SREE AYYAPPA COLLEGE

ERAMALLIKKARA, CHENGANNUR, ALAPPUZHA DISTRICT
KERALA

(GOVT. AIDED COLLEGE AFFILIATED TO THE UNIVERSITY OF KERALA)
NAAC Accredited

SSR (Cycle II)
Criteria - II
TEACHING, LEARNING AND EVALUATION

PROGRAMME OUTCOMES & COURSE OUTCOMES

Submitted to
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC)
July 2023

PROGRAMME OUTCOMES (PO) for M. Sc Computer Science Programme

	PROGRAMME OUTCOMES (PO)
PO1	To develop an interest in the candidates towards a career in academics and research, and to enable them with sufficient knowledge to become a competent academician
PO2	To apply knowledge of mathematical, scientific, and computer science to evaluate, analyze, synthesize, model and integrate technologies to develop new computer system for applied engineering systems.
PO3	To equip the students with adequate exposure and skills to empower them to catch a deserving position in the software industry.
PO4	Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.
PO5	To develop an interest in promoting the use of Computer Science for the positive development of our society and the environment
PO6	Recognize the need for and develop the ability to engage in continuous learning as a Computing professional.
PO7	Create, identify and apply appropriate techniques, resources, and modern computing tools to complex computing activities.
PO8	To enable the students to contest for regional/national/international level competitive examinations.

Programme Specific Outcomes

The students on completion of M.Sc (Computer Science) Programme will be able to:

PSO1	**Communicate computer science concepts, designs, and solutions effectively and professionally**
PSO2	Apply knowledge of computing to produce effective designs and solutions for specific problems
PSO3	Use of software development tools, software systems, and modern computing platforms to solve real life problems
PSO4	Investigate research gaps, analyze and carry out research in the specialized/emerging areas
PSO5	Apply knowledge of recent computing technologies, skills and current tools of computer science
PSO 6	Utilize skills and knowledge for computing practice with commitment on social, ethical, cyber and legal values

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

COURSE OUTCOMES

CO1	Solve problems on Sets, functions and relations
CO2	Describe Linear Algebra and its applications
CO3	Analyzing Mathematical logic and Boolean algebra
CO4	Solve problems of Probability
CO5	Apply Algebraic Structures on various problems
CO6	Evaluating Graph Theory

DISTRIBUTED OPERATING SYSTEMS

COURSE OUTCOMES

CO1	Describe the principles and concept of Distributed Systems and Distributed Operating Systems.
CO2	Identify the challenges and opportunities faced by Distributed Operating Systems.
CO3	Discuss the middleware technologies that support distributed applications such as RPC, RMI and object based middleware
CO4	Analyze different shared memory architectures
CO5	Identify the issues involved in studying process and resource management
CO6	Explain about the file organization and management in distributed systems.
CO7	Identify the security challenges and control measures in Distributed Operating Systems

DATA STRUCTURES & ALGORITHMS

COURSE OUTCOMES

CO1	Recognize the basic programming concepts in Python
CO2	Practice the data types supported by Python
CO3	Examine the different classifications of data Structures
CO4	Compare the implementation of different data structures
CO5	Interpret the pseudo code representation of algorithms
CO6	Design and implement the different algorithms

COMPUTER GRAPHICS AND IMAGE PROCESSING

COURSE OUTCOMES

CO1	Explain the display technologies including LED, LCD, OLED, Plasma Panel
CO2	Illustrate Bresenham's Ellipse Drawing Algorithm
CO3	Solve 3D transformation problems including rotation, translation and scalin
CO4	Recognize OpenGL command syntax
CO5	List the sequence of operations of the OpenGL rendering pipeline
CO6	Identify the steps in creating animation sequence
CO7	Implement computer graphics programs in Open GL
CO8	Implement basic image processing programs in python
CO9	Illustrate the working of algorithms for processing digital images
CO10	Perform Histogram Equalization

DATA STRUCTURES USING PYTHON LAB

COURSE OUTCOMES

CO1	Illustrate various data representation techniques in the real world
CO2	Implement linear and non-linear data structures
CO3	Formulate various algorithms based on their time and space complexity
CO4	Develop real-time applications using suitable data structure
CO5	Design suitable data structure to solve various computing problems

COMPUTER GRAPHICS & IMAGE PROCESSING LAB

COURSE OUTCOMES

CO1	Implement Computer graphics programs using Open GL
CO2	Implement basic image processing algorithms in Python
CO3	Write programs for 3D transformations of image
CO4	Write program for histogram equalization
CO5	Design Animation Sequences for a given problem

DATA BASE MANAGEMENT SYSTEMS

COURSE OUTCOMES

CO1	Explore relational database and various Normal forms and ER diagrams
CO2	Explain SQL and PL/SQL
CO3	Discuss various concepts of object oriented database
CO4	Identify the various kinds of data and pattern used in data mining.
CO5	Illustrate various algorithms used in data warehousing
CO6	Classify various cluster methods used in data mining and warehousing.

COMPUTER NETWORKS & SECURITY

COURSE OBJECTIVES

CO1	Describe the basics of Networks and Reference models
CO2	Analyze security issues in network, transport and application layers and outline appropriate security protocols
CO3	Discuss the fundamental concepts of Information Security & Cryptography
CO4	Analyze different classical encryption techniques
CO5	Identify the mathematical concepts for different cryptographic algorithms
CO6	Introduce fundamental concepts of authentication algorithms
CO7	Identify different authentication and digital signature schemes

SOFTWARE ENGINEERING

COURSE OBJECTIVES

CO1	Apply the principles of the engineering processes ins software development
CO2	Demonstrate software project management activities such as planning,scheduling and Estimation
CO3	Model the requirements for the software projects
CO4	Design and Test the requirements of the software projects
CO5	Design patterns and object oriented modelling for software projects
CO6	Implement the software development processes activities from requirements to validation and verification
CO7	Apply version control for software

COMPUTER FORENSICS AND CYBER LAWS

COURSE OUTCOMES

CO1	Discuss the importance of a systematic procedure for investigation of data.
CO2	Evaluate the use of computer forensics tools used in data analysis
CO3	Describe the nature and scope of cyber-crime.
CO4	Discuss Cyber crime investigation procedures
CO5	Discuss IT Act 2000, IPR, Copy right.
CO6	Explain the tools used in digital Forensics

CLOUD COMPUTING TECHNOLOGIES

COURSE OUTCOMES

CO1	Describe cloud service models
CO2	Discuss the architecture of Clouds
CO3	Explain about virtualization in clouds
CO4	Describe web services and applications
CO5	Describe the need of security mechanisms in cloud
CO6	Analyze different cloud tools
CO7	Identify the Future trends of Clouds

NATURAL LANGUAGE PROCESSING

COURSE OUTCOMES

CO1	Demonstrate the NLP- Text & Speech understanding system
CO2	Apply the n-gram & Language models in various NLP applications
CO3	Identify the different models for computational Morphological analysis
CO4	Apply and generalize the different types of Parts-of- speech tagging
CO5	Apply and execute the statistical parsing & probabilistic theory
CO6	Generalize the grammar formalisms & tree banks of syntactical parsing
CO7	Recall the Phonetics & Phonology in speech forms
CO8	Generalize the knowledge representation system in Language processing
CO9	Predicate the ambiguity & solutions of different methods
CO10	Describe the place and manner of articulation in speech processing
CO11	Evaluate the recall & F-score method in speech processing
CO12	Implement the Finite State Model for morphological processing
CO13	Criticize the Named Entity Recognition & relation extraction methods
CO14	Execute the probability model for speech processing

NETWORK PROGRAMMING IN JAVA LAB

COURSE OBJECTIVES

CO1	Develop a basic knowledge of programming constructs
CO2	Explore basic knowledge of networking
CO3	Analyze socket programming with Java
CO4	Develop socket programs and client server applications
CO5	Apply socket programming running over Proxy Server

DBMS & DATA MINING LAB

COURSE OUTCOMES

CO1	Describe various kinds of tools in DBMS.
CO2	Analyze the mining techniques for realistic data, and also to conceptualize Data Mining and the need for pre-processing
CO3	Develop the algorithms used for various types of Data Mining Problem
CO4	Construct algorithms to solve data mining problems using WEKA tool
CO5	Demonstrate the classification and clusters Techniques in large datasets.
CO6	Build an ability to add mining algorithms as a component to the existing tools.

AUTOMATA THEORY & COMPILER DESIGN

COURSE OUTCOMES

CO1	Evaluate concepts in automata theory and theory of computation.
CO2	Formulate grammars and recognizers for different formal languages
CO3	Prepare Finite Automata, NFA, Push Down Automata
CO4	Explain Turing Machines and types of Turing Machines
CO5	Analyze the lexical, syntactic and semantic structures of language features
CO6	Explore the techniques for intermediate code representation and machine code optimization

ARTIFICIAL INTELLIGENCE

COURSE OUTCOMES

CO1	Investigate the applications of artificial intelligence
CO2	Explain about learning systems and its application scope
CO3	Illustrate knowledge representation and its structures
CO4	Define machine learning
CO5	Compare different quantification methods of classification
CO6	Differentiate different clustering techniques and algorithms
CO7	Implement Support Vector Machine algorithm and its variants

SOFT COMPUTING TECHNIQUES

COURSE OUTCOMES

CO1	Learn Fuzzy logic and its applications
CO2	Discuss the basic concepts of artificial neural networks and its applications
CO3	Describe about Swarm models and its self-organisation
CO4	Understanding of nature inspired algorithms
CO5	Solve single-objective optimization problems using GAs
CO6	Solve multi-objective optimization problems using Evolutionary algorithms.
CO7	Apply Soft computing techniques to solve problems in various application domains.
CO8	Classify Single and multi-objective Optimization techniques

SOCIAL NETWORK ANALYSIS

COURSE OUTCOMES

CO1	Identify the different components of a web social network that can be used for analyzing and mining
CO2	Represent knowledge using ontology
CO3	Predict human behaviour in social web and related communities
CO4	Visualize social networks
CO5	Develop semantic web related applications

BIOINFORMATICS

COURSE OUTCOMES

CO1	Acquire basic knowledge in Life science
CO2	Obtain detailed knowledge about Bioinformatics
CO3	Appreciate the design of biological databases to hold enormous data
CO4	Implement algorithms used for sequence analysis
CO5	Demonstrate the use tools in bioinformatics
CO6	Identify how computer science is closely associated with Biology

DATA ANALYTICS LAB

COURSE OUTCOMES

CO1	Describe the installation of Hadoop
CO2	Implement some programs in Hadoop
CO3	Implement fewMap Reduce programs
CO4	Install and Run Hive
CO5	Data analytics using Apache Spark

RESEARCH METHODOLOGY & REPORT WRITING

COURSE OUTCOMES

CO1	Introduce concepts in research methodology and technical writing
CO2	Overview of research process
CO3	Introduction of concepts statistical data analysis and use of statistical functions in R language
CO4	Importance of publishing the results of research
CO5	Underline Ethics in research.
CO6	Outline formats and styles for research publications
CO7	Creation of article, book, report, slides using LaTeX

ADVANCED LEARNING TECHNIQUES

COURSE OUTCOMES:

CO1	Explain about fuzzy systems and Fuzzy Logic with examples. (Understand)
CO2	Use fuzzy set theory for solving problems.(Apply)
CO3	Apply Neuro-fuzzy concepts in developing an intelligent system. (Apply)
CO4	Illustrate the working of GANs
CO5	Implement KNN, ensemble and adaBoost classifiers for Machine learning. (Apply)
CO6	Compare different ANN networks and working structure. (Analyze)
CO7	Compare different Deep architectures and their learning models. (Analyze)

OPTIMIZATION TECHNIQUES

COURSE OUTCOMES

CO1	Acquire awareness about ability to apply theoretical knowledge of Mathematics and Computational Science to model and solve real time problems
CO2	Describe operations Research Introduction, limitations and solutions,Overview of Transportation problem, Applications and solutions
CO3	Identify the importance of optimization of industrial process management, Awareness about Assignment problem, limitations and solutions
CO4	Outline Game theory- systematic quantitative approach for deciding the best strategy in competitive situations.
CO5	Outline network theory concepts, CPM and PERT – How they minimise production delays, interruptions and conflicts
CO6	Outline queuing theory- How it helps users make informed business decisions on how to build efficient and cost-effective workflow systems
CO7	Outline Poisson distribution- tool used in probability theory statistics

COMPUTER VISION

COURSE OUTCOMES

CO1	Describe basic principles of computer vision
CO2	Develop understanding of the basic image operations
CO3	Explain image feature detection and matching
CO4	Explore basic theory of edge detection
CO5	Analyze Principal Component Analysis & Motion Estimation
CO6	Develop skills in the design and implementation of computer vision

MAJOR PROJECT PHASE- I

COURSE OBJECTIVES:

The project work aims to develop the work practice in students to apply theoretical and practical tools/techniques to solve real-life problems related to industry or current research. The project work can be a design project/experimental project and/or computer simulation project on any of the topics related to the field of Computer Science.

The project work is chosen / allotted individually on different topics. Work of each student shall be supervised by one or more faculty members of the department. The students shall be encouraged to do their project work in the College itself. If found essential, they may be permitted to carry out their major project outside the College.

The student is required to undertake the major project phase-1 during the third semester and the same is continued in the 4th semester (Phase 2).

In Major Project Phase-I, the students are expected to select an emerging research area in the field of Computer Science. After conducting a detailed literature survey, they should compare, analyze research works done and review recent developments in the area and prepare an initial design of the work to be carried out as Major Project. It is mandatory that the students should refer to National and International Journals and conference proceedings while selecting a topic for their Project. Emphasis should be given to introduction to the topic, literature survey, and scope of the proposed work along with some preliminary work carried out on the Project topic in Phase I.

Phase-1 consist of preliminary work, two reviews of the work and the submission of a preliminary report. First review would highlight the topic, objectives, preliminary report and scope of the work. Second review evaluates the progress of the work, methodology /design and expected results which is to be completed in the 4th semester?

SEMINAR

COURSE OBJECTIVES:

Each student shall present a seminar on any topic of interest related to the core / elective courses offered in the M. Sc. Computer Science programme / recent trends in the field of Computer Science. He / she shall select the topic based on the references from National or International journals of repute. They should get the paper approved by the Programme Co-Ordinator / Faculty member in charge of the seminar and shall present it in the class. Every student shall participate in the seminar.

COURSE OUTCOMES:

The students should undertake a detailed study on the topic and submit a report at the end of the semester. Marks will be awarded based on the topic, presentation, participation in the seminar and the report submitted.

COURSE OUTCOME M.Sc (Computer Science)

The MSc is a two-year graduate programmein Computer Science. Students may choose the research-based course, in which 60 % credits are devoted to courses and 60% credits to an individual research project, or the course-based route, in which 90 %credits are devoted to courses and 30 % credits to an MSc project, which can be a group project. The study programme relates closely to the research carried out at School of Computer Science, through research-based courses and advanced research projects. The goal of the programme is to prepare students for prominent careers in industry and/or for futher academic study.

PROGRAMME OUTCOME

Advanced C++ Programming

On completion of the course, students are able to:

1. Understand advanced concepts for handling runtime errors using stack unwinding, uncaught exception and automatic cleanup.

2. Study the Runtime Type Information of the member variables, functions and the multiple inheritance that are used in the program.

3. Study advanced concepts of C++ by resolving ambiguities and duplicate sub object in virtual base classes.

4. Understand applications of C++ like Smart Pointer , Generic Pointer , Object Validation and Reference Counting.

5. Understand detail concepts of STL.

Advanced Operating System

On completion of the course, students are able to:

1. Study files subsystem for UNIX operating system.

2. Understand detail working of UNIX operating system.

3. Understand process and memory management techniques.

Digital Image Processing

On completion of the course, students are able to:

1. Understand the application of digital image processing.

2. Explore knowledge about image processing fundamentals.

3. Get aware about image sampling and quantization and operation on images

4. Understand histogram processing and various image filtering algorithms.

5. Know about various noise models and transformation techniques.

6. Beaware of various morphological techniques and segmentation schemes.

LAB - II Lab on Advanced C++ Programming

On completion of the course, students are able to develop ROBUST, EXTENSIBLE and EFFICIENT programs using advanced concepts of STL in C++.

CS-201 Advanced DBMS

On completion of the course, students are able to:

1. Explore ideas about centralized and client server architecture of DBMS.

2. Differentiate and handle parallel and distributed databases.

3. Realize object oriented databases and XML databases for Dynamic website development.

4. Be familiar with mobile and multimedia databases.

Compiler Construction

On completion of the course, students are able to:

1. Know role of compilers in program execution.

2. Understand detail program execution using lexical and syntax analysis

3. Be aware of code generation and optimization.

Design and Analysis of Algorithms

On completion of the course, students are able to:

1. Design efficient algorithms using various algorithm designing techniques.

2. Comprehend dynamic programming using control abstraction and longest common subsequence.

3. Classifying any problem as NP complete and NP hard

LAB - IV Lab on Advanced DBMS

On completion of the course, students are able to build and maintain the databases handling real life applications and daily needs.

CS-302 Optimization of Algorithm

On completion of the course, students are able to:

1. Understanding classification and limitation of quantitative techniques.

2. Take hold of linear programming problem solving techniques.

3. Solve various kinds of transportation problems using different techniques.

4. Explore concepts in game theory

5. Be aware about the network models, sequencing models and simulaon models.

Advanced Java Programming

On completion of the course, students are able to:

1. Design programs using Remote method invocations (RMI).

2. Explore programming techniques of Java beans and swing.

3. Be aware about Java Enterprise applications.

4. Know about java servlets and java struts.

LAB –VILab on Advanced Java Programming

On completion of the course, students will get hands on training for various java programs like JDBC, EJB, Servlets, Struts etc.

Advanced Network Programming

On completion of the course, students are able to:

1. Understand network fundamentals with TCP/IP architecture.

2. Aware with client server programming and its application using socket interface.

3. Understand IGMP ICMP and IP datagrams

4. Understating the mobile and advoc network programming.

Data Warehousing and Data Mining

On completion of the course, students are able to:

1. Understand data warehousing for business analysis using OLAP, OLTP, MOLAP and ROLAP.

2. Explore the concepts of data mining and data preprocessing.

3. Understand concept of association rule mining.

4. Grasp classification and prediction and analysie different issues related to them.

5. Identify different cluster analysis techniques.

6. Know about advanced data mining techniques such as spatial data mining and understand the concept of big data analysis.

Mini Project

On completion of the course, students are able to:

1. Deal with real world data.

2. Familiar about real time IT industry enviorment.

3. Expeirnance about applying the knowledge they got uptil now.

4. Build a whole real time working system which will satisfy all custmor's needs.

COURSE OUTCOME BSc (Computer Science)

B.Sc. (**Computer Science**) **Programme Outcome** Develop ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution. To prepare students to undertake careers involving problem solving using **computer science** and technologies.

PROGRAMME OUTCOME

MM1131.10 MATHEMATICS I 1.

AIM: To introduce mathematical concepts and techniques that have applications in computer science field 2.

OBJECTIVES: To introduce advanced differential calculus

*To introduce solutions of differential equations

* To introduce Number theory

* To introduce ComplEX1 Number Theory.

CS 1121 INTRODUCTION TO IT

AIM: To create overall generic awareness about scope of the field of IT and to impart basic personal computingskills.

1. To create background knowledge for the various courses in the programme.

OBJECTIVES: To introduce the basic terminology in the field of IT

To impart functional knowledge about PC hardware, operations and concepts

To impart functional knowledge in the use of GUI Operating System 8To impart functional knowledge in a standard office package (word processor, spread sheet and presentationsoftwares) and popular utilities

To impart functional knowledge about networks and internet.

To give an overview of computer application in various fields and an overall generic awareness about thescope of the field of IT

CS 1131 DIGITAL ELECTRONICS

1. AIM: 8 To impart basic knowledge in digital logic and circuits and to introduce basic concepts of datacommunications.
2. OBJECTIVES: To review basic electronics concepts

To review data representation techniques

To introduce student to basic concepts of digital logic

To introduce students to the design of basic logic circuits

To introduce students to some commonly used combinational and sequential circuits

CS 1141 INTRODUCTION TO PROGRAMMING

1. AIM:

Ø To Expose students to algorithmic thinking and problem solving and impart moderate skills in

programmingina industry-standard programming language

2. OBJECTIVES:

- To expose students to algorithmic thinking and algorithmic representations
- To introduce students to basic data types and control structures in C.
- To introduce students to structured programming concepts
- To introduce students to standard library functions in C language

CS 1142 PROGRAMMING LAB – I

1. AIM: 8 To provide an opportunity for hands-on practice of basic features of DOS, Windows, software tools(wordprocessor, spread sheet, presentation s/w) and algorithmic thinking and problem solving in a industrystandardprogramming language 2. OBJECTIVES: After the completion of this course, the student should be able to: 8 Create, Save, Copy, Delete, Organise various types of files and manage the desk top in general 8 Use a standard word processing package Exploiting popular features 8 Use a standard spread-sheet processing package Exploiting popular features 8 Use a standard presentation package Exploiting popular feature

CS 1132 DIGITAL ELECTRONICS LAB

1. AIM:

To provide hands-on practice of the basic knowledge in digital logic and circuits

2. OBJECTIVES:

To provide hands-on practice basic logic circuits

To provide hands-on practice in some commonly used combinational and sequential circuits

MM 1231.10 MATHEMATICS II

1. AIM: To introduce mathematical concepts and techniques that have applications in computer science field 2. OBJECTIVES: 8 To introduce proof

methods in mathematics and mathematical logic 8 To review concepts and techniques of set theory, relations and functions 8 To introduce variousalgebraic structures 8 To introduce graph theory 8 To develop an excitement in mathematics by highlighting its hidden beauty and significance

CS1241 DATA STRUCTURES

1. AIM:

 To introduce students to various data structures and their features and applicability.

2. OBJECTIVES:

By the end of the course, students should be:

 Able to write well-structured programs in C

 Be familiar with data structures like array, structures, lists, stacks, queues, trees and graphs

 Able to implement the above data structures in C/C++

 Able to appreciate various searching and sorting strategies

 Able to select appropriate data structures for solving a given problem

CS 1242 OBJECT ORIENTED PROGRAMMING

1. AIM:

 To introduce the student to the basic concepts of object orientation and impart skills in an industrystandard
object oriented language

2. OBJECTIVES:

On the completion of this course, the student will be able to

 Understand the concepts of classes and object

 Define classes for a given situation and instantiate objects for specific problem solving

 Reuse available classes after modifications if possible

 Possess skill in object oriented thought process.

CS1243 PROGRAMMING LAB – II

1. AIM:

 To provide an opportunity for hands-on practice of object oriented programming and problem solving in a industry-standard programming language and also hands-on practice in various user-defined static and dynamic data structures.

2. OBJECTIVES:

This course will provide hands-on practice in a the following topics, under a variety of

programmingsituations with a focus on writing, debugging and analyzing object oriented programs:

- basic data types and control structures in C++.
- managing classes and objects in a variety of situations
- solving moderately complex problems involving the above and requiring selection of appropriate structures and algorithms

CS 1244 DATA STRUCTURES LAB

1. AIM:

- To provide an opportunity for hands-on practice on different algorithms using various data structures.

2. OBJECTIVES:

This course will provide hands-on practice in all the following topics, using either C or C++:

- Stack and queues
- managing both singly and doubly linked list
- different trees, construction and traversal
- Searching and sorting.

CS1341 COMPUTER ORGANIZATION & ARCHITECTURE

1. AIM:

- To impart knowledge in the functional organization of physical components and architecture of a computer.

2. OBJECTIVES:

- To understand the functional units of a standard PC and its working
- To understand the memory organization in a computer.
- To introduce the concept of parallel processing and multiprocessing

CS1342 SOFTWARE ENGINEERING

1. AIM:

To enable the students to have a thorough understanding of the activities in development projects using

(a)Structured Analysis and Design and

(b) Object Oriented Analysis and Design.

OBJECTIVES:

At the end of the course, the students should be able to :

Appreciate the importance of having a process for software development.

Understand the various activities undertaken for a software development project following theFunction oriented Design & Object oriented design 8 Understand the issues in code design and development 8 Test software developed using SSAD and OOAD methodologies. Have in depth knowledge about the different OOAD Themes and compare them with SSAD

CS 1343 OPERATING SYSTEMS

1. AIM:
2. To introduce students to basic functions and the theoretical underpinnings of modern operating systems

OBJECTIVES:

To introduce students to:

Fundamental concepts of systems software

Functions of operating systems as a resource manager

Strategies for constrained resource allocation

Strategies for process scheduling 8 Memory and I/O Management techniques

Salient features of popular operating systems.

CS 1344 INTERNET PROGRAMMING

1. AIM:

To Expose students to technology of web sites and to introduce various tools and languages required fortechnical and creative design of state-of-the-art web sites

OBJECTIVES:

To impart basic skills in moderately complex use of the following tools/scripts/languages: HTML, DHTML, CGI Script, Perl, CSS, Javascript, ASP and JSP.

To impart necessary ability to choose the appropriate web tools/languages for creating state-of-the art websites

To Expose students to current trends and styles in web design and applications.

CS 1345 MICROPROCESSORS & PERIPHERALS

1. AIM: 8 To introduce 80x86 assembly language and thereby familiarize the student with architecture ofmicroprocessors
2. OBJECTIVES

: By the end of the course, students should be able to:

Appreciate architectural features of x86 family of processors

Read and write moderately complex assembly programs for 8086 processor

Use the tools debug, TASM/MASM, Unix/Linux Codeview8 Use assembly routines in C/C++

CS 1346 PROGRAMMING LAB – III

AIM: 8 To give hands-on Exposure to 80x86 assembly language 2. OBJECTIVES: In this course, students shall: 8 Practice to use assembly language development tools like debug, TASM/MASM, Unix/Linux Codeview8 Practice majority of 8086 instruction set through simple Examples 8 Develop moderately complex assembly programs for 8086 processor 8 Develop assembly routines in C/C++

CS 1347 INTERNET PROGRAMMING– LAB

1. AIM:
   To give hands-on Exposure to various tools and languages required for technical and creative design ofweb sites
2. OBJECTIVES:
3. To practice moderately complex use of the following scripts/languages/technologies: HTML, DHTML, CSS, 8Javascript, 8 CGI Script, Perl,

CS 1441 DESIGN AND ANALYSIS OF ALGORITHMS

1. AIM: To make students able to devise and analyze new algorithms by themselves.

2. OBJECTIVES: On completion this course, student should:

* Be able to analyse the complexity of algorithms

Be able to select good algorithms from among multiple solutions for a problem

Have better knowledge on fundamental strategies of algorithm design

Have better awareness on complex algorithm design strategies

Implement some typical algorithms.

CS 1442 DATABASE MANAGEMENT SYSTEMS

1. AIM: To introduce basic concepts of data bases, and related techniques and tools

2. OBJECTIVES:

Be aware of basic concepts of data bases and data base management systems

Be aware of concepts of relational data bases. 8 Know to normalize relational data bases

Skilled in using relational algebra and relational calculus

Develop skills to write database queries

CS 1443 COMPUTER NETWORKS

1. AIM:

To introduce computer networks and through knowledge of data communication networks, their structures, techniques as well as some common standards.

3. OBJECTIVES:

On completion of this course student shall: 8 Be aware of evolution of development of networks understand the basic transmission technologies and characteristics
understand the use of layer architecture for networking systems
understand the main design issues of transport protocols and the mechanism to control traffic flow andcongestion.

CS 1444 PROGRAMMING IN JAVA

1. AIM:
   To introduce students to basic features of Java language and selected APIs
2. OBJECTIVES:
   Let students install and work with JDK, also make them aware the use of java doc.
   Practice basic data types, operators and control structures in Java
   Practice basic handling of classes and objects in Java
   Introduce the following selected APIs: I/O, Strings, Threads, AWT, Applet, Networking
   Idea to approach and use a new package

CS 1445 MINOR PROJECT

1. AIM: Minor project will give an opportunity for students to prepare for the major project and alsocontribute to achieving some of the objectives of the major project.
2. Minor projects shall also serveas an opportunity for producing and distributing socially useful software.

CS 1446 PROGRAMMING LAB – IV

1. AIM: To provide an opportunity for hands-on practice in Java.

2. OBJECTIVES: This course will provide hands-on practice, under a variety of programmingsituations with a focus on writing, debugging and analysing object oriented programs:
basic data types and control structures in Java
installing and using JDK 8 writing applications and applets
managing classes and objects in a variety of situations
using i/o, string, threads and net APIs 8 solving moderately complex problems involving the above.

CS 1541 FREE AND OPEN SOURCE SOFTWARES (FOSS)

1. AIM:
To introduce different free and open source softwares
OBJECTIVES: At the end of this course, the students will be able to

Explain the features of free &open source software 8 Familiarization with LINUX

Work with PHP 8 Demonstrate the working of MySQL

CS 1542 SYSTEM SOFTWARE

1. AIM:

 Provide an overall picture of the system related software

2. OBJECTIVES:

At the end of the course, the students should be able to

 Explain the internal working of the system

 Discuss the principles of assemblers

 Narrate the working of loaders and linkers

 Discuss system development tools

CS 1543 COMPUTER GRAPHICS

1. AIM: 8 To introduce basic theoretical underpinnings and concepts behind computer graphics and Expose student to algorithms, tools and techniques for implementing the same.

2. OBJECTIVES: On completion of this course, students should be able to:

handle basic graphic primitives in C/C++ for developing 2D and 3D graphics

program basic scan-conversion algorithms

apply various transformations to 2D and 3D graphic objects

derive various projections of 3D objects

give realistic rendering to 3D wireframe objects be familiar with current trends in computer graphics.

CS 1551 OPEN COURSE CS 1551.1 INTERNET TECHNOLOGY

1. AIM:

Give an introduction about the components of internet, its working and the way in which web pages are designed.

2. OBJECTIVE: At the end of this course, the students will be able to
   Discuss various components of internet
   Explain different devices used for networking
   Explain the working principle of Internet
   Design web pages using HTML

CS 1561 ELECTIVE
CS 1561.1 MULTIMEDIA SYSTEMS

1. AIM:

 To introduce students to various multimedia elements along with the theoretical underpinnings and
toexpose them to integration of these elements.

2. OBJECTIVES:

By the end of this course, students should be:

 Familiar with features of text, audio, images, video and active contents

 Familiar with the file formats for the above elements

 Aware of various application softwares used to process the above elements

 Aware of various applications of multimedia

CS 1641 INTRODUCTION TO INFORMATION SECURITY

1. AIM:
   To introduce internetworking and the issues and methods of information security over internetworks.
2. OBJECTIVES: On completion of this course student shall:
   Be aware of principles and protocols of internetworks
   understand the basic issues in information security
   understand the concept of ciphers and cryptography.
   To impart an idea on various ciphers
   understand the concept of digital signatures and e-mail security policies
   to impart an idea on malicious softwares and remedies.

CS 1642 ARTIFICIAL INTELLIGENCE

1. AIM: To Expose students to basic concepts and tools of Artificial Intelligence and create awareness about its applications, both current and futuristic
2. OBJECTIVES:
   To introduce the notion of machine intelligence
   To introduce the symbolic processing paradigm of AI and algorithms for state space search
   To introduce the knowledge representation formalism
   To introduce basics concepts and challenges of Robotics
   To introduce basics concepts and challenges of Speech and Language Processing
   To introduce basics concepts and challenges of Expert systems
   To give basic introduction to some of the tools/languages used in AI field

CS 1643 E-COMMERCE & E-GOVERNANCE

1. AIM:
   To create an awareness about role of IT in business and to introduce concepts and techniques of ecommerce
2. OBJECTIVES: By the end of this course, the student should: Have an awareness about role of IT in business
3. Have knowledge of basic concepts of e-commerce

4. Be aware of different types of e-commerce web sites and different modes of payments
5. Be aware of security and legal issues in e-commerce

CS 1661 ELECTIVES CS1661.1 MOBILE COMPUTING

1. AIM:
   To introduce wireless application protocol technology and applications
2. OBJECTIVES:
3. To introduce technology of mobile phones and pocket computers
4. To introduce applications of WAP 8 To introduce wireless communication technology such as GPRS
5. To impart basic idea on portal servers, data synchronization

Program Specific Outcomes for BSc Electronics

PSO1	Ability to apply knowledge of mathematics & science in solving electronics related problems
PSO2	Ability to design and conduct electronics experiments, as well as to analyze and interpret data
PSO3	Ability to design and manage electronic systems or processes that conforms to a given specification within ethical and economic constraints
PSO4	Ability to identify, formulate, solve, and analyze the problems in various disciplines of electronics.
PSO5	Ability to function as a member of a multidisciplinary team with sense of ethics, integrity and social responsibility
PSO6	Ability to communicate effectively in term of oral and written communication skills
PSO7	Recognize the need for and be able to engage in lifelong learning.
PSO8	Ability to use techniques, skills, and modern technological/scientific/engineering software/tools for professional practices

Atributes for preparing the Course outcomes

Sl No	Cognitive Level (CL)
1	Remembering (R)
2	Understanding (U)
3	Applying (Ap)
4	Analysing (An)
5	Evaluating (E)
6	Creating (Cr)

Sl No	Knowledge Dimension (KD)
1	Factual Knowledge (F)
2	Conceptual Knowledge (C)
3	Procedural Knowledge (P)
4	Metacognitive Knowledge (M)

DEPARTMENT OF MATHEMATICS
SREE AYYAPPA COLLEGE, ERAMALLIKKARA

LEARNING OUTCOMES

B. Sc Mathematics Programme

PROGRAMME SPECIFIC OUTCOMES

After the successful completion of this course, the student will be able to:

- Demonstrate an understanding of the foundations and history of mathematics.
- Develop familiarity with the depth of modern mathematics, by successful completion of a range of advanced courses.
- Communicate mathematics effectively in writing.
- Utilize technology to address mathematical ideas.
- Understand the broad background of Mathematics and develop an appreciation of how its various sub disciplines are related.
- Recognize and appreciate the connections between theory and applications.
- Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving.
- Develop an in-depth knowledge about topics chosen from those offered through the university.
- Engage in an independent mathematical project.
- Develop understanding of career opportunities in Mathematics and use mathematics in their careers.
- Build up strong foundations for higher studies in Mathematics.
- Formulate and analyze mathematical models of real life situations.
- Join teaching profession in primary and secondary schools.

COURSE OUTCOMES

FIRST SEMESTER

MM 1141 METHODS OF MATHEMATICS

After the successful completion of this course, the student will be able to:

- Take limits of algebraic and trigonometric expressions including limits that go to infinity, limits that don't exist and limits that are finite.
- Differentiate all polynomial, rational, radical, and trigonometric functions and compositions of those functions and apply it for optimization and for solving problems in Physics and economics
- Compute indefinite integrals and find antiderivatives, including finding constants of integration given initial conditions.
- Apply the definite integral to compute area between two curves, volumes of solids of revolutions, arc length, surface area for surfaces of revolution and work problems.

SECOND SEMESTER

MM 1221 FOUNDATIONS OF MATHEMATICS

After the successful completion of this course, the student will be able to:

- Understand the concept of complex numbers and hyperbolic functions
- Perform basic operations of complex numbers and to represent complex numbers in polar forms
- Develop understanding about the difference between total and partial derivatives and to perform both operations.
- Evaluate multiple integrals and apply it in relevant situations.
- Perform basic vector computations, as well as dot and cross products of two vectors and projection of one vector onto another vector.

THIRD SEMESTER

MM 1341 ELEMENTARY NUMBER THEORY AND CALCULUS - I

After the successful completion of this course, the student will be able to:

- Develop knowledge of basic concepts in Number Theory
- Analyze vector functions to find derivatives, tangent lines, integrals, arc length, and curvature etc.
- Apply derivative concepts to find tangent lines to level curves and to solve optimization problems.
- Find tangent lines to intersections of surfaces, extrema ofr multivariate functions and Lagrange multipliers to solve extremum problems with constrains.

FOURTH SEMESTER

MM 1441 ELEMENTARY NUMBER THEORY AND CALCULUS - II

After the successful completion of this course, the student will be able to:

- Gain knowledge in the fundamental facts in Elementary Number theory.
- Perform operations in connection with congruence relations and its properties.
- Understand about Mahavira's puzzle, modular inverses and polar Rho factoring method, Wilson's theorem, Fermat's little theorem and Euler's theorem.
- Evaluate double integrals and triple integrals in both Cartesian and polar coordinates and apply it to find areas and volumes under curves.
- Define and evaluate surface integrals and apply it to solve problems by making use of the divergence theorem, Gauss's law & Stoke's theorem.

FIFTH SEMESTER

MM 1541 REAL ANALYSIS - I

After the successful completion of this course, the student will be able to:

- Describe fundamental properties of the real numbers that lead to the formal development of Real Analysis.
- Interpret ideas in Real Analysis geometrically as well as algebraically.
- Approximate irrational numbers by rational numbers.
- Define neighborhood, absolute value, completeness of a set, countability etc.
- Develop an understanding of limits and how they are used in sequences, series, differentiation and integration.
- Illustrate Dedekind's property, Completeness property, Supremum property etc using examples.
- Use plotting softwares such as GeoGebra to plot various functions.

MM 1542 COMPLEX ANALYSIS - I

After the successful completion of this course, the student will be able to:

- Develop understanding of the basic concepts underlying complex analysis.
- Perform basic operations on complex numbers.
- Define uniform convergence, analyticity of functions, power series etc.
- Evaluate power series expansions of exponential functions and the sine and cosine functions.
- Describe integral of a function along a curve as a limit of Reimann sum.
- Illustrate the use of complex numbers in Number theory & Geometry.

MM 1543 DIFFERENTIAL EQUATIONS

After the successful completion of this course, the student will be able to:

- Recall the concepts in differential and integral calculus.
- Understand various methods to solve first order differential equations and second order linear equations.
- Solve various physical problems using differential equations.
- Find solutions of exact differential equations.
- Describe integration from the viewpoint of differential equations.

MM 1544 VECTOR ANALYSIS

After the successful completion of this course, the student will be able to:

- Define directional derivatives, vector fields, del and Laplacian operators etc.
- Evaluate line integrals.
- Describe conservative vector field.
- Prove Green's theorem and apply the theorem in relevant situations.
- Use Gauss's theorem to evaluate surface integrals.
- Apply Stoke's theorem to interpret integrals as anti-derivatives.

MM 1545 ABSTRACT ALGEBRA - I

After the successful completion of this course, the student will be able to:

- Recall the basic concepts of set theory.
- Recognize the concept of binary operations.
- Understand the well-definedness and closedness of a set under a binary operation. ➢ Define group, subgroup, cyclic groups, permutations, direct products, cosets etc.
- Prove Lagrange's theorem and apply the theorem in relevant situations. ➢ Write proofs and do problems based on axioms.

MM 1551 OPEN COURSE - OPERATIONS RESEARCH

After the successful completion of this course, the student will be able to:

- Formulate linear programming models and the graphical solutions of linear programs in two variables.
- Express linear programs in standard forms.
- Find solution of a linear programming problem using simplex method.
- Solve transportations problems using Vogel's approximation method. ➢ Understand project management and assignment problems.

SIXTH SEMESTER

MM 1641 REAL ANALYSIS - II

After the successful completion of this course, the student will be able to:

- Recall the basic concepts in Real Analysis.
- Understand the History of development of calculus.
- Interpret the notion continuity geometrically as an unbroken curve.
- Explain the connection between continuity and existence of limits. ➢ View differentiation from a conceptual point of view.
- Understand the difference between anti-differentiation and Reimann's theory of integration.
- Apply Reimann's theory of integration.

MM 1642 LINEAR ALGEBRA

After the successful completion of this course, the student will be able to:

- Recall the basic concepts of matrices.
- Understand the geometrical aspects of linear algebra.
- Describe the two dimensional aspects of analytic geometry, solutions of simultaneous equations in two variables and the theory of 2X2 matrices.

- Extend the concepts in two dimension to three dimension.
- Extend the concepts in two & three dimensions into arbitrary dimensions.

MM 1643 COMPLEX ANALYSIS - II

After the successful completion of this course, the student will be able to:

- Recall the basic concepts in complex analysis
- Understand the properties of functions analytic i9n a disc or on a punctured disc.
- Define singularity, residues, contour integral etc.
- Apply contour integral methods to evaluate and estimate sums.
- Represent analytic functions as power series.
- Apply Residue theorem to evaluate integrals.

MM 1644 ABSTRACT ALGEBRA - II

After the successful completion of this course, the student will be able to:

- Recall the basic concepts in group theory.
- Familiarize with detailed study on group theory.
- Understand the basic concepts of ring theory.
- Assess properties implied by the definitions of groups and rings.
- Define homomorphism of groups, factor groups etc.
- Analyze examples of rings, factor groups etc.

MM 1645 COMPUTER PROGRAMMING (PRACTICAL)

After the successful completion of this course, the student will be able to:

- Prepare document in computers using the LATEX typesetting program ➢ Understand the basics of computer programming using Python.
- Understand the fundamentals of GNU/Linux operating system.
- Identify the Linux directory structure and the advantages of keeping their files in well structured directories.

MM 1651 ELECTIVE COURSE – GRAPH THEORY

After the successful completion of this course, the student will be able to:

- Understand the basic concepts of graphs, directed graphs etc
- Represent graphs by matrices
- Understand the properties of trees and to find the centre, radius and diameter of trees ➢ Determine whether a graph is planar or non planar
- Define walks, paths, circuits, connected graphs, bipartite graphs etc.
- Understand the concept of Euler graph and apply it to describe the Konigsberg problem, utility problem, seating problem etc.

MM 1646 PROJECT

After the successful completion of project, the student will be able to:

- Demonstrate library research skills in the area of Mathematics.
- Develop communication and teamwork skills.
- Produce a mature oral presentation of a non-trivial mathematical topic.

STATISTICS COMPLEMENTARY COURSE FOR MATHEMATICS

FIRST SEMESTER

ST 1131.1 DESCRIPTIVE STATISTICS

After the successful completion of this course, the student will be able to:

- Understand the characteristics of data and will get acquainted with describing data through illustrating examples and exercises.
- Collect, organize and summarize data.
- Create and interpret simple graphs.
- Compute appropriate summary statistics.

SECOND SEMESTER

ST 1231.1 PROBABILITY AND RANDOM VARIABLES

After the successful completion of this course, the student will be able to:

- Understand the ideas of probability and random variables in both univariate and bivariate cases.

THIRD SEMESTER

ST 1331.1 STATISTICAL DISTRIBUTIONS

After the successful completion of this course, the student will be able to:

- Understand the ideas of standard probability distributions, limit theorems and sampling distributions and its applications.

FOURTH SEMESTER

ST 1431.1 STATISTICAL INFERENCE

After the successful completion of this course, the student will be able to:

- Understand point estimation, interval estimation, testing of hypothesis and design of experiments.

ST 1432.1 PRACTICAL USING EXCEL

After the successful completion of this course, the student will be able to:

- Use statistical tools available in Excel
- Have hands on training in Data Analysis

Course outcome of **Biochemistry (core)** of BSc Biochemistry and Industrial Microbiology

SEMESTER	PROGRAMME CODE	COURSE TITLE	COURSE OUTCOME
Semester I	**IM1121:**	**Foundation course I- Core related** **Course title: Biomolecules**	Student will be able to • List out the contributions of popular scientists in the field of biochemistry. • Describe the classification, structure and chemical properties of biomolecules including carbohydrates, lipids, proteins, amino acids and nucleic acids.
Semester II	**IM1241**	Environmental Studies	To understand the scope and importance of Environmental studies Ecology, Biodiversity and its conservation and Natural resources Industry and Environment Social issues and environment
Semester III	IM1341	**Analytical Biochemistry and Biophysical Chemistry**	• Discuss about various concepts in research methodology • Explain the principle, working and application of different separation techniques like chromatography, electrophoresis and centrifugation • Describe the principle, working and application of colorimeter and spectrophotometer • List out the application of information technology and statistical methods in biology

Semester IV	**IM1441**	**Physiological aspects of Biochemistry and Enzymology**	• Describe the mechanism of food digestion, hemopoeisis, hemostasis, kidney functions and respiration. • Detail on the physiological events in nephron, muscle, nerve and bone. • Explain the classification, functions and regulation of hormones and hormonal control of reproduction. • Depict mechanism of enzyme action, enzyme kinetics and inhibition.
Semester V	**IM1541**	Molecular Biology	• Explain about the genome organization. • Detail on gene expression and regulation of gene expression in prokaryotes. • Describe the various mutations and repair pathways in prokaryotes.
Semester V	**IM1542**	**Food Science**	• Explain about the basic aspects of human nutrition and chemical composition of food consumed by human. • List out the techniques of preservation of food and the common methods of adulteration. • • Enumerate food safety and management processes.

Semester V	**IM1551**	**Open Course :** Lifestyle Diseases	List out the common diseases caused by improper lifestyle. • Describe the methods of diagnosis of the diseases. • Explain the ways of treatment and management of these diseases.
Semester VI	**IM1641**	**Clinical Biochemistry**	Clinically assess the laboratory indicators of physiological conditions and diseases. Describe the basic concepts of pharmacology and mechanism of action of drugs.
Semester VI	**IM1642**	**Metabolism**	Write the reactions involved in metabolism of carbohydrates, lipids, amino acids & nucleic acids. • List out the inborn errors of metabolism and the defective enzymes associated with it. • Describe the regulatory mechanisms and bioenergetics of the metabolic pathways. • Explain the process involved in photosynthesis.
Semester VI	**IM1643**	**Advanced Biochemistry**	• Write the principle of rDNA technology, PCR, cloning, RFLP, RAPD, AFLP and STR. • List out techniques for characterization of nanomaterials and its functionalization. • Explain nanotechnology and its applications in medicine and developing nano-biosensors.

			• Describe applications of virtual techniques in life science.

CAREER RELATED FIRST DEGREE PROGRAMME IN BIOCHEMISTRY (CORE) & INDUSTRIAL MICROBIOLOGY (VOCATIONAL)

Under

CHOICE BASED CREDIT & SEMESTER SYSTEM

PROGRAMME & COURSE OUTCOME-INDUSTRIAL MICROBIOLOGY (VOCATIONAL)

Aim of the Programme:

Microbiology deals with the study of microbes. The Degree programme aims at providing an in depth understanding of the Microbiology, Microbial genetics, physiology of microbes, cell biology, Medical, Environmental, Food and Industrial Microbiology and their experimental aspects. Microbiologists study the interaction of microorganisms with people and how they affect their lives, as well as the roles these organisms play in the environment. The students need to achieve the program specific outcome listed below.

Program Specific Outcome

After successful completion of the programme a student will acquire/develop following competencies:

1. Acquire knowledge and understanding of the microbiology concepts as applicable to diverse areas such as medical, industrial, environment, genetics, agriculture, food and others.

2.Demonstrate key practical skills/competencies in working with microbes for study and use in the laboratory as well as outside, including the use of good microbiological practices.

3. Competent enough to use microbiology knowledge and skills to analyze problems involving microbes, articulate these with peers/ team members/ other stake holders, and undertake remedial measures/ studies etc.

4. Develop a broader perspective of the discipline of Microbiology to enable them to identify challenging societal problems and plan his professional career to develop innovative solutions for such problem

COURSE CODE: IM 1171

VOCATIONAL COURSE I

CORSE TITLE: FUNDAMENTALS OF MICROBIOLOGY

CREDITS: 4 **Total lecture hours- 54 hours (3hours /week)**

PRE – REQUISITE:

Basic knowledge on Microbiology gained during H. Sc.

COURSE OBJECTIVES:

To become familiar with the foundation concepts of history of Microbiology and to understand the structure and functions of a typical prokaryotic cell. To gain the knowledge of microscopy, staining concepts, culture methods and culture media. To understand and implement sterilization techniques and safety measures.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to:

1. Get acquainted with contributions of various scientists. CO1
2. Gain knowledge about microscopy and general characters of microorganisms. CO2
3. Acquainted with staining techniques. CO3
4. Explore basic techniques of microbiology. CO 4
5. Identify the shapes of microbes and cultivate microbes in the lab. CO 5 & CO 6

(CO1 - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** Create)

SEMESTER I

PRACTICAL FOR IM 1171

VOCATIONAL PRACTICAL -I

CREDIT - 0 **Total Hrs-36 (2Hrs /week)**

PRE- REQUISITE:

Basic knowledge on Microbiology gained during H. Sc

COURSE OBJECTIVES:

This course develops the concepts of methodology involved in studying the different components of microbial cell and various techniques and instruments used in Microbiology laboratory isolation, visualization and handling of microorganisms

COURSE OUTCOME:

After the completion of this course, the student will be able to:

Get acquainted to the laboratory precautions and techniques to be followed in

1. General microbiology laboratory. CO2
2. Understand the working of common instruments in Microbiology laboratory. CO2
3. Understand the preparation of media used in Microbiology laboratory. CO3
4. Identify microscopic morphology of microorganisms. CO4
5. Acquire skills to isolate microorganisms. CO3, CO6
6. Understand the cultural characteristics of microorganisms. CO2, CO3

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** Create)

SEMESTER II

COURSE CODE: IM 1222

FOUNDATION COURSE II - (VOCATIONAL)

CORSE TITLE: MICROBIAL TAXONOMY AND PHYSIOLOGY

CREDITS - 3 **Total lecture hours- 54 hours (3hours/week)**

PRE - REQUISITE:

Basic knowledge of microorganisms during the first year of this programme.

COURSE OBJECTIVES:

The major objective of this paper is to develop clear understanding of taxonomical classification of Microorganisms, various aspects of microbial physiology, growth, nutritional requirement and nutritional classification and energy generation.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to:

1. Know about basics of microbial classification, taxonomy. CO 2
2. Explore the taxonomy, characters, life cycle and economic importance of Fungi, algae, protozoa with representative types. CO3
3. Gain knowledge about growth and key factors influencing the growth of microorganisms. CO 3
4. Distinguish the Microorganisms based on their nutritional requirements and transport mechanisms of nutrients uptake CO 4
5. Be acquainted applications of bioluminescence CO 4

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** Create)

SEMESTER II

COURSE CODE: **IM 1271**

VOCATIONAL COURSE II- PRACTICALS (P-2)

MICROBIAL PHYISIOLOGY & CULTURE TCHNIQUES

CREDITS - 3 **Total Hrs-36 (2Hrs /week)**

PRE- REQUISITE:

Basic knowledge of microorganisms during the first semester of this programme.

COURSE OBJECTIVES:

To gain skill in isolation and enumeration of microorganisms from various samples and to understand the identification of microorganisms using biochemical tests.

COURSE OUTCOME:

1. Identify standard methods for the isolation, identification and culturing of microorganisms. CO3 &CO4
2. Comprehend the ubiquitous nature of microorganisms and identify the different groups of microorganisms from different habitats and their applications. CO3 &CO4
3. Carry out experiments to evaluate effect of physical and chemical factors on microbial growth. CO3 &CO4

(CO1- Remember; CO2 - Understand; CO3 - Apply; CO4 - Analyze; CO5 - Evaluate; CO6 – Create)

SEMESTER III

COURSE CODE: IM 1371

VOCATIONAL COURSE III

COURSE TITLE: CELL BIOLOGY

CREDITS -3 **Total lecture hours- 72hrs (4hrs/week)**

PRE- REQUISITE:

Basic knowledge of prokaryotic and eukaryotic cell structures acquired during HSc and first year of this programme

COURSE OBJECTIVES:

This course is intended to provide the basic understanding of structures and purposes of basic components of cell membranes, different cell organelles, cellular communication, cell division and its regulation

COURSE OUTCOME:

On the successful completion of the course, student will be able to:

1. Recall the origin of life and history of cytology and draw the structure of cell organelles and locate its parts along with functions. CO 2
2. Distinguish the structure of prokaryotic and eukaryotic cell. CO2
3. Students will understand and describe the structure and basic components of prokaryotic and eukaryotic cells. CO2
4. Explain the communications of cells with other cells and to the environment. CO2
5. Compare and contrast the events of cell cycle and its regulation. CO4
6. Design the model of a cell. CO6

(**CO1**- Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER III

COURSE CODE: IM 1372

VOCATIONAL COURSE- IV

COURSE TITLE: MICROBIAL GENETICS AND BIOTECHNOLOGY

CREDITS - 3 **Total lecture hours- 54hrs (3hrs/week)**

PRE- REQUISITE:

Basic knowledge of microorganisms during the first year of this programme.

COURSE OBJECTIVES:

To become familiar with the foundation concepts of microbial genetics and to understand the importance of replication, transcription, translation, mutation and repair in the cell. To gain the knowledge of recombinant DNA technology and its applications and also to acquaint

knowledge about animal cell culture, plant tissue culture techniques and basic knowledge on intellectual property rights.

COURSE OUTCOME:

On the successful completion of the course, student will be able to:

1. Recall the origin of life and history of cytology and draw the structure of cell organelles and locate its parts along with functions CO2
2. Distinguish the structure of prokaryotic and eukaryotic cell CO2
3. Students will understand and describe the structure and basic components of prokaryotic and eukaryotic cells. CO2
4. Explain the communications of cells with other cells and to the environment. CO2
5. Compare and contrast the events of cell cycle and its regulation. CO4

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER III

PRACTICAL FOR IM 1372

VOCATIONAL PRACTICAL-P3

CREDITS - 0 **Total lecture hours- 36 hrs (2hrs/week)**

PRE- REQUISITE:

Basic knowledge of microorganisms during the first year of this programme

COURSE OBJECTIVES:

The objective of this course is to train the student in basic molecular biology and microbial genetics techniques. The student will learn how to isolate and analyze, DNA and plasmids. The student will become familiar with transferring genetic material into bacteria by transformation and conjugation methods, plant tissue culture, mushroom cultivation and bioassay for evaluating mutagen or carcinogen.

COURSE OUTCOME:

1. Is able to perform agarose gel electrophoresis. CO3, CO5
2. Is able to isolate antibiotic resistant bacterial population. CO3, CO5
3. Is able to perform replica plate technique CO4, CO5
4. Is able to isolation genomic and plasmid DNA. CO3
5. Learns to set up bacterial recombination CO2
6.

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER IV

COURSE CODE: IM1471

VOCATIONAL COURSE –V

ENVIRONMENTAL, SOIL AND AGRICULTURAL MICROBIOLOGY

CREDITS - 3 **Total lecture hours- 54hrs (3hrs/week)**

PRE- REQUISITE:

Basic knowledge of microorganisms during the first year of this programme.

COURSE OBJECTIVES:

The major objective of this paper is to impart knowledge about structure, composition and functioning of microbial communities of diverse environment and to become familiar with basics of microbial interactions, and also to understand the use of microbial population in agriculture, mineral recovery, management of various types of pollutants and conversion processes of various types of wastes into value added products.

COURSE OUTCOME:

On the successful completion of the course, student will be able to:

1. Know about basics of Microorganisms interactions CO2
2. Gain knowledge about solid and liquid waste management CO 3

3. Gain knowledge about role of microorganisms in Biogeochemical cycling CO2
4. Gain knowledge about the application of microorganisms in agriculture CO3
5. Understand about different plant diseases and their management CO2 & CO3

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER IV

COURSE CODE:IM 1472

VOCATIONAL COURSE –VI

FOOD AND DAIRY MICROBIOLOGY

CREDITS - 2 **Total lecture hours- 54hrs (3hrs/week)**

PRE-REQUISITE:

Basic knowledge of microorganisms during the first year of this programme.

COURSE OBJECTIVES:

The course will enable students to understand the importance of microorganisms in food and dairy industry. The course will teach the strategies to develop various fermented and non-fermented products using microorganisms and also the role of microbes in food spoilage, preservation, Good manufacturing practices, principle of HACCP and various food borne diseases.

COURSE OUTCOME:

On the successful completion of the course, student will be able to:

1. Understand the role of Microbes in food. CO 2
2. Familiarize the preservation techniques in food. CO2 &CO3
3. Create awareness about spoilage of food by microbes CO3 &CO4
4. Gain acquaintance about fermented foods CO3 &CO6
5. Get the knowledge about food borne diseases and their outbreaks CO4 &CO5

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER IV

COURSE CODE: IM 1473

VOCATIONALCOURSE VII- PRACTICAL-P4

COURSE TITLE: ENVIRONMENTAL & FOOD MICROBIOLOGY TECHNIQUES

CREDITS - 3 **Total lecture hours- 54hrs (3hrs/week)**

PRE- REQUISITE:

Basic knowledge of microorganisms during the first year of this programme

COURSE OBJECTIVES:

The course impact knowledge to students on water quality analysis, isolation of N2 fixing microorganisms, management different diseases of plants caused by microorganisms and also to gain knowledge on various methods of microbial analysis of food and dairy products.

COURSE OUTCOMES:

After the completion of this course, the student will be able to:

1. Acquire knowledge about water quality analysis. CO3,CO4
2. Acquire knowledge about the isolation of N2 fixing microorganisms. CO3
3. Acquire knowledge about the management different diseases of plants caused by microorganisms. CO3,CO4
4. Acquire knowledge about milk quality analysis. CO3,CO4
5. Acquire knowledge about the microbiological examination of different kinds of food. CO3,CO4

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER V

COURSE CODE: IM 1571

VOCATIONAL COURSE – VIII

COURSE TITLE: FERMENTATION TECHNOLOGY

CREDITS - 3 **Total lecture hours- 72hrs (4hrs/week)**

PRE- REQUISITE:

Knowledge of microorganisms studied during the first & second year of this programme.

COURSE OBJECTIVES:

The course will enable students to apply the learning of microbiology concepts toward the exploitation of microbial population for industrial and human benefits. The strategies for development of microbial strains, process optimization, large scale production and product recovery will be covered for industrially relevant microbial products.

COURSE OUTCOME:

On the successful completion of the course, student will be able to:

1. Screen and isolate beneficial microorganisms from the environment. CO3
2. Understand about strain improvement techniques CO2
3. Understand the parts and design of fermenter CO2
4. Gain theoretical knowledge on production of microbial products. CO2
5. Gain knowledge about different techniques of fermentation product recovery CO2
6. Gain knowledge about different microorganisms important in food industry CO2

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER V

COURSE CODE: IM 1572

VOCATIONAL COURSE –IX- PRACTICAL-P5

COURSE TITLE: INDUSTRIAL MICROBIOLOGY

CREDITS - 4 **Total lecture hours- 108hrs (6hrs/week)**

PRE- REQUISITE:

Basic knowledge of microorganisms and laboratory techniques studied during the first & second year of this programme.

COURSE OBJECTIVES:

To make the students knowledgeable on production of various industrial products and to understand various techniques used in fermentation industries.

COURSE OUTCOME:

1. The students will be able to understand screening methods for Industrial microbes. CO2
2. The students will be able to understand various techniques used in Fermentation Industries. CO2
3. The students will be able to know the Industrial production of various Products CO3

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER VI

COURSE CODE: IM 1671

VOCATIONAL COURSE – X

COURSE TITLE: MEDICAL MICROBIOLOGY

CREDITS-3 **Total lecture hours- 54hrs (3hrs/week)**

PRE- REQUISITE:

Knowledge of microorganisms during the first & second year of this programme.

COURSE OBJECTIVES:

The student will able to learn the basic concepts of medical microbiology and microbial pathogenesis: study of microbes, antimicrobial agents, epidemiology, and virulence factors associated with the pathogenic microorganisms.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to:

1.	Gain the basic knowledge about infections, outbreaks and control measures.	CO2 & CO3
2.	Understand the pathogenicity of Gram positive bacterial pathogens.	CO2 & CO3
3.	Gain the basic knowledge about fungal infections.	CO 2 & CO3
4.	Gain the basic knowledge about viral and parasitic infections.	CO 2 & CO3
5.	Gain the basic knowledge antibiotics their mode of action and antibiotic sensitivity testing	CO 2 & CO3

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

SEMESTER VI

COURSE CODE: IM 1672

VOCATIONAL COURSE IX- PRACTICAL

COURS TITLE: MEDICAL MICROBIOLOGY & IMMUNOLOGY

CREDITS - 4 **Total lecture hours- 108 hrs (6hrs/week)**

PRE- REQUISITE:

Basic knowledge of microorganisms studied during the first & second year of this programme.

COURSE OBJECTIVES:

The student will be able to evaluate methods used to identify common infectious agents in the clinical microbiology lab. The student will be able to assess treatment strategies including the appropriate use of antimicrobial agents and common mechanisms of antimicrobial action and resistance and to perform various serological and immunological diagnostic tests.

COURSE OUTCOME:

1. To learn standard laboratory procedures in clinical microbiology. CO2& CO3
2. To understand how to handle and identify medically important bacteria. CO2& CO3
3. To perform antimicrobial sensitivity tests. CO2& CO3
4. Gain knowledge on various serological and immunological Techniques involved in diagnosis. CO2& CO3

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

ELECTIVE COURSE

COURSE CODE: IM 1661

COURSE TITLE: IMMUNOLOGY

ELECTIVE COURSE (VOCATIONAL)

CREDIT:2 **Total lecture hours- 36hrs (2hrs/week)**

PRE - REQUISITE:

Basic knowledge of immunology studied during HSc and first, second year of this programme.

COURSE OBJECTIVES:

The objective of this course is to understand the various components of the host immune system, their structure and organization, and functions to serve as the defense system of the body. It would also make the students understand the operational mechanisms which underlie the host defense system, allergy and organ transplantation.

COURSE OUTCOMES:

1. Understand the basics of Immunology and defense mechanisms CO2
2. Gain knowledge about immunity types and function of immunoglobulins. CO2
3. Understand about the cells and organs of immune system CO2
4. Know about the autoimmune diseases CO2
5. Create awareness about hypersensitivity and immunodeficiency disease. CO3 & CO4

(**CO1** - Remember; **CO2** - Understand; **CO3** - Apply; **CO4** - Analyze; **CO5** - Evaluate; **CO6** – Create)

Career Related First Degree Programme in
Commerce with Computer Application
Under the Choice Based Credit and Semester System (CBCSS)
[Schedule 2 (b)]
(To be introduced from 2018 admissions)

The Career Related First Degree Programme in Commerce with Computer Application **is** designed with the objective of equipping the students to cope with the emerging trends and challenges in the industrial and business world. The programme is designed with three major subjects so that a successful candidate can go for higher studies in any one of the major subjectsof his/ her choice. The programme also aims at making the students fit for taking up various jobs and to initiate and run self-employment ventures.The three major subjects offered under this programme are:

I. Business Management
II. Accounting and Taxation
III. Computer Application.

PROGRAMME OUTCOMES

At the end of three year B.Com programme, the students will be able to :-

- Study of this program will provide wide knowledge both in commerce and Computer software applications.
- Business software applications courses like Tally will enable the students to start a small software business of self employment.
- Courses of this program provide bright future in the IT fields, Software, Banks, Companies, BPOs and KPOs
- This program courses consist of both theoretical as well as good practical exposures to the students in the relevant areas to meet the industries expectations
- Courses of the program provide the cost benefit analysis and SWOT analysis enables the students for cost consciousness of each and every business operations.

- Build a strong foundation in accounting, management and business subjects
- Seek variety of career options in accounting, management and business related fields
- Equip with skills and knowledge to excel in their future careers
- Develop critical thinking skills in students
- Enter master programmes like M.Com, MBA and pursue professional programmes like C.A, CMA, C.S, etc.
- Develop entrepreneurial skills
- Helps students developed management skills, Entrepreneurial skills and Numeric ability
- Familiar with business regulatory framework
- Having basic knowledge of important business laws, financial, costing,
  Management accounting and basic principles of economics
- Capability of the learners to make decision at personal & professional level will increase after completion of this course
- Students knowledge enrich in creation, selection and application of modern business world and capability to interface successfully
- The curriculum offers a number of specialization and practical exposure which would equip the students to face the modern day challenge in commerce.
- Capability to explore cross curricular talent individually and as a team
- Behavioral awareness for legal and social readabilities in commerce domain

PROGRAMME SPECIFIC OUTCOMES

At the end of three year B.Com programme with specialisation in Computer Application, the students will be able to:-

- Understand the application of business Knowledge in both theoretical and practical aspects.
- Determine the procedures and schedules to be followed on preparing financial statements of Companies.
- Understand the basic concepts and functions of accounting, trade and computer software
- Develop proficiency in the management of an organisation
- Attain skills in conducting business transactions online

- ❖ Analyse the scope of the business by adopting modern technology in the business practice
- ❖ Follow the ethics pertaining to business transactions
- ❖ Graduates integrate knowledge, skill and attitude that will sustain an environment of learning and creativity in them
- ❖ Graduates are capable of making decision at personal and professional level and also ready to take up entrepreneurship as their Venture
- ❖ Graduates acquire skills to work as tax consultant, audit assistant and other financial supporting services
- ❖ Programme provides the outcome of Accounting, Banking, Cost Accounting, Management Accounting, Computer Language, Software and Software application in the Commerce.
- ❖ Programme curriculum result in the office atomization with computers and computer software application.
- ❖ Programme has opened the floodgates in the eve of software application jobs in the eve of trade Commerce, Business, Banking, Insurance and in related eve of business.
- ❖ Students will get the Practical skill to work as accountant, audit assistant,Tax consultant and computer operatorsas well as financial supporting services.

COURSE OUTCOME

CODE	SUBJECT	OUTCOMES
▪ SEMESTER 1		
EN 1111.4	**English I- Language Skills**	▪ English as an acquired language for undergraduate students is to be mastered with focus on learning the basic skills of listening, speaking, reading and writing the language proficiently. ▪ This course aims to impart these skills in an interactive manner along with classroom activities and using the text as a resource for self study as well. ▪ Discursive Practice as the learning and teaching method for this course will encourage teachers to localise and personalise learning of English for students in undergraduate classrooms. ▪ The course will equip the students with basic language skills along with improved non-verbal skills thereby improving their employability quotient
CC1141	**Introduction to IT**	▪ This course deals with the application of

		computers and telecommunications equipment to store, retrieve, transmit and manipulate data often in the context of a business or other enterprise. Subject Description: ▪ To enable the students to have thorough knowledge of computer hardware, software, its components and operating system. ▪ To provide basic conceptual knowledge about the computer systems and information technology Objectives
CC 1121	**Methodology and Perspectives of Business Education**	▪ To create a basic awareness about the business environment and the role of business in economic development. ▪ To provide a holistic, comprehensive and integrated perspective to business education ▪ To give a fundamental understanding about ethical practices in business.
CC 1142	**Environ mental studies**	▪ To facilitate the students to know about the importance of Human Resources. ▪ To make the students to understand the various aspects of the Human Resources Management. ▪ To participate in improvement and protection of environment.
CC 1143	**Management Concepts and Thoughts**	▪ To equip learners with knowledge of management concepts and their application in contemporary organizations ▪ To facilitate overall understanding of the different dimensions of the management process
CC 1131	**Managerial Economics**	▪ To familiarise students with the economic principles and theories underlying various business decisions. ▪ To equip the students to apply the economic theories in different business situations
▪ **SEMESTER 2**		
EN 1211.4	**English II-English for Career**	▪ To introduce students to the language skills required for appearing in career orientedcompetitive examinations ▪ To frame modules of study that would develop the cognitive, logical, verbal andanalytical skills necessary to succeed in

		competitive examinations. ▪ To provide the pattern of questions based on common models of competitive tests ▪ To provide sufficient practice in Vocabulary, Grammar, Comprehension and Remedial English from the perspective of career oriented tests. ▪ To help students to prepare for and appear in competitive examinations.
CC1241	**Financial Management**	▪ To familiarise the students with the conceptual framework of financial management. ▪ To enable the students to understand the practical application of financial management.
CC 1221	**Informatics and Cyber Laws**	▪ To review the basic concepts and fundamental knowledge in the field of informatics. ▪ To create an awareness about the nature of the emerging digital knowledge society and the impactof informatics on business decisions. ▪ To create an awareness about the cyber world and cyber regulations.
CC 1242	**Financial Accounting**	▪ To familiarize the students with different methods of depreciation. ▪ To equip the students to prepare the accounts of specialised business enterprises.
CC 1243	**Business Regulatory Framework**	▪ To provide a brief idea about the framework of Indian business Laws ▪ To enable the students to apply the provisions of business laws in business activities
CC 1231	**Business Mathematics**	▪ To familiarise the students with the basic mathematical tools. ▪ To impart skills in applying mathematical tools in business practice
▪ **SEMESTER 3**		
CC 1341	**Project Finance**	▪ To familiarise the students with the types of project appraisal, risk analysis, project financing costing and valuing; ▪ To provide an overview of global project appraisal issues.
CC 1342	**Entrepreneurship Develop ment**	▪ To equip the students to have a practical insight for becoming an entrepreneur ▪ To familiarize the students with the latest programmes of Government in promoting small and medium industries. ▪ To impart knowledge regarding starting of new

		ventures.
CC 1343	**Advanced Financial Accounting**	▪ To equip the students with the preparation of accounts of various business areas. ▪ To create awareness of accounts related to dissolution of partnership firms. ▪ To acquaint students with the system of accounting for different branches and departments. ▪ To enable students to prepare accounts of consignments.
CC 1344	**Company Administration**	▪ To familiarize the students about the salient provisions of Indian Companies Act 2013. ▪ To acquaint the students with Management and Administration of Companies, Compliance requirements,investigation into the affairs of the company and Winding up procedure
CC 1345	**Computer Application for Business**	▪ To update and expand skills in electronic data processing and computer application inbusiness operations. ▪ To give functional knowledge in the field of free software. ▪ To develop practical skills in document preparation, publishing and business presentation.
CC 1331	**EBusiness**	▪ To expose the students to e- business and its potentialities ▪ To provide students a clear-cut idea of e-commerce and e-business and their types and models ▪ To acquaint students with some innovative e-business systems. ▪ To impart knowledge on the basics of starting online business.
CC 1345	**Computer Application for Business-LAB**	▪ To update and expand skills in electronic data processing and computer application in business operations. ▪ To give functional knowledge in the field of free software. ▪ To develop practical skills in document preparation, publishing and business presentation
▪ **SEMESTER 4**		
CC 1441	**Financial Services in India**	▪ To provide a general awareness about the financial services ▪ To familiarize the students with the structure and functioning of financial service sector inIndia.

CC 1442	**Indian Financial Markets**	▪ To provide an in-depth knowledge on Financial Market and its Operations ▪ To provide a clear-cut idea about the functioning of Indian Financial ▪ Market in general and Capital market operations in particular
CC 1443	**Banking and Insurance**	▪ To expose the students to the changing scenario of Indian banking and Insurance. ▪ To provide a basic knowledge about the theory and practice of banking ▪ To provide a basic understanding of Insurance business. ▪ To familiarize the students with the changing scenario of Indian Banking and Insurance.
CC 1444	**Corporate Accounting**	▪ To expose the students to the accounting practices prevailing in corporate. ▪ To create awareness about corporate accounting in conformity with the provisions of Companies Act, IAS and IFRS. ▪ To help the students in preparation of accounts of banking and insurance companies. ▪ To enable the students to prepare and interpret financial statements of joint stock companies.
CC 1445	**Software for Data Management**	▪ To update and develop theoretical and technical expertise in applying software for data management. ▪ To familiarise the students with the basics of Software for data management. ▪ To equip the students to meet the demands of the industry. ▪ To develop practical skills in spread sheet application, statistical software and database application
CC 1431	**Business Statistics**	▪ To develop the skill for applying appropriate statistical tools and techniques in different business situations. ▪ To enable the students to gain understanding of statistical techniques those are applicable to business. ▪ To enable the students to apply statistical techniques in business
CC 1445	**Software for Data Management-LAB**	▪ To update and develop theoretical and technical expertise in applying software for data management. ▪ To familiarise the students with the basics of

		Software for data management. ▪ To equip the students to meet the demands of the industry. ▪ To develop practical skills in spread sheet application, statistical software and database application
▪ **SEMESTER 5**		
CC 1541	**Fundamentals of Income Tax**	▪ To impart basic knowledge and understanding of the concepts and practices of Income Tax law in India. ▪ To familiarize the students about the fundamental concepts of Income Tax. ▪ To enable the students to acquire the basic skills required to compute the tax liability of individual assessee with more emphasis on Income from Salaries and Income from House property.
CC 1542	**Cost Accounting**	▪ To impart knowledge of cost accounting system and acquaint the students with the measures of cost control. ▪ To familiarize the students with cost and cost accounting concepts ▪ To make the students learn cost accounting as a distinct stream of accounting
CC 1543	**Marketing Management**	▪ To impart the knowledge of various concepts of modern marketing management ▪ To provide an understanding of the contemporary marketing process in the emerging business scenario. ▪ To study various aspects of application of modern marketing techniques for obtaining a competitive advantage in business organizations.
CC 1551	**Open Course – Principles of Management**	▪ To familiarise the students from other faculties on the framework of management. ▪ To provide knowledge on the fundamentals of management principles and functions.
CC 1544 1	**Web Designing and Production for Business**	▪ To expose students to environment for web designing and developing ▪ To impart functional knowledge in the field of Web design ▪ To develop practical skills in Web deigning and production for business organisations
Project	**Project**	▪ To impart knowledge and skills on the applications of the concepts learnt in a given context. ▪ To learn by experiencing and observing ▪ To document and reflect upon learnings ▪ To develop exhibits of case studies undertaken, analysis made, exercises done and fact finding missions.

CC 1544 1	**Web Designing and Production for Business-LAB**	▪ To expose students to environment for web designing and developing ▪ To impart functional knowledge in the field of Web design ▪ To develop practical skills in Web deigning and production for business organisations
▪ **SEMESTER 6**		
CC 1641	**Auditing**	▪ To acquaint the students with the principles and practice of auditing ▪ To provide students the knowledge of auditing principles, procedures and techniques in accordance with current legal requirements and professional standards. ▪ To familiarize students with the audit of Companies and the liabilities of the auditor
CC 1642	**Applied Costing**	▪ To develop the skill required for the application of the methods and techniques of costing in managerial decisions. ▪ To acquaint the students with different methods and techniques of costing. ▪ To enable the students to apply the costing methods and techniques in different types of industries.
CC 1643	**Management Accounting**	▪ To develop professional competence and skill in applying accounting information for decision making. ▪ To enable students to acquire sound knowledge of concepts, methods and techniques of management accounting ▪ To make the students develop competence with management accounting usage in managerial decision making and control.
CC 1651	**Open Course – Management of Foreign Trade**	▪ To expose the students to the overall management of foreign trade affecting International business. ▪ To acquaint the students with India's foreign trade. ▪ To familiarise the students with international trade and services.
CC 1644	**Computerised Accounting**	▪ To update and expand the skills in the application of accounting packages. ▪ To expose the students to computer application in the field of Accounting. ▪ To develop practical skills in the application of Tally Package.
CC 1644	**Project**	▪ To impart knowledge and skills on the applications of the concepts learnt in a given context. ▪ To learn by experiencing and observing ▪ To document and reflect upon learnings

		▪ To develop exhibits of case studies undertaken, analysis made, exercises done and factfinding missions.
CC 1644	**Computerised Accounting-LAB**	▪ To update and expand the skills in the application of accounting packages. ▪ To expose the students to computer application in the field of Accounting. ▪ To develop practical skills in the application of Tally Package.

DOUBLE MAIN PROGRAMME

B.A English and Media Studies

Programme Outcome

- PO 1: Imbibe a comprehensive understanding of the two different streams of learning and their interdisciplinary nature that needs to be addressed and imbibed.

- PO 2: Gain a basic understanding of the realms of knowledge production specific to the two disciplines and the specific educational philosophy they cater to.

- PO 3: Understand the need to cross over disciplinary border lines to achieve a multidisciplinary perspective of knowledge production.

- PO 4: Imbibe a research oriented approach to the study of humanities in connection with the basic understanding of social sciences to initiate a multidisciplinary approach of study.

- PO 5: Understand the importance of interdisciplinary learning to broaden the subject knowledge and enhance the skill development as per the global context and requirement

- PO 6: Imbibe the importance of a multidisciplinary approach to understand the nuances of literary expressions and vice versa.

- PO 7: Form an awareness of the multiplicities of socio-cultural realities that shape literary representations and to critique the inherent hegemony.

- PO 8: Address the requirements of the language use in a globalized context

- PO 9: Ensure the importance of language study in relation with the study of language and literature of the mother tongue

- PO 10: Acquire improved competence in translation and to view the same not only as a tool for cultural transmission but also as skill acquisition, esp. in the field of media and translation.

- PO 11: Comprehend the current modes of writings – that which encompasses the issues of power related to class, caste, race, gender, ethnicity, climate change etc. and realize the role of literature in inculcating social sensitiveness and responsibilities.

- PO 12: The competence to identify the literary voices of dissent from diverse parts of the globe and to reflect on the popular culture, literature and everyday resistance.

- PO 13: Gain the basic knowledge of research methodology and other areas related to the faculty of research.

- PO 14: Imbibe a research oriented approach to the study of humanities in connection with the basic understanding of social sciences to initiate a multidisciplinary approach of study.

- PO 15: Contribute to the realm of knowledge production with an increased intellectual, creative, critical and multidisciplinary capability.

ENGLISH

1. **Core Course 1: ENM 1131 - Introduction to Literary Studies I**
   Course Outcome
   CO 1: Introduce varied literary representations.

CO 2: Familiarize students with the nature and characteristics of literature.
CO 3: Discuss the nature and characteristics of literature
CO 4: Introduce two key genres of literature, poetry and drama.
CO 5: Possess a foundational understanding of poetry and drama.

2. **Core Course 2: ENM 1132 – Introduction to Literary Studies II**
   Course outcome
   CO 1: Cultivate a taste for the literary among students
   CO 2: Familiarize students with the nature and characteristics of different genres of literature.
   CO 3: Introduce two key genres of literature- fiction and non-fiction.
   CO 4: Imbibe the representational possibilities of the respective genres.
   CO 5: Instil a creative aptitude
3. **Foundation Course 2: EML 1221 – Environmental Studies and Disaster Management**
   Course Outcome:
   CO 1: Understand environmental crises and disaster management situations
   CO 2: Take lead in spreading environmental values and creating awareness among the public
   CO 3: Understand local environmental issues better
   CO 4: Respond in a better way to a natural calamity or disaster
   CO 5: Articulate environmental concerns using appropriate vocabulary
4. **Core Course 3: ENM 1231 – Popular Literature and Culture**
   Course Outcome
   CO 1: Encourage the learners to think critically about popular literature
   CO 2: Understand the categories of the “popular” and the “canonical”
   CO 3: Identify the conventions, formulas, themes and styles of popular genres such as fairy tales, detective fiction, science fiction, fantasy, children’s literature, and comics.
   CO 4: Assessment of the literary and cultural value of popular texts
   CO 5: Sensitize the learners to the ways in which popular fiction reflects and engages with questions of gender, identity, ethics and education.
5. **Core Course 4: ENM 1232 - Art and Literary Aesthetics**
   Course Outcome
   CO 1: engage with literature in a broader, educated perspective.
   CO 2: think with greater originality and independence about the complex interrelationship between different art forms.
   CO 3: engage sensitively and intelligently with new readings of literature.
   CO 4: develop an understanding of the co-relation between literature, film, music and painting and encourages ways of reading and seeing which deliver insights into literary texts.
   CO 5: initiate students to implement the multidisciplinary scope of art and literary studies.
6. **Core Course 5: ENM 1331 - British Literature**
   Course Outcome
   CO 1: Comprehend the origins of English literature
   CO 2: Understand the specific features of the particular periods
   CO 3: Understand themes, structure and style adopted by early British writers
   CO 4: Gain knowledge of growth and development of British Literature in relation to the historical developments
   CO 5: Understand how writers use language and creativity to capture human experience through different literary forms
7. **Core Course 6: ENM 1332 - Evolution of the English Language**
   Course Outcome

CO 1: Knowledge of the paradigm shifts in the development of English.
CO 2: Well aware of the historical paradigm shifts in the history of English Language
CO 3: Imbibe the plural socio-cultural factors that went in to the shaping of the English Language.
CO 4: Place English language in a global context.
CO 5: Recognize the politics of many 'Englishes'

8. **Core Course 7: ENM 1431 –World Literatures**
   Course Outcome
   CO 1: Learners are introduced to varied socio-cultural and political experiences and expressions
   CO 2: Learners get acquainted with varied socio-cultural and political experiences and expressions.
   CO 3: Gain a theoretical grounding to read literatures in English from different regions and accept the fact that world literature is literature that gains in translation.
   CO 4: Learn to avoid homogenising cultures and languages and protect the diversity of languages and cultures present in literary works.
   CO 5: Recognise that world literature has a readership and an impact beyond its original language and cultural area.
9. **Core Course 8: ENM 1432 – Narratives of Resistance**
   Course Outcome
   CO 1: Be able to identify themes of resistance in different forms and genres of literature.
   CO 2: Have a sense of the various kinds of injustice related to race, ethnicity and gender prevalent in society.
   CO 3: Develop an idea of literature as a form of resistance to all forms of totalitarian authority.
   CO 4: Understand the inter connection between various genres in manifesting resistance
   CO 5: How resistance is an undeniable presence in the everyday narratives of literary and other artistic expressions.
10. **Core Course 9: ENM 1531 –Translation Studies**
    Course Outcome
    CO 1: Recognise the art involved in translation.
    CO 2: Get well versed in the uniqueness of language structures.
    CO 3: Learners take up translation as a profession.
    CO 4: Procure and improve language and vocabulary skills CO 5: Undertake an independent Translation Project.
11. **Core Course 10: EN 1532 – Criticism and Theory**
    Course Outcome
    CO 1: Analyze and appreciate texts critically, from different perspectives.
    CO 2: Appreciate Indian Aesthetics and find linkages between Western thought and Indian critical tradition.
    CO 3: Show an appreciation of the relevance and value of multidisciplinary theoretical models in literary study.
    CO 4: Demonstrate an understanding of important theoretical methodologies and develop an aptitude for critical analysis of literary works.
    CO 5: Gain a critical and pluralistic understanding and perspective of life
12. **Core 11: ENM 1533 Project/Dissertation**
13. **Core Course 11: ENM 1631 – English for the Media**
    Course Outcome

CO 1: Familiarize students with the process of writing for the media
CO 2: Make them familiar the specific use of English in the field of media
CO 3: Generate interest in various aspects of media and thereby to equip them with the basic writing skills required for the same.
CO 4: Enable the students to take up jobs in the media industry- both in the print, broadcast and the new media. CO 5: Promote their writings with the help of the new media

14. **Core Course 12: ENM 1632 – Linguistics and Structure of the English Language**
    Course Outcome
    CO 1: Understand the phonological and grammatical structure of English Language
    CO 2: Be able to analyse actual speech in terms of the principle of linguistics
    CO 3: Improve the accent and pronunciation of the language
    CO 4: Introduce the students to internationally accepted forms of speech and writing English
    CO 5: Explore the ancient linguistic tradition of India
15. **Core Course 14: ENM 1633 – Creative Writing**
    Course Outcome
    CO 1: Create a body of original creative works which exhibit basic elements of literary writing.
    CO 2: Generate the ability to apply the creative as well as critical approaches to the reading and writing of literary genres.
    CO 3: Critique and support the creative writing of peers in a guided workshop environment.
    CO 4: Engage in literary output by identifying, analyzing and expressing socially sensitive and personally abstract themes and ideas.
    CO 5: Gain expertise in providing critical readings of works of literary expressions.

MEDIA STUDIES

Programme Outcomes – Media Studies

¬ PO1- To identify and plan strategies for effective communication

¬ PO2 - To report and edit news events

¬ PO3- To build sociological outlook to the media practices

¬ PO4- To script and produce for broadcasting

¬ PO5- To map and document the historical turns in Media ¬ PO6- To inculcate research inquiries in media and formulate Methodological framework

1. **FUNDAMENTALS OF MASS COMMUNICATION| ENM 1141**
   Course Outcomes
   CO1 To understand the foundational principles of Mass Communication
   CO2 To know the functions of various mass media forms
   CO3 To learn the models of communication
   CO4 To acquire knowledge on evolution of communication technology
2. **BASICS OF INFORMATICS | ENM 1121 (Foundation Offered by Media Studies)**
   Course Outcomes
   CO1 To locate the history of IT in Indian perspective
   CO2 To explain the process and practice of Information flow

CO3 To practice a learning management system
CO4 To review the ethics of social media intervention

3. **PRINT MEDIA PRACTICES – I | ENM 1241**

Course Outcomes

CO1 To train students to identify news
CO2 To familiarise news rooms operations and print media practices
CO3 To write news reports CO4 To identify news elements in events and social practices

4. **MEDIA HISTORY | ENM 1242**

Course Outcomes

CO1 To review the historical conditions of Media
CO2 To track the media institutional practices
CO3 To differentiate the conceptual frameworks of different phases
CO4 To evaluate the role of media in the Social history

5. **PRINT MEDIA PRACTICES – II | ENM1341**

Course Outcomes

CO1 To familiarize the basics of news editing
CO2 To train students in verbal and factual accuracy
CO3 To initiate students to write effective and meaningful headlines
CO4 To coordinate and rehash news packages

6. **VISUAL MEDIA: TELEVISION AND CINEMA | ENM 1342**

Course Outcomes

CO1 To learn the aesthetics and principles of visual compositions
CO2 To study the visual language and basics of sound design for visuals
CO3 To Explain film movements and the history of world cinema
CO4 To review the global cinema in its socio-cultural context

7. **THEORIES AND RESEARCH METHODS OF MASS COMMUNICATION| ENM 1441**

Course Outcomes

CO1 To understand key theories, theoreticians and schools of thought incommunication
CO2 To apply proper theoretical framework in communication and media studies
CO3 To inculcate the perspectives of media content in different contexts
CO4 To develop basic research and analytical skills

8. **PUBLIC RELATIONS AND ADVERTISING | ENM1442**

Course Outcomes

CO1 To narrate the basic concepts of public relations, advertising, and corporate communication
CO2 To acquire skills required for PR and advertising professionals
CO3 To explain the role of the public relations in the corporate environment and describe the strategies, tactics, and techniques of public relations and corporate communications
CO4 To prepare newsletters and news releases

9. **RADIO BROADCASTING | ENM1541**

Course Outcomes

CO1 To familiarize the production of various broadcasting formats
CO2 To sketch the process of Broadcasting operations and production
CO3 To prepare basic writings for Broadcasting production CO4 To explain the recording process of Broadcasting

10. **MEDIA LAWS AND ETHICS | ENM 1542**

Course Outcomes

CO1 To explain and incorporate legal framework
CO2 To suit concepts of freedom of press and the constitution
CO3 To acquaint with judicial structure and role of fourth estate
CO4 To review contemporary verdicts related to Media

11. **DIGITAL MEDIA- BASIC THEORIES& PRACTICES | ENM 1543**

Course Outcomes

CO1 To explain the emerging modes of journalism and content production practices in digital platform
CO2 To familiarize the working pattern of digitality in the Social
CO3 To assess the suitability of hardware, software including open source solutions and applications of computer technologies and web page design
CO4 To map the data journalism trends

12. **OPEN COURSE OFFERED BY MEDIA STUDIES -UNDERSTANDING CINEMA | ENM 1551**

Course Outcomes

CO1 To map the evolution cinema and its origin
CO2 To explain cinema language and its visual components
CO3 To review the global cinema in its socio-cultural context
CO4 To identify Cinema as a medium of Communication

13. **MEDIA AND SOCIETY | ENM 1641**

Course Outcomes

CO1 To explain the issues pertaining in mass media practices
CO2 To familiarize the operational framework of institutions and societal interaction of mass media
CO3 To review and write the movements of digital media and social change along with the relevance of digital divide
CO4 To locate the technological connect of Media and Society

14. **MASS MEDIA MANAGEMENT | ENM1642**

Course Outcomes

CO1 To familiarize with modern management concepts
CO2 To apply the managerial aspects and functions of mass media organizations
CO3 To acquaint with business challenges and to tackle them in media organizations.
CO4 To understand the legal and institutional framework of media organisations
Internship- Mandatory

15. **PROJECT-DISSERTATION100 Marks |ENM1643**

Course Outcomes

CO1 To identify a research inquiry which is specific and workable
CO2 To formulate research design
CO3 To prepare and adopt suitable methods for research Co4 To practice academic writing in the area of Media research