEEVAN SHIKSHAN ABHIYAN, RTM NAGPUR UNIVERSITY, NAGPUR

CERTIFICATE COURSE IN FRESH WATER FISH CULTURE

Department of Zoology	After successful completion of Certificate Course in Freshwater Fish Culture in the subject Zoology the students are able to:
Program Outcomes	**PO1:** Students know about fundamentals of inland fisheries practices so as to increase fish production to meet protein malnutrition as well as providing job opportunities **PO2:** Impart knowledge for developing proficiency and management practices in food fishes **PO3:** It can help for getting self-employment through different farming schemes **PO4:** It provide detail knowledge about tools and techniques in freshwater fish culture **PO5:** Develop organizational capabilities in fisheries workers for assisting fishermen
Program Specific Outcomes	**PSO1:** It help to get Train manpower for the development of inland fisheries **PSO2:** It increase knowledge regarding the fish varieties used for culturing **PSO3:** It help to maintain production and supply demand regularly. **PSO4:** Understand good laboratory practices related to water parameters which must be check regularly. **PSO5:** This sector can help to get commercial valuable by-products.
Course Outcomes of certificate course in vermicomposting and vermiculturing	
PAPER:	**CO1:** Study of Classification, general characteristics of freshwater fishes **CO2:** pond preparation and its maintenance **CO3:** To know Biology and importance of fish seed production **CO4:** To learn method of fish harvesting and other operational techniques **CO5:** Study of various pest and diseases.
Lab Work:	• Identification of fishes • Identification of Developmental stages in fishes • Water parameters • Physicochemical analysis of pond soil to determine its texture • Qualitative and quantitative study of Zooplankton • Crafts and gears used in fresh water fish capture • Visit to Fish breeding center

CERTIFICATE COURSE IN 'IOT DEVICES'

Electronics	After successful completion of 43 Hrs. certificate course in IoT Devices the students are able to:
Program Outcomes	PO1: Students will be able to understand the application areas of IoT · PO2: Students will be able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks. PO3: Students will be able to understand the building blocks of Internet of Things and characteristics
Program Specific Outcomes	PSO1: After completing this program, interested students can design and construct automation project . PSO2: Students can become entrepreneur and can work on multidisciplinary projects.
Course Outcomes	
Unit 1	CO1: To enrich the students with the basic requirement of for Internet CO2: To familiarize them about the internet and IoT Protocols and Addressing Layers CO3: To explore them with different development board and their specifications.
Unit 2	CO1: To enrich the students about the basic concept of sensor. CO2: To familiarize with different types of sensors and their uses in different applications.
Unit 3	CO1: To enrich the students about the basic concept of Actuators. CO2: To familiarize with different types of Actuators and their uses in different applications.
Unit 4	CO1: To familiarize the students with interconnection and integration of the physical world and the cyber space. CO2: To learn how to design programs for various IoT application.

CERTIFICATE COURSE IN BASIC SKILLS IN COMPUTER

Course Outcome for Basic Skills in Computer	
Course I Basic Skills in Computer	**CO1 -** Recognize when to use each of the Microsoft Office programs to create professional and academic documents. **CO2-** Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards. **CO3-** Apply skills and concepts for basic use of computer

	hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.

CERTIFICATE COURSE IN BASIC OF JEWELLERY DESIGN AND MAKING

	After successful completion of 43 Hrs Certificate Course in
Program Outcomes	**PO1:**To Produce jewellery designers and creators to the increasing demands and for the better prospects of this industry which is growing jewellery industry, which has transformed itself from a traditional small scale operation to a segment, which has tremendous future potential. **PO2:** .To introduce students of the Nagpur to the vast and promising field of jewellery designing and making. **PO3:** Provide Basic knowledge of jewellery designing and making to generate interest of students for opting this field as their carrier.
Program Specific Outcomes	**PSO 1:** Provide Basic knowledge of jewellery designing and making to generate interest of students for opting this field as their carrier. **PSO 2:**To impart basic entrepreneurship skills and professionalism in the students. **PSO3 :**Exhibit the knowledge and understanding of contemporary jewellery as well as history of jewellery designing. **PSO 4:**Demonstrate aesthetic qualities of jewellery and various jewellery components as well as develop the aesthetic skills of students .
Course Outcomes	
JEWELLRY DESIGNING	**CO1** :Student learn Elements and principles of design Students will be able to create simple manual designs (mini port folio) of their own. Students will have basic knowledge about raw material required for jewellery making as well as finishing.

	CO2: Motif development : Analytical and Methodical approach **CO3** : Rendering Jewellery : Metal finishes, Stone rendering, light, shades, Textures **C04:** Students know theVarious cuts of gemstones with measurements. Students will be able to create simple manual designs (mini portfolio) of their own. Students will have basic knowledge about raw material required for jewellery making as well as finishing.
JEWELLERY MAKING	**CO5:** Students learn the iintroduction To Beading Process **CO6:** Students learn actual process of making articles like Studs, bracelets

CERTIFICATE COURSE IN BASICS OF PUBLIC HEALTH AND NUTRITION

	After successful completion of 43 Hrs Certificate Course in Basics of public Health & Nutrition the students are able to:
Program Outcomes	**PO1:** To define vast and promising field of Nutrition and Public Health to the students of the Dharampeth Science College, Nagpur and also to Recognize current and emerging global concerns in public health nutrition. **PO2:** Provide Basic knowledge of Public Health & Nutrition & generate interest of students for opting this field as their carrier. **PO3:** Exhibit the knowledge and understanding of Public Health and Nutrition. **PO4:** Public health nutrition is the promotion of good health through primary prevention of nutrition-related illness in the population.
BASICS OF NUTRITION	**CO 1**: Students will learn Basic concepts of Nutrition, Macro &micro nutrient, concept of balanced diet **CO2**: Food Nutrition & Health (meaning, functions, concept, status, interrelationship between Nutrition & health) **CO3**: Role in Nutritional & Prevention (Healthcare worker, concept

BUDGETING STORING FOOD PRESERVATION **FOOD &HEALTH** **COMMUNITY HEALTH**	**CO**4: Deficiency in brief- (PEM, Kwashiorkar, marasmus, marasmus & kwashiorkor, nutritional anemia, iodine defi, B-Complex defi, Vit C, Vit D, Flourosis, Lathyrism, Measles, Diarrhoea, CVD, DM, Obesity, Maternal Malnutrition,) brief-overview/nature/clinical features/causes/treatment/prevention/nutri management/imp of healthcare & kitchen Planning. **CO5**:Students learnBudgeting (factors/principles/preparation),Selection (Macro/Micro/Protective foods/Accessories/Beverages/Regulatory foods) &Role of grades/brands/labels/in food purchasing **CO6**:Food spoilage(Factors/classification),storage)along withPreservation(principles/methods/home-scale/at low cost max of nutritional benefits/ prevent nutrient loses/ avoid wastage),contamination,adulteration **CO7**:Consumer protection/standards/quality control agencies/ certification/law's Nutritionalprogrammes/concept/components/organizations/assessments(In Brief-anthropometric/clinical methods/biochem/diet survey/growth monitoring charts/tools/techniques) **CO8**: Students learn Population dynamics & Epidemiology along with Family planning programmes and Personal hygiene/cleanliness/rest/exercise/mental health ,Food borne diseases along with Healthcare concept &organisation responsibility. **CO9:** Students healthcare programmes- intro/types of programmes/ other Income generated programme- special prog/ minimum needs/development prog/employment programmes/anti poverty programmes,Learning working with community/individuals/groups/agencies,Factors influencing community health & nutri(intro/determinants of community health, food behaviour) And Present nutrition prog(intro/concept/nutri prog/feeding prog/MDMP/ICDS/Evaluation) **CO10**: Learning working with community(intro/learning/working with community/identifying/evaluation),Community strategies in nutri and health education(intro, learning, working with community, identifying , evaluation)Factors affecting Community nutrition & health

CERTIFICATE COURSE IN COMMUNICATION SKILL AND PERSONALITY DEVELOPMENT

English	After successful completion of 43 Hrs. certificate course in Communication Skills and Personality Development the students are able to:
Program Outcomes	PO1: To learn about the components of effective communication skills like reading, writing, speaking and listening. PO2: To help the students to learn the barriers of communication and how to overcome them. PO3: To make them aware of the non-verbal communication that will help them to crack Group discussion and personal Interviews.
Program Specific Outcomes	PSO1: To provide knowledge regarding the understanding soft skills related techniques for communication for both personal situation (development) and at work place (for your professional career development). PSO2: To develop more confidence in expressing one's ideas and opinions by building trust in others.
Course Outcomes	
Unit 1	CO1: To introduce students with the methodology and different types of communication. CO2: To familiarize the students with Career Building and inter-personal communication. CO3: To acknowledge students with the barriers of communications and the strategies of overcoming them.
Unit 2	CO1: To provide the students with the concepts of non-verbal communication skills. CO2: To guide them about the techniques to improve non- verbal communication skills. CO3: To acknowledge students with the importance of Listening Skills and the major differences between Hearing and Listening
Unit 3	CO1: To enrich the students about the basic concept of Group Discussions. CO2: To provide the training regarding the Interview techniques of both Offline and Online Mode.
Unit 4	CO1: To familiarize the students about the methods and manners of online communication. CO2: To teach the learners the procedure of e-mail writing.

CERTIFICATE COURSE IN COMMUNICATION SKILLS

English	**After successful completion of 43 Hrs. certificate course in Communication Skills and Personality Development the students are able to:**
Program Outcomes	PO1: To be able to Apply Verbal and Non-Verbal Communication Techniques in the Professional Environment. PO2: To emphasize the essential aspects of effective written communication necessary for professional success. PO3: To develop communicative skills and sustain comprehension of an extended discourse.
Program Specific Outcomes	PSO1: The main emphasis of this course is to enable students to learn the dynamics of social communication and to demonstrate the ability to learn the nuances of informal communication. PSO2: The Course is designed to enhance vocabulary skills and make students fluent, thereby improving receptive and expressive skills.
Course Outcomes	
Unit 1	CO1: Students will understand the process and nature of communication. CO2: Students will become masters of Formal and Informal Communication.
Unit 2	CO1: To develop the writing skills of the students so that they are capable of communicating efficiently. CO2: To be able to write a business communication given a specific audience and purpose
Unit 3	CO1: To identify other common methods of professional communication CO2: To discuss appropriate ways to communicate to an audience outside of the company
Unit 4	CO1: To discuss the different types of reports and their purposes CO2: To compose emails and memos intended for an audience within the same company or team as the writer

CERTIFICATE COURSE IN DEVELOPING COMPUTATION SKILLS USING SOFTWARE PACKAGES AND ONLINE GOOGLE TOOLS

	Course Outcome for Developing Computational Skills Using Software Packages & Online Google Tools
Course IV Developing Computational Skills Using Software Packages & Online Google Tools	Upon completion of the course students will be able to: **CO1-** . Recognize when to use each of the software packages to create professional and academic documents. **CO2-** Develop the computational skills and concepts using software packages and Google tools for the use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards. **CO3**- It helps to enhance their computational Skills. **CO4** - Students can enhance their employ-ability skills at the end of the course.

CERTIFICATE COURSE IN DIGITAL MARKETING

	Course Outcome for Digital Marketing
Course II Digital Marketing	**CO1 –** At the end of the course students can understand the impact of technology on the traditional marketing mix and become familiar with the elements of the digital marketing plan. **CO2-** After completion of the course students can develop their skill which helps to digital marketing to increase sales and grow their business. **CO-3** Students can help to understand how to reach your online target market and develop basic digital marketing objectives. **CO-4** Students can analyze the confluence of marketing, operations, and human resources in real-time delivery and comprehend the importance of conversion and working with digital relationship marketing. **CO-5** Demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs.

CERTIFICATE COURSE IN EXCEL FOR BANKING AND ACCOUNTS

Department of Computer Science	After successful completion of 60 hours. Certificate Course in Excel for Banking and Accounts the students are able to:
	PO1: Organize data in an easy-to-navigate way **PO2:** Do basic and complex mathematical functions **PO3:** Turn piles of data into helpful graphics and charts **PO4:** Analyze data and make forecasting predictions
Program Specific Outcome	**PSO1:** After the program completion, students will be able to work in the field of banking sector, in the CA office etc. **PSO2:** This program provides students to work in any office where Excel is used.
Course Outcomes Certificate Course in Excel for Banking and Accounts	
Unit I: Basic of MS-Excel & Conditional Formatting	**CO1:** Understands the working with Formulas, Functions, Operators **CO2:** Understand Conditional Formatting Rule: -rule, clear rules, manage rules, Top 10 items rule, Bottom 10 items Top 10%, Bottom 10%, Above Average, Below Average **CO3:** Able to sort and filter the huge data in the Excel Sheet. **CO4:** Understand the large and rich set of operators used in the Excel.
Unit II: Pivot Tables and Pivot Charts	**CO1:** Able to understand how to create pivot table and insert data in pivot table **CO2:** Understand to filter, group, ungroup and adding rearranging data in the pivot table **CO3:** Able to create pivot charts and understand difference between standard charts and pivot charts. **CO4:** understands all keyboard shortcuts used in Excel.
Unit III: Graphs and Statistical Analysis	**CO1:** Understands all statistical functions used in Excel Spreadsheet. **CO2:** Able to represents all data in graphical analysis. Understands different types of graphs and also which type of data should be represent in which type of chart. **CO3:** Able to use formulas which are used in Banking sector mainly in loan departments. **CO4:** Understands Correlation and Regression with Excel.
Unit IV: Advanced Excel	**CO1:** Able to understand role of management accounting and generation of MIS reports in Excel. **CO2:** Able to link number of worksheets in a single workbook and also to link number of workbook.

	CO3: Understands Automation in excel through Macros, VBA code, Macro Settings **CO4:** Understands all lookup functions like VLOOKUP, HLOOKUP, LOOKUP

CERTIFICATE COURSE IN FULL STACK DEVELOPER

	Course Outcome for Full Stack Developer
Course III Full Stack Developer	**CO1-** After the completion of the course students can develop /craft a portfolio of websites to apply for junior developer jobs. **CO2-** Students will be able to build ANY website. **CO3-** At the end of the course students can develop a hybrid Mobile APPS (iOS, APK) **CO4-** Students can enhance their employability skills in various areas like Code games & animations with CSS3 and jQuery of technology after the end of the course

CERTIFICATE COURSE IN LATEX

	After successful completion of 43 Hrs Certificate Course in LaTeX the students are able to:
Program Outcomes	**PO1:** Typesetting of journal articles, technical reports, thesis, books, and slide presentations. **PO2:** To control over large documents containing sectioning, cross-references, tables and figures. **PO3:** Typesetting of complex mathematical formulae. **PO4:** Typesetting of mathematics with AMS-LaTeX
Program Specific Outcomes	**PSO 1:** To understand LaTeX, a document preparation system for high - quality typesetting. **PSO 2:** To understand features of LaTeX. **PSO 3:** To have hands on experience to become a user of LaTeX.
Course Outcomes	
LaTeX.	**CO1:** Typesetting of complex mathematical formulae using LaTeX. **CO2:** Use tabular and array environments within LaTeX.

	CO3: Use various methods to either create or import graphics into a LaTeX document. **CO4:** Typesetting of journal articles, technical reports, thesis, books, and slide presentations. **CO5:** Automatic generation of table of contents, bibliographies and indexes.

CERTIFICATE COURSE IN PATTERN MAKING & EMBELLISHMENT

	After successful completion of 43 Hrs Certificate Course in Pattern Making & Embellishment the students are able to:
Program Outcomes	**PO1:** This certificate will teach the enrolled students the Basics of pattern making. PO2: Grading gives commercial value to garment industry. By introducing grading concept, we focus the commercial view point creating professionalism. PO3: It will generate self-employability. Students will learn knowledge of fabric embellishment which can be related to fashion designining
Program Specific Outcomes	**PSO 1:** Students can sell the different patterns of motifs and designs prepared by them. **PSO2**: Students will learn polymer clay art, the purpose of which is also embellishment of fabric. **PSO3**: With polymer clay art they can also design Jewellery (bracelets, earrings). **PSO4:** Traditional art of Maharashtra State i.e., WARLI will be introduced. Student will be able to use Polymer clay art on WARLI. **PSO5:** Students will learn the concept of Basic and Regional embroidery. **PSO6**: With the knowledge gained students can also engaged Hobby Classes and Tailoring.
Course Outcomes	
BASICS OF PATTERN MAKING	**CO1**: Introduction of Pattern making, Definitions, Advantages & Disadvantages, what is Commercial Pattern, Body types & measurements, essential & symbols of pattern pieces,

	Identification of Grain lines, Darts as well as cutting lines, stitching lines
	Pattern Layout with it's types
PATTERN GRADING	**CO2**: Students learn the meaning of Pattern Grading along with Grading Sizes
	CO3: Students gain the concept of Pattern grading in different sizes (concept necessary for starting self-employability & Textile Industry to manage any industry unit.
	CO4: Making of pattern Envelope
EMBROIDERY AND EMBELLISHMENT	**CO5**: Embroidery types: Basic & Regional embroidery (used to embellish the garment) **CO6**: Concept of **Polymer art its** steps in process and making (all together a new concept of embellishment) **CO7**: Concept of Traditional Art & Embroidery Students learnt **WARLI ART** (Concept of traditional & regional importance, can also be used as fabric Embellishment (popularity of that State) **CO8**: Structuring & making Designs Students prepare Portfolio for various Designs & Embroidery

CERTIFICATE COURSE IN R-CONSOLE SOFTWARE

CERTIFICATE COURSE IN SKILL DEVELOPMENT IN COMPETITIVE EXAM

English	**After successful completion of 43 Hrs. certificate course in Skill Development for Competitive examinations the students are able to:**
Program Outcomes	PO1: To develop understanding and problem-solving skills of students for Competitive examination. PO2: To develop their ideas and concepts about Competitive Aptitude. PO3: To develop their time management skill for Competitive examination

Program Specific Outcomes	PSO1: To help them to decide which specific Competitive Examinations can be shortlisted according to their aptitude. PSO2: To give them opportunity to appear for various Competitive Examinations for entry in services.
Course Outcomes	
Unit 1	CO1: To provide them knowledge about different topics covered in quantitative aptitude in various examinations. CO2: To familiarize them with short tricks to solve questions in lesser time. CO3: To introduce the students with the various methods to solve questions.
Unit 2	CO1: To enrich them with the concepts of critical thinking skills. CO2: To provide them knowledge about different topics covered in logical reasoning in various examinations. CO3: To guide them about the techniques to solve verbal and non-verbal reasoning questions.
Unit 3	CO1: To familiarize them with the concepts of English grammar & error detection from competitive examinations point of view. CO2: To provide them the training of reading comprehension and finding the answers of questions on it.
Unit 4	CO1: To introduce them different topics covered in general knowledge. CO2: To enrich them with most important topic current affairs.

CERTIFICATE COURSE IN VEDIC MATHEMATICS

	After successful completion of 43 Hrs Certificate Course in Vedic Mathematics the students are able to:
Program Outcomes	**PO1:** To increases speed and accuracy. **PO2:** To improved academic performance and instant results. **PO3:** To sharpens the mind, increases mental agility and intelligence **PO4:** To Increases visualization and concentration in children Increases speed and accuracy. Become a mental calculator
Program Specific Outcomes	**PSO 1:** To develop Analytical thinking through Vedic maths. **PSO 2:** To enhance computational skills in maths. **PSO 3:** To crack entrance of competitive exams. **PSO 4:** To Promote Vedic culture.

Course Outcomes	
Vedic Mathematics	**CO 1**: Develop the understanding of objectives and features of Vedic Arithmetic. **CO 2**: Recognize the meaning of mathematical sutras of vedic arithmetic in Sanskrit. **CO 3**: Understand the concept of addition using completing the whole Method. **CO 4**: Manage to solve the multiplication using vertically and crosswise and one more than the previous one method and demonstrate multiplication by 11, 12 and 13 by using Vedic sutras of multiplication. **CO 5:** Distinguish between squaring numbers ending in 5 and squaring numbers near the base and subbase and manage to perform squaring by Duplex Method and Cubing by Anurupyen Sutra.

CERTIFICATE COURSE IN VERMICULTURING AND VERMICOMPOSTING

Department of Zoology	After successful completion of Certificate Course in Vermicomposting and Vermiculturingin the subject Zoology the students are able to:
Program Outcomes	**PO1:** It help to protect environment and management of waste in sustainable way. **PO2:** Vermicomposting is eco-friendly activity as it does not contain chemical elements, to develop awareness among the people about vermicomposting and increase use of organic product. **PO3:** It helps to avoid the use of hazardous chemicals and its adverse effect on the environment, soil, and plants. **PO4:** Understanding the role of earthworm in modern farming **PO5:** The potential of vermicompost as an alternative to chemical fertilizers
Program Specific Outcomes	**PSO1:** Students know about of Earthworm and its varieties. **PSO2:** It develops student's interest in research activities. **PSO3:** Vermicomposting is eco-friendly activity and can be easily adopted by everyone. **PSO4:** Students are able to work for oneself or develop business **PSO5:** Students will also turn towards organic farming and also convince local farmers about vermicomposting

	importance.
Course Outcomes of certificate course in vermicomposting and vermiculturing	
PAPER:	**CO1:** Importance of Vermiculture/ Vermicompost **CO2:** Earthworm Biology and Rearing **CO3:** Methods of vermicomposting technology and its Application **CO4:** Vermicompost comparison with other fertilizers
Lab Work:	• Identification of different types of earthworms • Study of Systematic position and External characters of Eisenia foetida • Study of Life stages Eisenia foetida • Morphology and development of Earthworm. • Study of Vermicompost • Study of Vermiwash • Study of equipment and devices used in vermicomposting • Preparation vermibeds • Maintenance of vermibeds • Harvesting, packaging, transport and storage of Vermicompost • Separation of Earthworms from Vermicompost