## Department of Commerce

| F.Y.B.Com. | SEM – I | SEM – II |
|---|---|---|
| | **101 English for Business**<br>• Improved communication skills in English among students.<br>• Improved various soft skills of students.<br>• Improved oral and written competency in English of students. | **201 English for Business**<br>• Introduce communication theory to students.<br>• Familiar with various soft skills to students.<br>• Developed oral and written competency in English of students.<br>• Develop linguistic competency of students through various grammatical and vocabulary |
| | **102 a Local Language – Optional English and**<br>**102 b Local Language – Optional Marathi**<br>• Developed English reading and linguistic comprehension of students.<br>• Developed professional and entrepreneurial attitude of students through success stories.<br>• To Acquaint Students with special challenges of starting new ventures<br>• Understand the qualities to become a successful entrepreneur | **202 a Local Language – Optional English**<br>• Know about various famous entrepreneurs to commerce students.<br>• Develop English reading and linguistic comprehension of students.<br>• Improved professional and entrepreneurial attitude of students through success stories.<br>• Understand qualities to become a successful entrepreneur<br><br>**202 b Local Language – Optional Marathi**<br>• Introduce various famous entrepreneurs to commerce students.<br>• Develop Marathi reading and linguistic comprehension of students.<br>• Improve professional and entrepreneurial attitude of students through success stories. |

| F.Y.B.Com. | SEM – I | SEM – II |
|---|---|---|
| | | • Understand the qualities to become a successful entrepreneur |
| | **103 Micro Economics**<br>• Students understand the concept of opportunities of cash trade off and benefits of exchange<br>• Students know about law of supply and demand and equilibrium. | **203 Micro Economics**<br>• Students understand the concept of opportunities of cash trade off and benefits of exchange<br>• Students know about law of supply and demand and equilibrium. |
| | **104 Financial Accounting and Costing**<br>• Lay a foundation for understanding the Accounting Standards issued by the ICAI.<br>• Gain the ability to solve problems relating to settlement of obligations on dissolution of partnership firm and also relating to their business combinations<br>• Introduce the concepts used in Cost Accounting, elements of costs and the concept of cost sheet. | **204 Financial Accounting and Costing**<br>• Lay down a theoretical foundation for the recording of financial transactions concerning specialized area related to non-corporate entities and for preparing the related accounts or statements.<br>• Lay a foundation for the preparations of financial statements from incomplete record.<br>• Lay a foundation for understanding the Accounting procedure for Material cost and price methods. |
| | **105 Computing Skills**<br>• Familiarize the Students with basics of Internet.<br>• Understand the use of Office application.<br>• Know the role of word processor, Spread sheet, presentation in industry. | **205 Quantitative Techniques**<br>• Understand the statistical terms<br>• Understands the merits and demerits of various statistical techniques |

| F.Y.B.Com. | SEM – I | SEM – II |
|---|---|---|
| | • Understand the how of accounting software works.<br>• Know the relevance of Tally accounting package in modern competitive world. | |
| | **106 a - Elective - Modern office Management**<br>• To understand the concept of office management.<br>• To acquire operational skills of office management.<br>• To develop the interest in methods and procedures of office management.<br>• To know the secretarial procedure.<br>• To understand office layout and environment in modern context.<br>• To acquire the basic knowledge of office appliances and machines.<br>• To understand office system.<br>• To acquire knowledge of office meetings and proceedings. | **206 a- Elective –Modern Office Management**<br>• Students can understands about office management, modern office and its functions<br>• Understands about function of administrative office management. |
| | **107 a - Elective - Principles & Practices of Banking**<br>• Students understand the scope and extern of modern bank activities<br>• Students are able to research and analysis structural development and trends in banking and their impact on bank operations and performance | **207 a - Elective - Principles & Practices of Banking**<br>• Students understand the scope and extern of modern bank activities<br>• Students are able to research and analysis structural development and trends in banking and their impact on bank operations and performance |

## Department of Commerce

| F.Y.B.Com. | SEM – I | SEM – II |
|---|---|---|
| | **107 c - Elective - Marketing & Advertising**<br>• Understand about marketing & advertising<br>• Understand basic concepts of marketing & advertising<br>• Established link between business and marketing & advertising<br>• Know the relevance of marketing & advertising in modern competitive world<br>• Develop an analytical ability to plan for various marketing& advertising strategy. | **207 c - Elective - Marketing & Advertising**<br>• Students will be able to perform market segmentation analysis, identify the organizational targets market marker/audience and define consumer behavior of each segment<br>• Understand the fundamental marketing concepts, theories and principals in areas of marketing policies |

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| S.Y.B.Com. | SEM – III | SEM – IV |
|---|---|---|
| | **Compulsory Paper: Macro Economics**<br>• Familiarize with the basic concepts of macro Economics<br>• Students understand objectives of macro Economics The ones and Policies<br>• Develop skills for MPSC and UPSC Exams | **Paper: Macro Economics**<br>• Understand the basic concepts of macro Economics<br>• Understand objectives of macro Economics The ones and Policies<br>• Develop skills for MPSC and UPSC Exams |
| | **Paper: Business & Tax Laws**<br>• Learn The Law & Legal Principals OF Contract Act 1872<br>• Draft legal documents including partnership deed & service tax returns<br>• Understand the basic structure, rules & powers of consumer | **Paper: Business Tax and Laws**<br>• Understand the essential provisions of the Partnership Act and the structure of legal document the Partnership deed.<br>• Understand the basic structure, rules & powers of the Consumer Protection Act. |

| S.Y.B.Com. | SEM – III | SEM – IV |
|---|---|---|
| | protection act.<br>• Understand the provision regarding strikes and lock outs under industrial dispute act.<br>• Be acquainted with development of patents and environment protection act.<br>• Students to gain a better underrating of the negotiable instrument act.<br>• Learn how to analysis the legal constraints on business.<br>• Be able to face the Problems on Various Sides of Business and Tax Law | • Aware with the Environment Protection Act.<br>• Aware with the Goods and Services tax Act. |
| | **Paper: Business Management**<br>• Know the concept of management to the students.<br>• Understand the modern management practices.<br>• Develop leadership skills and communication skills.<br>• Familiarize the students with the nature and scope of management.<br>• Understand the concept of management. Also expose the students to latest trends in management. | **Paper: Business Management**<br>• Understand the concept of management to the students.<br>• Students aware with modern management practices.<br>• Develop leadership skills and communication skills.<br>• Understand the nature and scope of management.<br>• Understand the concept of management. |
| | **Paper: Corporate Accounting and Costing**<br>• Develop an understanding of the rules of measurement and reporting relating to various components of corporate financial | **Paper: Corporate Accounting and Costing**<br>• Understanding the rules of measurement and reporting relating to various components of corporate financial transactions. |

| S.Y.B.Com. | SEM – III | SEM – IV |
|---|---|---|
| | transactions.<br>• Provide working knowledge of accounting principles and procedures for recording of transactions related to corporate entities, and for preparing the corporate accounts and statements in accordance with the statutory requirements.<br>• Know about the relevant Accounting Standards issued by the Institute of Chartered Accounts of India.<br>• Understand different methods of Costing. | • Aware about accounting principles and procedures for recording of transactions related to corporate entities, and for preparing the corporate accounts and statements in accordance with the statutory requirements.<br>• Aware about the relevant Accounting Standards issued by the Institute of Chartered Accounts of India.<br>• Know different methods of Costing.<br>• Lay a foundation for understanding the Labor & Overheads Accounting procedure. |
| | **Paper: Computing Management**<br>• Understand the Objectives of Computerised Accounting.<br>• Know the Principles Of Tally Software.<br>• Developed Computing Skills.<br>• Learn features of Tally.<br>• Learn Modern Technology In Accounting. | **Paper: Business Communication**<br>• Understands the Concept Process, Importance and Objectives of Communication<br>• Aware about regarding New Trends in Business Communication<br>• Know the Principles Of Effective Communication.<br>• Acquire Communication Skills.<br>• Aware various Types Of Business Letters.<br>• Develop Skills to Draft Letters.<br>• Acquaint with Modern Technology In Communication. |
| | **Paper: 6(a): Business Entrepreneurship** | **Paper: 6(a): Business Entrepreneurship** |

| S.Y.B.Com. | SEM – III | SEM – IV |
|---|---|---|
| | • Learn the concept of entrepreneurship.<br>• Understand the qualities of entrepreneur.<br>• Know the types of entrepreneur.<br>• Introduced new business opportunities.<br>• Know the Entrepreneurship Development Programme.<br>• Understand the Role of Entrepreneur and Inducement measures.<br>• Understand entrepreneurship development theories and factors affecting. | • Understand the concept of entrepreneurship.<br>• Know the qualities of entrepreneur.<br>• Indentify the new business opportunities.<br>• Know the Entrepreneurship Development Programme.<br>• Acquaint with Role of Entrepreneur and Inducement measures.<br>• Aware about entrepreneurship development theories and factors affecting. |
| | **Paper: 7(a): Modern Banking and Financial System**<br>• Understand new concepts of Banking<br>• Know about new changes in Banking<br>• Understand the relevance Banking practices in modern competitive world<br>• Understand Banking operations | **Paper: 7(a): Modern Banking & Financial System**<br>• Acquaint with the new concepts of Banking<br>• Update the students about new changes in Banking<br>• Aware about relevance Banking practices in modern competitive world<br>• Know Banking operations |
| | **Paper: 7(c): Retail Management**<br>• Know Basic Retailing Management Concepts.<br>• Empowering Students with the Most Modern Techniques and Practices of Retailing as Seen and Experienced around the Globe.<br>• Understand Theoretical and Practical Knowledge to Ensure | **Paper: 7(c): Retail Management**<br>• Aware Basic Retailing Management Concepts.<br>• Imparting Theoretical and Practical Knowledge to Ensure Understanding of the Dynamic of Modern Organized Retail Trade. |

| S.Y.B.Com. | SEM – III | SEM – IV |
|---|---|---|
| | Understanding of the Dynamic of Modern Organized Retail Trade | |

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| T.Y.B.Com. | SEM – V | SEM – VI |
|---|---|---|
| | **Paper: 1 Indian Economic Scenario**<br>• Aware about new concepts of Economics.<br>• Update the students about new changes brought in Indian Economy.<br>• Know the relevance Economic practices in modern competitive world.<br>• Make students competent to become success in competitive examination. | **Paper: 1 Indian Economic Scenario**<br>• Aware new concepts of Economics.<br>• Know about new changes brought in Indian Economy.<br>• Know the relevance Economic practices in modern competitive world. |
| | **Paper: 2 Principles & Practices of Auditing**<br>• Enable the students to understand the responsibilities of auditor and work | **Paper: 2 Principles & Practices of Auditing**<br>• Enable the students to understand the responsibilities of auditor and work |
| | **Paper: 3 Income Tax**<br>• Know the various provisions relating to Income and Incomes tax computation<br>• Understand the basic concepts of the Income Tax Act 1961 and get the elementary | **Paper: 3. Soft Skills Development**<br>• Equip students with the necessary soft skills to enhance their competitive edge in the job market<br>• Develops positive attitude towards life and work<br>• Students are able excel in their individual and professional |

| T.Y.B.Com. | SEM – V | SEM – VI |
|---|---|---|
| | • Knowledge of scheme of taxation in India<br>• Compute Income and Tax of an Individual assesse under the Act | lives using the soft skills |
| | **Paper: 4 Human Resource Management**<br>• Aware the concept, principles and practices of H.R.M.<br>• Familiarize with concepts of human resource planning, Job Analysis, Recruitment and selection procedures. | **Paper: 4 Human Resource Management**<br>• Aware about the concept Training and Management Development of H.R.M. to the students.<br>• Understand recent trends in Human Resource Management.<br>• Develop the total personality of students as future Human Resource of India.<br>• Aware various dimensions of Human Resource Management |
| | **Paper: 5 a) MODERN MANAGEMENT TECHINIQUE- I**<br>• Students will be abele learn emerging ideas and practices in the field of management | **Paper: 5 a) MODERN MANAGEMENT TECHINIQUE- II**<br>• Students will be abele learn emerging ideas and practices in the field of management |
| | **Paper: 6a: Advanced Accounting–I**<br>• Aware about accounting treatment of functional aspects of Corporate and Non-corporate undertakings<br>• Know about need and importance of Accounting Standards concerning the Functional aspects accounting<br>• Know about the application of accounting knowledge in preparation of financial Statements of Farm Activities, and | **Paper: 6a: Advanced Accounting–I**<br>• Aware about application of about accounting treatment of functional aspects of Corporate and Non-corporate undertakings<br>• Know about need and importance of Accounting Standards concerning the Functional aspects accounting<br>• Know about the application of accounting knowledge in |

| T.Y.B.Com. | SEM – V | SEM – VI |
|---|---|---|
| | Corporate Sector units. | preparation of financial Statements of Farm Activities, and Corporate Sector units. |
| | **Paper: 7 a: Advanced Accounting–II**<br>• Know about accounting treatment of corporate under takings restructuring.<br>• Know about the application of accounting knowledge in preparation of financial statements of Bank Accounts.<br>• Know about application of the AS concerning the aspects in accounting.<br>• Know about application of accounting knowledge in reading and interpreting the financial statements of corporate entities. | **Paper: 7 a:AdvancedAccounting–II**<br>• Know about accounting treatment of corporate under takings restructuring.<br>• Know about the application of accounting knowledge in preparation of financial statements of Bank Accounts.<br>• Know about application of the AS concerning the aspects in accounting.<br>• Know about application of accounting knowledge in reading and interpreting the financial statements of corporate entities. |

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## Department of Computer Science

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **CS 101: Essential of Computer Science**<br>• Understand the History of Computers.<br>• Understand What is Computer and Basic concepts of computer.<br>• Aware about various types of Computers, types of I/O devices.<br>• Preparation of Algorithm and Flowchart of Program.<br>• Learn computer networks, its types and basics of Internet.<br>• Understand computer viruses and its types.<br>• Demonstrate basics Understanding Computer H/W & S/W.<br>• Knowledge of Installation of Software.<br>• Demonstrate basics understanding network Principle. | **CS 201: Internet Computing** |
| **CS 102: C Programming-I**<br>• As it is Universal Language, after completion of this course students are able to solve any kind of problem in any field.<br>• Understand the basic programming construct.<br>• Learn function oriented programming concepts required in all other languages. | **CS 202: C Programming Language-II**<br>• As it is Universal Language, after completion of this course students are able solve any kind of problem in any field.<br>• Understand the basic programming construct.<br>• Learn function oriented programming concepts required in all other languages. |
| **CS 103: LAB**<br>• On completion of the course, students are able to develop programs using C to meet real world needs and able to develop their own websites. This course provides platform to<br>• Enhance student's basic skills required for advanced programming. | **CS 203: LAB**<br>• On completion of the course, students are able to develop programs using C to meet real world needs and able to develop their own websites. This course provides platform to<br>• Enhance student's basic skills required for advanced programming. |

## Department of Computer Science

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| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **COMP 211: Data Structure-I**<br>• Know what is data structure and basic algorithmic notations.<br>• Analyze the time and space requirement of any algorithm.<br>• Understand different linear data structures for conversion of mathematical expressions and polynomial representations.<br>• Know the file structures. | **COMP 221 : Data Structure – II**<br>• Know different non-linear data structures that can be used to represent hierarchical relationship between objects.<br>• Traverse and represent the graphs in computer.<br>• Understand the different approaches of sorting and searching elements in the arrays.<br>• Understand different techniques of designing the algorithms. |
| **COMP 212 : OOAD & Introduction to C++**<br>• Be familiar with Object Oriented Programming Environment.<br>• Differentiate between Structure oriented programming and object oriented programming.<br>• Understand different object modelling techniques and analysis like Generalization , Aggregation and Metadata.<br>• Write Reusable, Extensible and Robust programs in C++. | **COMP 222 : Programming in C++**<br>• Explore polymorphism using Function and Operator Overloading.<br>• Write programs for handling runtime errors using exception.<br>• Understand the concepts of pointers in C++.<br>• Understand the different aspects of hierarchy of classes and their extensibility.<br>• Write generic programs using templates and STL. |
| **COMP 213: Practical Course**<br>• On completion of the course, students are able to develop programs using C++ based on object oriented concepts and write the ROBUST, EXTENSIBLE and EFFICIENT programs. | **COMP 223 : Practical Course**<br>• On completion of the course, students are able to develop programs using C++ based on object oriented concepts and write the ROBUST, EXTENSIBLE and EFFICIENT programs. |

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| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| **CS-311 System Programming**<br>• Get aware about system software and their tools like Editors and Debug Monitors.<br>• Get familiar with language processing activities.<br>• Understand detail working of Assembler, Macro and Macro Preprocessor, Compiler and linker & Loader. | **CS-321 Operating System**<br>• Know about functions and services of operating system.<br>• Aware about different CPU scheduling algorithms<br>• Get familiar with different memory management techniques.<br>• Understand different disk and drum scheduling algorithms as well as deadlock concepts.<br>• Get introductory knowledge about android operating system. |
| **CS-312 Database Management System**<br>• Get aware of Describing & storing data.<br>• Know about E-R Model by overview of database design..<br>• Get familiar with Conversion of ER to Relational model.<br>• Know about functional dependency and Data Normalization.<br>• Understand Database Implementations.<br>• Make use of Concurrency control, Backup & recovery for large or huge of databases.<br>• Get aware about handling huge databases. | **CS-322 MS SQL Server**<br>• Understand features and data types in SQL server.<br>• Create and manipulate databases for various applications.<br>• Use procedures and trigger for performing complex operation on databases.<br>• Handle errors using exception handling concepts. |
| **CS-313 Software Engineering**<br>• Get aware of evaluation of software and Software Development Life Cycle (SDLC).<br>• Know about Software Development Model. | **CS-323 Internet Programming using PHP**<br>• Understand how PHP works with lexical structure of it.<br>• Program for different applications using arrays, functions and strings.<br>• Aware about different web techniques used in PHP. |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| • Get knowledge of Requirement Analysis and Specification in software engineering .<br>• Learn use of Fact finding Techniques , Types of Requirement Modeling and Data Modeling Concepts.<br>• Get knowledge of Design Concepts in software engineering.<br>• Know about Cohesion & Coupling , Decision Table & Decision Tree, Data flow Diagram<br>• Know about Software Coding & Testing.<br>• Get aware about Elements of Software Quality Assurance. | • Integrate PHP with MYSQL. |
| **CS-314 Computer Aided Graphics**<br>• Differentiate between interactive and non interactive graphics.<br>• Explore different line and circle drawing algorithms.<br>• Perform 2D and 3D transformation on different images.<br>• Know about detail working of image clipping and windowing.<br>• Understand raster graphics and hidden surface elimination. | **CS-324 Theoretical Computer Science**<br>• Understand what is Push down Automata and its applications.<br>• Understand concepts of Context free grammar and normalization of CFG.<br>• Convert regular expression to Finite Automata.<br>• Design Turing Machines for various applications like enumerator, function computer and universal Turing machine. |
| **CS-315 Programming in VB.NET**<br>• Get aware about .Net platform.<br>• Understand looping structure, control flow statements and exception handling in VB.NET<br>• Understand object oriented programming in VB.NET | **CS-325 Computer Network**<br>• Understand applications of network, network structures and protocol hierarchy<br>• Aware about details of physical, data link, network and transport layer of TCP/IP network model. |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
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| • Program using ADO.NET | • Understand about different aspects of network security like firewalls, IP security and VPNs.<br>• Aware about attacks and Confidentiality used in cryptography. |
| **Elective-A CS-316 A) Programming in C#**<br>• By using c# code and ASP.Net create dynamic web pages.<br>• Using MS Visual Studio.NET IDE and Create Console Applications.<br>• Know about Basic Principal of OOP, Defining Class and using functions.<br>• Able to use constructor and destructor.<br>• Use Polymorphism ,Method Overriding ,Method hiding<br><br>**Elective -B UG-CS-316 B) JAVA Programming-I**<br>• Get knowledge JDK Environment.<br>• Explore polymorphism using Function and Operator Overloading ,overriding .<br>• Understand the different aspects of hierarchy of classes and their extensibility .<br>• Understand the concepts of streams and files .<br>Write programs for handling runtime errors using exception. | **Elective - A CS-326 A) Web Programming using ASP.NET**<br>• Using features of ASP.Net create ASP.Net Compilation Model, Code behind Model Execution Stages.<br>• Know about ASP.NET Controls , ASP.Net Intrinsic Objects<br>• Use page layout, styles and text balance, site map, Master pages and content Pages, Navigation controls: Tree view, site map path(bread crumb), Menu navigation.<br>• By using ASP.Net create dynamic web pages<br><br>**Elective - B CS-326 B) JAVA Programming-II**<br>• Program using graphical user interface with Swing classes.<br>• Handle different kinds of events generated while handling windows.<br>• Create programs using menus and dialog boxes.<br>• Program for websites using applets.<br>Understand advanced java concepts like JDBC and servlets. |
| **CS-Lab-301 Lab on System Programming**<br>• On completion of the course, students are able to develop system | **CS-Lab-304 Lab on MS SQL Server**<br>• On completion of the course, students are able to develop database |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| programs to provide basic applications for computing like line editor, interrupt handler, SMAC0 and lexical<br>• Analyzer. | management system using features and services provided by MS SQL Server |
| **CS-Lab-302 Lab on Programming in VB.NET, Computer Aided Graphics**<br>• On completion of the course, students are able to develop different programs for demonstrating different Computer graphics algorithms like circle, line drawing and clipping and filling as well as students can create dynamic web pages using VB.NET. | **CS-Lab-305 Lab on Internet Programming using PHP**<br>• On completion of the course, students are able to develop interactive static as well as dynamic websites. |
| **Elective -A CS-Lab-303 A) Lab on Programming in C# and CS-Lab**<br>• On completion of the course, students are able to develop programs using C# based on object oriented concepts and write the ROBUST, EXTENSIBLE and EFFICIENT<br>• Programs by using c# code and ASP.Net create dynamic web pages.<br><br>**Elective -B CS-Lab-303 B) Lab on JAVA Programming – I**<br>• On completion of the course, students are able to develop efficient programs which provides graphical user interface for easy handling of computers using JAVA. | **Elective -A CS-Lab-303 A) Lab on ASP.NET**<br>• On completion of the course, students are able to develop programs using C# based on object oriented concepts and write the ROBUST, EXTENSIBLE and EFFICIENT Programs by using c# code and ASP.Net create dynamic web pages.<br><br>**Elective -B CS-Lab-303 B) Lab on JAVA Programming – II**<br>• On completion of the course, students are able to develop efficient programs which provides graphical user interface for easy handling of computers using JAVA. |

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| F.Y.MSc. SEM – I | F.Y.MSc. SEM – II |
|---|---|
| **CS-101 Advanced C++ Programming**<br>• Understand advanced concepts for handling runtime errors using stack unwinding, uncaught exception and automatic cleanup.<br>• Study the Runtime Type Information of the member variables, functions and the multiple inheritance that are used in the program.<br>• Study advanced concepts of C++ by resolving ambiguities and duplicate sub object in virtual base classes.<br>• Understand applications of C++ like Smart Pointer , Generic Pointer , Object Validation and Reference Counting.<br>• Understand detail concepts of STL. | **CS-201 Advanced DBMS**<br>• Understand a core concept of DBMS.<br>• Study to Distributed Database.<br>• Understand a Tier architecture of DBMS.<br>• Understand Mobile Database & Multimedia DataBase. |
| **CS-102 Automata Theory and Computability**<br>• Understand what is Push down Automata and its applications.<br>• Design Turing Machines for various applications like emunerator, function computer and universal turing machine.<br>• Study Post correspondence problem, decidability of membership, emptiness and equivalence problems of natural languages.<br>• Get familiar with Computability and complexity measures.<br>• Understand what is DNA and Membrane Computing. | **CS-202 Machine Intelligence**<br>• Understand artificial intelligence and AI problem solving techniques.<br>• Explore logic for solving various AI problems.<br>• Grasp the techniques of knowledge representation in machine.<br>• Comprehend advanced machine learning techniques such as fuzzy logic and genetic algorithms. |
| **CS-103 Advanced Operating System**<br>• Study files subsystem for UNIX operating system.<br>• Understand detail working of UNIX operating system. | **CS-203 Compiler Construction**<br>• Know role of compilers in program execution.<br>• Understand detail program execution using lexical and syntax analysis |

| F.Y.MSc. SEM – I | F.Y.MSc. SEM – II |
|---|---|
| • Understand process and memory management techniques.<br>• Study Linux shell command. | • Be aware of code generation and optimization. |
| **CS-104 Digital Image Processing**<br>• Understand the application of digital image processing.<br>• Explore knowledge about image processing fundamentals.<br>• Get aware about image sampling and quantization and operation on images<br>• Understand histogram processing and various image filtering algorithms.<br>• Know about various noise models and transformation techniques.<br>• Be aware of various morphological techniques and segmentation schemes. | **CS-204 Design and Analysis of Algorithms**<br>• Design efficient algorithms using various algorithm designing techniques.<br>• Comprehend dynamic programming using control abstraction and longest common subsequence.<br>• Classifying any problem as NP complete and NP hard |
| **CS-105- LAB - I Lab on Advanced OS and Digital Image Processing**<br>• Get hands on various linux commands and shell script for different application.<br>• Familiar with MATLAB environment.<br>• Explore various algorithms for digital image processing using MATLAB. | **CS-205- LAB - III Lab on DAA and MI**<br>• On completion of the course, students are able to build the program that can solve the problems which requires intelligence to solve them. They can build programs which can generate output in less time and execute in less space. |
| **CS -106-LAB - II Lab on Advanced C++ Programming**<br>• On completion of the course, students are able to develop ROBUST, EXTENSIBLE and EFFICIENT programs using advanced concepts of | **CS -206-LAB - IV Lab on Advanced DBMS**<br>• On completion of the course, students are able to build and maintain the databases handling real life applications and daily needs. |

| F.Y.MSc. SEM – I | F.Y.MSc. SEM – II |
|---|---|
| STL in C++. | |

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| S.Y.MSc. SEM – III | S.Y.MSc. SEM – IV |
|---|---|
| **CS-301 Software Engineering**<br>• Know the requirements of developing software.<br>• Be aware of various models required for software development.<br>• Test the developed software for its functionality and performance.<br>• Understand software quality and quality measures.<br>• Grasp the software configuration management and project planning. | **CS-401 Natural Language Processing**<br>• Understand languages and linguistic background<br>• Be familiar with applications and research background in NLP.<br>• Grasp mathematical foundation related to NLP like probability, bays theorem and machine learning.<br>• Know about linguistics essentials and grammar as part of speech and parsing and differentiating them.<br>• Aware about word morphology and N-Gram Models. |
| **CS-302 Optimization of Algorithm**<br>• Understanding classification and limitation of quantitative techniques.<br>• Take hold of linear programming problem solving techniques.<br>• Solve various kinds of transportation problems using different techniques.<br>• Explore concepts in game theory<br>• Be aware about the network models, sequencing models and simulaon models. | **CS-402 Advanced Network Programming**<br>• Understand network fundamentals with TCP/IP architecture.<br>• Aware with client server programming and its application using socket interface.<br>• Understand IGMP ICMP and IP datagrams<br>• Understating the mobile and advoc network programming. |
| **CS-303 Advance java Programming**<br>• Explore programming techniques of Java beans and swing. | **CS-403 Data Warehousing and Data Mining.**<br>• Explore the concepts of data mining and data preprocessing. |

| S.Y.MSc. SEM – III | S.Y.MSc. SEM – IV |
|---|---|
| • Be aware about Java Enterprise applications. And new Tech.<br>• Know about java servlets and java struts.<br>• Understand a Framework.<br>• Study a Session Concept. | • Understand concept of association rule mining.<br>• Grasp classification and prediction and analysie different issues related to them.<br>• Identify different cluster analysis techniques.<br>• Know about advanced data mining techniques such as spatial data mining and understand the concept of big data analysis. |
| **CS-304 Windows, WCF and WPF Programming**<br>• Familiar with windows environment and child window controls.<br>• Understand windows communication foundation using WCF contracts, clients and services security.<br>• Understand windows presentation foundation programming. | **CS-404- LAB – VII Lab on Network programming and Data Mining**<br>• On completion of the course, students are able to develop client server programs for various services like TCP, UDP, Telnet, FTP and HTTP. Students are also able to analyze the processing and classification techniques using WEKA tool. |
| **CS-305-LAB – V Lab on Windows, WCF and WPF Programming**<br>• On completion of the course, students are able to develop program having graphical user interface for various applications. | **CS -405 Mini Projects**<br>• Deal with real world data.<br>• Familiar about real time IT industry environment.<br>• Experience about applying the knowledge they got until now.<br>• Build a whole real time working system which will satisfy all customers needs. |
| **CS -306-LAB –VI Lab on window Programming and VC++**<br>• On completion of the course, students are able to develop program having graphical user interface for various applications. | |

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# Department of Microbiology

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **MB 101: Microbial Diversity**<br>• Understand the basic microbial structure and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know general bacteriology and microbial aspects pertinent to bacteria, fungi and algae<br>• How the subject emerge as new branch of biology<br>• Learn ancient view about life continuity and concept of experiment<br>• Aware about historical developments and their applications as technology<br>• Cognizant about contribution of various pioneers of microbiology<br>• Aware about diversity of microorganism<br>• Impact of microbes on earth atmosphere, health and technology development<br>• Recognize the scope of microbiology in all spheres of life and industrial sector<br>• Ways to classify the living system<br>• Understand the taxonomy (identification, binomial nomenclature, and Classifications schemes/keys) and comprehend the various approaches of microbial taxonomy. | **MB 201: Basic Biochemistry and Cytology**<br>• Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also<br>• Understand the structural architecture and differences among bacteria/archaea<br>• Know basic knowledge pertinent to cell biomolecules |
| **MB 102: Microscopy and Basic Bacteriology** | **MB 202: Microbial Techniques** |

## Department of Microbiology

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| • Demonstrate theory in microscopy and their handling techniques and staining procedures Know various Culture media and their applications and also understand various physical and chemical means of sterilization Know general bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae<br>• Learn aseptic techniques and be able to perform routine culture handling tasks safely and effectively<br>• Comprehend the various methods for identification of unknown microorganisms<br>• Understand the modes of nutrition in microbial metabolism and able to classify the bacteria based on nutrition<br>• Know the various Physical and Chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement. | • Know general bacteriology and introduce microbial techniques for isolation of pure cultures of bacteria, fungi, algae and virus Demonstrate theory and practical skills in handling microbial culture<br>• Know various bacteria based on nutritional needs and also understand various physical and chemical means of sterilization<br>• Discern knowledge about sterility assessment of sterilizing agents |
| **MB 103: Microbiology Practical Paper – I**<br>• Inculcate the ability to apply the process of science<br>• Demonstrate ability to formulate hypotheses and design experiments based on the scientific method. o Analyse and interpret results from a variety of microbiological methods and apply these methods to analogous situations. Develop ability to use quantitative reasoning to solve problems in microbiology | **MB 203: Microbiology Practical –II**<br>• Demonstrate practical skills in microscopy and their handling techniques and staining procedures<br>• Understand the bacterial growth and comprehend various physical and chemical means of sterilization<br>• Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae Practice aseptic techniques |

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| • Communicate and collaborate with other disciplines<br>• Effectively communicate fundamental concepts of microbiology in written and oral format. o Identify credible scientific sources and interpret and evaluate the information therein. Understand the relationship between science and society<br>• Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures<br>• Understand the basic microbial practices and study the comparative characteristics of prokaryotes and eukaryotes<br>• Comprehend the various methods for identification of microorganisms adopted in Bergey's manual and able to classify the bacteria Know the various Physical growth requirements of bacteria<br>• Prepare and view specimens using microscopy (bright field microscope).<br>• Aware and train in aseptic handling of microbial specimens. Practice safe microbiology, using appropriate ctive and emergency procedures.<br>• Use appropriate microbiological and molecular lab equipment and methods.<br>• Document and report on experimental protocols, results and conclusions | and able to perform routine culture handling tasks safely and effectively<br>• Understand preparation of standard solutions required in various assays |

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## Department of Microbiology

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **MB:231 Fundamental Biochemistry**<br>• Develop fundamental knowledge about various biomolecules<br>• Understand the basic concepts related to enzymes<br>• Know various biochemical pathway<br>• Understand the concept of microbial metabolism | **MB:241 Genetics and Immunology**<br>• Understand concept of genes and chromosomes<br>• Familiar with concept of mutations<br>• Know the concepts of spontaneous mutations<br>• Understand basics of immunology |
| **MB:232 Microscopy and Microbial Ecology**<br>• Understand Principle, working, ray diagram and application of advance microscopes<br>• Know concepts related with of microbial interaction<br>• Get an idea regarding microbes and their relation with environment<br>• Understand the enumeration technique for microbes | **MB: 242 Basic Microbial Biotechnology**<br>• Aware of screening of bacteria<br>• Understand fermentation process<br>• Implement techniques of continuous culture<br>• Know various downstream processing |
| **MB:233 Practical course in Microbiology –I**<br>• Detect microbial enzymes<br>• Detection of biomolecules,<br>• Understand symbiotic interaction<br>• Check portability of water, microflora of air. | **MB:244 Practical course in Microbiology I**<br>• Develop skill to stain parts of bacterial cell<br>• Detect fermentation product<br>• Isolate mutants<br>• Screen bacteria for organic acid and antibiotics |

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| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| **MB351 Microbial genetics**<br>• Concept of central dogma of molecular biology<br>• Process of DNA replication transcription, translation | **MB361 Molecular Biology**<br>• Concept of gene regulation<br>• Principals and applications of various molecular techniques |

## Department of Microbiology

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| • Viral genetics<br>• Various method used for genetic recombination | • Concept, methods and application of r-DNA technology<br>• Gene library and gene mapping |
| **MB352 Fermentation Technology**<br>• Bioreactors,<br>• Industrial sterilization<br>• Strain improvement<br>• Scale up and large scale production | **MB362 Pharmaceutical Microbiology**<br>• Quality control and assurance,<br>• Concepts of GMP and GLP regulations<br>• Standard protocols in pharmaceutical industry - IP, BP, USP and EP,<br>• Pharmaceutical audit and testing procedures for fermentation process |
| **MB353 Microbial Metabolism**<br>• Concept of bioenergetics<br>• Anabolism and catabolism with examples<br>• Laws of thermodynamics<br>• Bacterial photosynthesis | **MB 363 Enzymology**<br>• Vitamin as cofactor, its role metabolism,<br>• Regulation of enzyme<br>• Various methods used for enzyme purification<br>• Enzyme assays |
| **MB 354 Medical Microbiology**<br>• Various concepts of medical microbiology<br>• Role of international organizations such as CDC and WHO<br>• Anatomy of human system<br>• Various chemotherapeutic agent and their mode of action | **MB 364 Clinical Microbiology**<br>• Various viral disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxsis<br>• Various bacterial disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxsis<br>• Various fungal disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxsis<br>• Various protozoal disease, their causative agent, mode of infection, |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| | epidemiology, treatment, lab diagnosis, prophylaxsis |
| **MB355 Immunology**<br>• Concept related to cells and organs related to immune system<br>• Immune response and immune mechanism<br>• Immunological disorders<br>• Concepts related to Immunodeficiency | **MB 365 Diagnostic Immunology**<br>• Various antigen antibody reaction,<br>• Different immunological techniques<br>• Concepts related to transplantation,<br>• Concept of tumor immunology, type of tumors, immune mechanisms against tumors |
| **MB356 Applied Microbiology**<br>• Milk microbiology- technique used in milk industry,<br>• Food microbiology – technique used in food industries,<br>• Microbial food poisoning<br>• Concepts related to geo-microbiology and nanotechnology | **MB366 Environmental Microbiology**<br>• Concepts related to Plant pathology<br>• Various plant pathogens and disease<br>• Soil microbiology and xenobiotics<br>• Microbial waste treatment methods. |
| **MB357 Techniques in Diagnostic Microbiology –I**<br>• Isolate and identify microorganism form laboratory sample<br>• Perform MIC of antibiotics<br>• ELISA test for disease diagnosis<br>• Immuno-diffusion techniques | **MB367 Techniques in Diagnostic Microbiology –II**<br>• Isolate and identify microorganism form laboratory sample,<br>• Antibiotics senstitivity and resistance test<br>• Detection of parasite<br>• Handling of blood and body fluids |
| **MB358 Techniques in Industrial Microbiology –I**<br>• Techniques used in industrial production of alcohol<br>• Phenol coefficient test<br>• Evaluation of sterilization techniques | **MB368 Techniques in Industrial Microbiology –II**<br>• Techniques used in industries –Citric acid fermentation,<br>• UV-survival curve<br>• Enzyme production and determination of its activity |

## Department of Microbiology

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| • Temperature relation with microorganism- TDT, TDP | • Validation techniques of instruments and immobilization process. |
| **MB359 Techniques in Applied Microbiology –I**<br>• Various techniques to estimate size of microbes<br>• Isolation of bacteriophage and endophytic microorganism<br>• Check quality of milk<br>• Awareness of material safety Data sheet. | **MB369 Techniques in Applied Microbiology –II**<br>• Various methods used in agriculturally important microbes<br>• Tests in waste water treatment<br>• Antimicrobial action of plant extract<br>• Test for milk quality |

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| F.Y.MSc. SEM – I | F.Y.MSc. SEM – II |
|---|---|
| **MB 101 Microbial Taxonomy and Diversity**<br>• Microbial taxonomy – concepts and techniques for identification<br>• Concept related to extremophilic microbes and archea<br>• Characters and significance of algae and fungi<br>• Characters and significance of virus | **MB201 Microbial Genetics**<br>• Genome organization and vocabulary<br>• Virus genome replication<br>• DNA damage and repair<br>• Gene regulations in bacteria, virus and eukaryotes |
| **MB 102 Microbial Biochemistry**<br>• Structure and properties of Biomolecules<br>• Transport and energy metabolism<br>• Metabolism of carbohydrates, lipids, amino acid, nucleotide.<br>• Metabolic pathways and Bioenergetics | **MB202 Microbial Enzymology**<br>• Basic Enzymology<br>• Enzyme kinetics and inhibitions<br>• Catalytic mechanisms and regulation,<br>• Industrial applications of enzymes and extremozymes |
| **MB 103 Bio-Analytical Techniques**<br>• Students aware about relevant topics on life science | **MB203 Immunology**<br>• Immune system and immune response<br>• Detail procedure of hyper immune response |

## Department of Microbiology

| F.Y.MSc. SEM – I | F.Y.MSc. SEM – II |
|---|---|
| | • Immune response to infections and diseases<br>• Histo-chemical and immune techniques |
| **MB 104 Methods in Microbiology**<br>• Biosafty procedures in microbiology<br>• Cultivation of algae, and fungi<br>• Nucleic acid and protein separation techniques<br>• Advance instrumentation such as HPLC, GC, AAS | **MB 204 Methods in Enzymology**<br>• Qualitative and quantitative enzyme assay<br>• Effect of environmental factors on enzyme<br>• Enzyme kinetics and immobilization<br>• Purification of enzymes |
| **MB 105 Methods in Biochemistry**<br>• Basic biochemistry perpetrations<br>• Biochemical analysis of sugar, protein, by various methods<br>• Quantitative and qualitative estimation of nucleic acid<br>• Basic bioinformatics software's | **MB 205 Methods in Molecular Biology and Immunology**<br>• Methods used in molecular biology.<br>• DNA amplification using PCR technique<br>• Isolation of plasmid and fungal DNA<br>• Protein and DNA separation techniques |

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| S.Y.MSc. SEM – III | S.Y.MSc. SEM – IV |
|---|---|
| **MB301 Applied and Environmental Microbiology**<br>• Method of sampling, investigation and examination of food<br>• Different techniques used to treat waste water<br>• Biological conversion of lignocellulosic waste,<br>• Bioremediation and biodegradation of xenobiotic compound, biomarkers and bioreporters | **MB401 Fermentation Technology**<br>• Principals in upstream process in fermentation industries.<br>• Design and application of bioreactor<br>• Downstream processing and recovery<br>• Production of few microbial products |

## Department of Microbiology

| S.Y.MSc. SEM – III | S.Y.MSc. SEM – IV |
|---|---|
| **MB302 Molecular Biology and Bioinformatics**<br>• Basic concept of molecular biology<br>• Basic concept in Bioinformatics<br>• Process of transcription, translation,<br>• Protein targeting and degradation. | **MB402 Applied Molecular Biology**<br>• Tools of molecular biology for rDNA technology<br>• Methods in r DNA technology<br>• Concept of microbial genome<br>• Protein engineering and proteomics |
| **MB303 Pharmaceutical Microbiology**<br>• Antibiotics and synthetic antimicrobial agents<br>• Regulations aspects in pharmaceutical industry<br>• Production of few biopharmaceuticals<br>• Concept of drug design | **MB403 Agricultural Microbiology**<br>• Approaches used in agriculture to control disease in plant<br>• Microbial ecology and microbial interaction<br>• Pathogenic interactions with plant<br>• Microbial bi-control agents |
| **MB 304 Methods in Biostatistics and Bioinformatics**<br>• Different computational methods used in basic biostatistics<br>• Software used in the bioinformatics<br>• Biological databases for protein and nucleic acid<br>• Multivariate analysis in biostatistics | **MB 404 Methods in Biotechnology**<br>• Analysis of biogas digested slurry<br>• Isolation and estimation of RNA/DNA from various sources<br>• Protocols regarding siderophore, VAM fungi spores, PGPR<br>• Protocols regarding DNA fingerprinting, GFP marker |
| **MB 305 Methods in Applied Microbiology**<br>• Validation of instruments<br>• Microbiological assay of vitamin<br>• Environmental monitoring in pharmaceutical industry<br>• Analytical tests such as Microbial limit tests, Phenol coefficient, LAL | **MB 405 Laboratory course (Project Dissertation)**<br>• Selection of research topic<br>• Collection and compilation of literature<br>• Designing of experiment with objectivity<br>• Compilation and interpretation of results<br>• Presentation of research data in report form |

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## Department of Electronics & Physics

## (Electronics)

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **ELE 101: NW Analysis and SD Diodes**<br>• Understand electronic systems with a continuously variable signal<br>• Understand proportional relationship between a signal and a voltage or current that represents the signal.<br>• To learn function of basic components use in linear circuits.<br>• Understand component symbol, working principle, classification and specification.<br>• Learn different theorems for simplification of basic linear electronics circuits. | **ELE 201: Analog Electronics**<br>• Understand Basic Circuits using Active Devices<br>• Learn function of basic circuit components used in linear circuits.<br>• Understand basic construction, equivalent circuits and characteristics of basic electronics devices.<br>• Students understand basic linear electronics circuits and their working principle, |
| **ELE – 102 - Digital IC**<br>• Understand basic digital electronic systems<br>• Learn function of basic digital circuits and use of transistors to create logic gates in order to perform Boolean logic.<br>• Learn different theorems for simplification of basic Digital electronics circuits.<br>• Understand symbols, Truth tables, Boolean equations, & working principle. | **ELE – 202 – Linear IC**<br>• Understand Basic differential amplifier and their applications in linear Integrated circuits<br>• Learn basic function of operational amplifier, Ideal and practical characteristics and their mathematical application.<br>• Understand basic construction of active filters, comparators and their application in electronics. |
| **Lab: 103**<br>• Gain the practical knowledge of above subject. | **Lab: 203**<br>• Gain the practical knowledge of above subject. |

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## Department of Electronics & Physics

## (Electronics)

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **ELE 231: Analog Circuits and Applications**<br>• Understand Basic Analog Circuits and their applications using Active Devices<br>• Learn basic function of single stage amplifier, multistage amplifier and power Amplifier and their working principle.<br>• Understand basic construction of feedback circuits and their application in Oscillators analog circuits.<br>• Understand basic amplifier and oscillator circuits and their application in electrical parameter. | **ELE 241: Linear Integrated Circuits & Applications**<br>• Understand Basic differential amplifier and their applications in linear Integrated circuits<br>• Learn basic function of operational amplifier, Ideal and practical characteristics and their mathematical application.<br>• Understand basic construction of active filters, comparators and their application in electronics.<br>• Students understand different types of multivibrator and wave form generator using IC 555 |
| **ELE 232: Instrumentation**<br>• Understand Basic Analog and digital meters for measurement of various<br>• Learn basic test instruments such as power supply, function generator, DFM and CRO and their construction and working principle.<br>• Understand basic principle of transducers and their construction, Working principle, classification and application in various fields.<br>• Understand the construction of data convertor circuits and their applications in digital circuits. | **ELE 242: 8085 Microprocessor**<br>• Understand the basic architecture of 8- bit microprocessors.<br>• Program writing on 8085 microprocessor based systems.<br>• Identify the addressing modes of an instruction.<br>• Develop programming skills in assembly language. |
| **Lab: 233 Lab**<br>• Perform practical on some measuring instrument. | **Lab: 243 Lab**<br>• Perform practical on various op amp circuits. |

## Department of Electronics & Physics

## (Electronics)

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| • Student will perform experiment on transistor and its application<br>• Student will perform practical on transducers and its application.<br>• Learn and study the oscillator circuits. | • Perform practical on multivibrators using IC 555.<br>• Student perform practical on 8085 programming in assembly language.<br>• Student perform practical on active and passive filters. |

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| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| **ELE 351: Semiconductor Physics**<br>• Understand the fundamental concept of semiconductor like crystal structure, energy band gap, charge carrier statistics.<br>• Understand the physics, basic characteristics and operation of semiconductor devices such as p-n junctions and Zener diodes<br>• Have knowledge of fabrication technology for semiconductor devices and integrated circuits | **ELE 361: Electrodynamics**<br>• Understand concepts in electrostatic law.<br>• Get acquainted with Conceptual understanding of the electromagnetic laws, set up a model and perform the necessary calculations.<br>• Have knowledge of electromagnetic waves and their propagation. |
| **ELE 352: Basic Communication Systems**<br>• Understand the basic concept of communication system.<br>• Understand AM , FM and demodulation.<br>• Understand antenna and radio wave propagation used in communication system. | **ELE 362: Advanced Communication Systems**<br>• Understand basic concept of digital communication system.<br>• Understand the fiber optic communication.<br>• Understand computer network and security. |
| **ELE 353: 8086 Microprocessor**<br>• Understand basic architecture of 16 bit microprocessors. | **ELE 363: Microprocessor Interfacing Techniques and Advanced Mi**<br>• Understand interrupt and interrupt service routine. |

## Department of Electronics & Physics

## (Electronics)

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| • Write programs on 8086 microprocessor based systems.<br>• Illustrate the organization of registers and memory in microprocessors.<br>• Differentiate Minimum and Maximum Mode bus cycle.<br>• Identify the addressing mode of an instruction.<br>• Develop programming skills in assembly language. | • Understand I/O interfacing and techniques.<br>• Understand advance microprocessor. |
| **ELE 354: The C Programming Language**<br>• Understand basic of the programming language<br>• Able to switch any other programming language<br>• Able to write C program for simple real life applications using structures. | **ELE 364: Numerical Simulation in Electronics**<br>• Find root of equation by different numerical methods<br>• Find out differentiation and integration of equation<br>• Solve linear equation system.<br>• Simulate electronic circuits numerically. |
| **ELE 355: Microcontroller 8051**<br>• Ability to differentiate microprocessor and microcontroller.<br>• Describe the architecture of 8051<br>• Able to write assembly language program for 8 bit microcontroller | **ELE 365: Embedded Systems**<br>• Write interfacing programming.<br>• Identify embedded systems in various applications.<br>• Write advanced microcontroller programming for real life application. |
| **ELE 356: Advanced Digital System Design**<br>• Design advanced digital systems.<br>• Understand the Hardware Description Languages (HDL).<br>• Design combinational and sequential logic circuits using VHDL. | **ELE 366: Industrial and Power Electronics**<br>• Understand power semiconductor devices used in industries.<br>• Understand the construction and working of different power semiconductor devices<br>• Analyze various triggering circuits used for different semiconductor |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| | devices<br>• Design power electronic circuit for real time application like rectifier and convertor etc. |
| **ELE-357: General Lab – I**<br>• Perform practical to find properties of semiconductor material.<br>• Perform practical on modulation & De-modulation.<br>• Perform Simulation using VHDL<br>• Perform Simulation using PSPICE. | **ELE-357: General Lab – II**<br>• Perform practical to find characteristics of power device such as SCR, TRIAC, MOSFET etc.,<br>• To study the digital modulation & de-modulation technique. |
| **ELE-358: µP, µC and C/MATLAB Lab – I Programming**<br>Student understand how to,<br>• Write a program for µP to perform various job.<br>• Write a program for µC to perform various job.<br>• Write a program in C language | **ELE-358: µP, µC and C/MATLAB Lab – II Programming**<br>Student understand how to,<br>• Perform the practical on interfacing using µP.<br>• Perform the practical on interfacing using µC.<br>• Perform the practical on MATLAB. |
| **ELE-359: Project Part-I**<br>• To achieve the knowledge of actual project skill and design of the<br>• project<br>• To get idea about the market requirement product and scope of the correct technology | **ELE-359: Project Part-II**<br>• To manage the project program strategy for complete one year to visit industries and libraries.<br>• To learn the difficulties and troubleshooting in actual practical work. |

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## Department of Electronics & Physics

## (Physics)

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **PHY-101: Basic Mechanics**<br>• Apply the concept of use of knowledge of mechanics to real life problems.<br>• Understanding of the course will create scientific temperament. | **PHY-201 Electricity and Electrostatics**<br>• Identify the presence of static electric charges and fields due to static charges<br>• Possess adequate knowledge to analyze electrical circuits using Kirchhoff's laws |
| **PHY-102: Dynamics and Elasticity**<br>• Understand the effect of gravitation on objects and understand the principle of rocket<br>• Learn the fundamentals of harmonic oscillator model, including damped and forced oscillators<br>• Distinguish between different types of oscillatory motion and to understand the variation of amplitude with time under various circumstances.<br>• Distinguish rigid/flexible materials by measuring moduli of elasticity.<br>• Differentiate between the streamline and turbulent flow of liquids and reason out the effects of liquids while flowing<br>• Compare the viscosity and interfacial surface tension between the liquids and Assimilate and analyze the motion in fluids point. | **PHY-202: Dielectric, Magnetism and Electromagnetism**<br>• Distinguish between different types of magnetic materials and different kinds of magnetism manifested in materials<br>• Analyze magnetic properties of a ferromagnetic solid by analyzing or recording its hysteresis behaviour<br>• Distinguish between magnetic effect of electric current and electromagnetic induction and to apply the related laws in appropriate circumstances<br>• Demonstrate magnetic field of electric current/ electromagnetic induction through proper understanding<br>• Compare the principles and working of different types of galvanometer<br>• Apply and analyze the behaviour of ac/ dc circuits based on L,C and R<br>• Understand the unification of electric and magnetic fields and Maxwell's equations governing EM waves |

## Department of Electronics & Physics

## (Physics)

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **PHY-103 Lab**<br>• The student is expected to learn from this laboratory course the concept of error and its analysis.<br>• It also allows the student to develop experimental skills to design new experiments in Science and Technology.<br>• With the exposure to these experiments the student can compare the theory and correlate with experiment. | **PHY- 203 Lab**<br>• Able to understand the practically theoretical concept of physics |

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| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **PHY-231: Waves and Oscillations**<br>• Learn about simple harmonic motion and comparison between two SHM s by obtaining Lissauges figures.<br>• Learn about free oscillations and damped oscillations with study harmonic oscillator and series LCR circuit.<br>• Understand idea of forced oscillations, resonance and its equations with solution.<br>• Learn forced oscillations in electrical circuit like LCR circuit.<br>• Understand the Doppler effect in sound and its apparent frequency and asymmetric nature.<br>• Understand Doppler effect in light and its apparent change in | **PHY – 241: Modern Physics**<br>• To solve problems associated with energy crisis by means of photo thermal conversion and photovoltaic conversion.<br>• To demonstrate construction and working of flat-plate collector, liquid flat plate collector, Basic photovoltaic system and solar modules for power generation.<br>• To understand Laser, its types, applications - Ruby LASER, He-Ne LASER.<br>• To verify experimentally of discrete atomic energy levels and correspondence principle<br>• To understand atomic spectra and distinguish classical planetary model |

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| wavelength.<br>• Learn applications of Doppler effect.<br>• Learn about ultrasonic and piezoelectric effect.<br>• Understand the working of piezoelectric oscillator and magnetostriction oscillator.<br>• Learn about detection of ultrasonic waves and their applications | and Bohr's theory of hydrogen atom and quantum mechanical Bohr's Sommerfield model.<br>• To understand matter wave, concept of wave group, and relations between phase velocity, group velocity, particle velocity.<br>• To demonstrate Davission and Germer experiment.<br>• To understand Uncertainty principle and its application in Non existence of electron in nucleus, determination of ground state of electron and size of hydrogen atom). |
| **PHY- 232 (A): Electronics- I**<br>• Learn fundamentals of measurements.<br>• The ability to estimate and correct deviations in measurements due to the influence of the instrument and due to the accuracy of the instrument.<br>• The ability to select a suitable measuring instrument for a given application.<br>• Able to measure temperature using Non-electrical, Electrical, and radiation methods.<br>• Determine pressure using different gauges.<br>• Analyze the response of acoustical instruments<br>• Learn different flow meters. | **PHY-242: Optics**<br>• To learn Power of lens, Spherical aberration in lens, and to distinguish Chromatic aberration and Achromatism aberration.<br>• To understand concept of interference pattern due to reflected light in parallel sided thin films and in thin wedge shaped film.<br>• To demonstrate experimental set up for Newton's rings, theory and its application to determine wavelength of source and refractive index of liquids.<br>• To demonstrate Michelson Interferometer (experimental setup and its application for measurement of wavelength of monochromatic source).<br>• To distinguish between Fresnel and Fraunhoffer diffraction. |

## Department of Electronics & Physics

## (Physics)

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| • Able to measure magnetic field using Hall gauge meter and search coil method.<br><br>**PHY- 232 (B) - Instrumentation –I**<br>• To understand standards of measurements and calibration.<br>• To learn measurement of temperature using: Non - electrical, Electrical and Radiation Methods.<br>• To learn measurement of pressure using McLaud Guage (b) Pirani Gauge.<br>• To learn Measurement of flow using: Venturi tube, Pitot tube and Rota meter.<br>• To understand characteristics of sound and to know typical sound measuring system.<br>• To learn Measurement of magnetic field by using search coil method and Hall gauge meter. | • To understand theory of plane transmission grating and its resolving power.<br>• To state Brewster's law and Maluss law for polarization by double refraction in crystals.<br>• To understand Construction of Polaroid, Quarter and Half wave plates, Nicol prism.<br>• To learn production and detection of circularly and elliptically polarized light<br>• To demonstrate principle and working of Polarimeter or Sacherimeter. |
| **PHY-233 Lab**<br>• Understand the basic concepts of waves and oscillations like damping oscillations and resonance with the experiments logarithmic decrements, bottle as a resonator , Ketter's Pendulum De Sauty's bridge etc.<br>• Understand the basics of modern physics like electronic charge, energy | **PHY- 243 Lab**<br>• Able to understand the practically theoretical concept of physics |

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| gap by performing experiments on pn junction diode<br>• Understand the basic of Instrumentation by performing the Course experiments on | |

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# Department of Chemistry

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **CH-111: Physical and Inorganic Chemistry**<br>• Develop an ability to use conceptual and mathematical tools to express and predict atomic and molecular behavior<br>• Predict atomic structure, chemical bonding or molecular geometry based on accepted models.<br>• Convert scientific equation in straight line to get physical parameter for slope and intercept.<br>• Understand deviation of real gas from ideal behavior.<br>• Understand critical constant and vanderwall's constant. | **CH-121: Physical and Inorganic Chemistry**<br>• Identify methods and instruments that can be used to study chemistry<br>• Evaluate data generated by experimental methods for chemical characterization.<br>• To understand specific and equivalent conductance.<br>• To understand cell constant and use of it to obtain specific and equivalent conductance.<br>• To know Kolhaurash's law and application of it. |
| **CH-112: Organic and Inorganic Chemistry**<br>• Understand the general properties of organic compounds, applications of organic compounds.<br>• Understand the Mono functional compounds - Common and IUPAC nomenclature of various type of organic compound.<br>• Understand the the alkane by many organic reaction.<br>• Understand of S- block Elements of alkali metals and Alkaline earth metals<br>• Understand Arrhenius theory, Bronsted- Lowry theory, and Lewis theory.<br>• Understand ionic product of water, Buffer solutions. | **CH-122: Organic and Inorganic Chemistry**<br>• Understand the preparations, reactions and properties of Monohalogen and Dihalogen derivatives of Alkane.<br>• Understand the preparations, reactions and properties of Alcohol, Ether and Epoxide.<br>• Understand the preparations and reactions of carbonyl group.<br>• Understand the preparation of carboxylic acids.<br>• Determine the Molecular weight, formula weight, equivalent weight of organic compounds.<br>• Understand the Electronic structures, size of atoms and ions, ionization energy, metallic and nonmetallic of p block elements. |

## Department of Chemistry

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **CH-113: Chemistry Practical**<br>• Calibrate the apparatus like volumetric flask, pipette and burette.<br>• Understand the determination of heat of solution, equivalent weight, surface tension etc.<br>• Carry out qualitative analysis of acidic and basic radicals.<br>• Learn the applications of types of titrations for various estimations<br>• Carry out quantitative analysis by gravimetric method<br>• Carry out quantitative analysis by volumetric method | **CH-123: Chemistry Practical**<br>• Handle viscometer to determine the viscosity and relative viscosity of liquids .<br>• Carry out quantitative analysis by instrumental method using Conductometer.<br>• Estimate of aniline / phenol.<br>• Perform qualitative analysis of organic compounds.<br>• Carry out quantitative analysis by volumetric method and gravimetric methods |

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| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **SY B.Sc CH 231: Physical and inorganic chemistry**<br>• Understand the Electronic structures, size of atoms and ions, ionization energy, metallic and nonmetallic of d block elements.<br>• Understand concept of Helmolthz free energy<br>• Understand numerical calculations of Gibbs free energy.<br>• Understand concept of vapor pressure of liquids.<br>• Understand the concept of physical properties of metals<br>• Learn methods of purification of ores. | **CH 241 Physical and inorganic chemistry**<br>• Understand colligative properties and its application calculation of molecular weight of solutes<br>• Understand concept of electromotive force and its measurement<br>• Understand about properties of Lanthanides and actinides.<br>• Understand concept of s-s, s-p, p-p, p-d & d-d combination of orbitals.<br>• Understand about classification of electrodes. |
| **CH 232: Organic and analytical chemistry:**<br>• Review the concept of isomers and discuss the isomer which results | **CH 242: Organic and analytical chemistry**<br>• Understand the synthesis and reaction of 5, 6 member and condensed |

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| from free rotation of C-C single bond, from a chirallity, from restricted rotation, R, S and E, Z nomenclature.<br>• Study of amines their formation reactivity.<br>• Study of reactivity, preparation and reactions of organo Li, Cu, Zn compounds.<br>• Understand the importance of analytical chemistry in analysis of compounds by titrimetric, gravimetric and instrumental methods.<br>• Know the importance of sampling methods and ways of interpretation of results of analysis.<br>• Determine the causes of errors and their minimization during analysis<br>• Learn the application of types of titrations for quantitative analysis of the samples. | heterocyclic systems.<br>• Understand the synthesis of synthetic reagents and their synthetic utility.<br>• Know the mechanism and stereochemistry of E1, E2 reaction.<br>• Understand the concept of quantitative analysis by gravimetric methos.<br>• Understand the concept for separation of analytes in samples by thin layer, paper and column chromatographic methods. |
| **CH 233: Chemistry practical:**<br>• Understand techniques chromatography for separation of components in the mixture.<br>• Understand recrystallization for purification of organic compounds.<br>• Prepare various inorganic complexes.<br>• Analyze compounds by titrimetric, gravimetric and instrumental methods..<br>• Understand to determine thermodynamic parameter. | **CH 243: chemistry practical:**<br>• Carry out qualitative analysis of organic compounds.<br>• Determine molecular weight by depression of freezing point method.<br>• Handle landsbergers apparatus for determination of molecular weight.<br>• Estimate of Nickel and Barium gravimetrically.<br>• Make use of potentiometer for determination of standard electrode potential. |

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| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| **CH 351: Physical chemistry**<br>• Understand spontaneous and non spontaneous processes.<br>• Understand the importance of salt bridge in electrochemical cell.<br>• Understand the concept electrochemical cell and determination of potential of cell<br>• Understand the laws of photochemistry (Grothus Draper Law and Stark Einstein law)<br>• Understand the concept quantum yield and fluoresce and phosphorescence from Jalblonski diagram.<br>• Understand the various devices to measure the radiation from radioactive sample. | **CH-361: Physical chemistry.**<br>• Understand the types of spectra, Rotational, Vibration and Electronic energy levels.<br>• difference between order and Molecularity<br>• Understand the first, second and third order reaction.<br>• Understand the concept anisotropic, isotropic, etch figure, polymorphism,<br>• Learn concept Photoelectric effect, Compton Effect and Heisenberg's uncertainty principals.<br>• Understand the concept of X- ray analysis. |
| **CH-352: Inorganic chemistry**<br>• Understand the basic concept of the co-ordination compound, and identify the types of given ligand, chelates.<br>• Understand the different physical method for the study of complexes and assumptions, drawbacks and isomerism in Werner's theory.<br>• Understand Effective atomic number (EAN) and how to calculate EAN for any given complexes.<br>• Understand the modern theories of metal-ligand bond related to valence bond theory.<br>• Application of CFT related to different geometry e. Square planer, | **CH-362: Inorganic chemistry**<br>• Understand the electronic structure, Extraction uses, oxidation states biological role of Cu.<br>• Know about the all basic theory of Acid and bases.<br>• Understand the concept of Hard and Soft acid bases concept theories, application and limitations.<br>• Know the different types and theories of Corrosion and how to protect Metal from corrosion. |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| tetrahedral, Octahedral.<br>• Understand the basic concept about CFT e. Spin magnetic moment, crystal field stabilization energy related to weak and strong field, limitation of theory.<br>• Understand the modern theories of metal-ligand bond related to Molecular orbital theory, and difference between B.T., C.F.T. and M.O.T. | |
| **CH-353: Organic chemistry**<br>• Understand Polarity picture of carbonyl group and nucleophilic addition reaction to it.<br>• Introduction concept of aromaticity electrophilic and nucleophilic aromatic substitution reaction.<br>• Molecular rearrangement involving migration to C, N and Oxygen.<br>• Drawing the resonating structures.<br>• Understand Nuclophic substitution reactions.<br>• Understanding electrophilic addition reactions. | **CH-363: Organic chemistry**<br>• Understands common terms in spectroscopy.<br>• Learn Physical methods of structure determination which includes IR, UV and NMR.<br>• Solve the problems based on IR, UV and NMR.<br>• Understand retro synthesis.<br>• Predict synthons and reagents.<br>• Solve the problems based on retro synthesis. |
| **CH-354: Analytical Chemistry**<br>• Understand procedure of extraction of metal ions using Solvent Extraction process.<br>• Understand the application of Ion Exchange Chromatography method for the separation of cations and anions using different types of resins. | **CH-364 Analytical Chemistry**<br>• Perform the analysis of samples using instrumental methods<br>• Understand the concepts of spectrometry, know the principles of instruments and their applications<br>• Understand principle, working and applications of Flame and Plasma |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| • Understand applications of Size Exclusion Chromatography for the separation of analytes based on their size and shapes.<br>• Understand the working of Gas Chromatographic unit and apply the knowledge to separate volatile compounds in sample.<br>• Understand Principle, choice of column materials for HPLC and its application.<br>• Understand Principles of Electrophoresis and choice of techniques of electrophoresis for various applications | Emission Spectrometry.<br>• Understand principle, Instrumentation and application of Atomic Absorption Spectrophotometry<br>• Understand principle, Instrumentation and applications of Turbidimetry and Nephelometry.<br>• Understand principle, Instrumentation and applications of thermogravimetric methods like TGA, DTA and DSC. |
| **CH-355: Industrial chemistry**<br>• Understand general concept of Industrial chemistry.<br>• Understand manufacturing of sugarcane.<br>• Understand general idea of differ physical methods used in manufacturing.<br>• Understands various types of fertilizer.<br>• Understand manufacturing of Beer and spirit.<br>• Understand the aspects of small scale industry. | **CH-365: Industrial chemistry**<br>• Understand the process of manufacturing of petrol and gasoline.<br>• Understand the process of manufacturing of methanol.<br>• Understand the process of manufacturing of soap.<br>• Understand the process of manufacturing of detergents.<br>• Understand classification of dyes and paints.<br>• Understand properties of drugs. |
| **CH 356: B Environmental chemistry**<br>• Understand the concept to awareness about environmental chemistry<br>• Understand the concept about atmosphere and different layer and composition<br>• Understand the concept. awareness about air pollution and organic | **CH 366: Polymer chemistry**<br>• Understand the basic concepts of polymerization.<br>• Understand the different methods of polymerization.<br>• Understand various techniques of polymerization.<br>• Understand the preparation, properties and applications of PE, PVC, |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| inorganic pollutants<br>• Understand the concept, water pollution and domestic sewage waste water, industrial pollution agriculture pesticide water pollution.<br>• Understand the different methods of water treatment, water effluents and sewage water.<br>• Understand the green house gases and global warming. | Polystyrene, polyacrilonytrile,<br>• Understand the concept Glass transition temperature |
| **CH-357: Physical Chemistry Practical**<br>• Prepare molar and normal solutions of various concentrations.<br>• Determine concentration of unknown solutions by Spectrophotometric method.<br>• Measure the pH, pKa and Ka of various acids by potentiometry.<br>• Measure refractive index, molar refraction and unknown concentration of various solvents.<br>• Determine the molecular weight of a given polymer by turbidimetry.<br>• Investigate the reaction rate. | **CH-367: Physical Chemistry Practical**<br>• Prepare molar and normal solutions of various concentrations.<br>• Determine concentration of unknown solutions by Spectrophotometric method.<br>• Measure the pH, pKa and Ka of various acids by potentiometry.<br>• Measure refractive index, molar refraction and unknown concentration of various solvents.<br>• Determine the molecular weight of a given polymer by turbidimetry.<br>• Investigate the reaction rate. |
| **CH 358: Inorganic practical**<br>• Estimate ores and alloy by gravimetric and volumetric method.<br>• Separate and analyze binary mixtures by qualitative method<br>• Prepare and determine percent purity of various inorganic complexes.<br>• Perform chromatographic technique (paper chromatography). | **CH 368: Inorganic practical**<br>• Estimate ores and alloy by gravimetric and volumetric method.<br>• Separate and analyze binary mixtures by qualitative method<br>• Prepare and determine percent purity of various inorganic complexes.<br>• Perform chromatographic technique (paper chromatography). |

| T.Y.BSc. SEM – V | T.Y.BSc. SEM – VI |
|---|---|
| • Estimate Lead, Iron by gravimetric method.<br>• Estimate Titanium and Iron by Spectrophotometric method. | • Estimate Lead, Iron by gravimetric method.<br>• Estimate Titanium and Iron by Spectrophotometric method. |
| **CH 359: Organic practical:**<br>• Separate and analyze binary water insoluble mixture<br>• Separate and analyze binary water soluble mixture<br>• Estimate - acetamide, glucose by volumetric method<br>• Estimate basicity of various acids.<br>• Prepare various organic compounds.<br>• Understand Thin Layer Chromatographic techniques and physical constant. | **CH 369: Organic practical:**<br>• Separate and analyze binary water insoluble mixture<br>• Separate and analyze binary water soluble mixture<br>• Estimate - acetamide, glucose by volumetric method<br>• Estimate basicity of various acids.<br>• Prepare various organic compounds.<br>• Understand Thin Layer Chromatographic techniques and physical constant. |

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# Mathematics

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **MTH-101: Matrix Algebra:**<br>• Understanding of operations on matrices<br>• Understanding the concept of inverse of a matrix<br>• Matrices are used in solving linear equations.<br>• Linear equations are vital for solving any differential equations<br>• Many areas of Numerical analysis depend upon linear equations.<br>• Specific fields of applications are computer graphics, Cryptography etc. | **MTH-201: Ordinary Differential Equations:**<br>• To understand the necessity of differential equations<br>• To learn about forming differential equations from physical situations<br>• To know various types of differential equations<br>• To practice methods of solution for various types of differential equations.<br>• It is useful for methods of momentum and energy transfer.<br>• It is used in all branches of engineering. |
| **MTH-102: Calculus**<br>• It is used in almost all branches of engineering.<br>• It is a science that deals with rate of change.<br>• Understanding the concept of differentiation.<br>• Understanding the concept of Integration.<br>• Applications of differentiation include measuring velocity, acceleration, etc.<br>• Applications of Integration include estimating areas, volumes, etc. | **MTH-202: Theory of equations:**<br>• To know about number system<br>• To learn division algorithm and its application<br>• To know about congruence classes<br>• To understand the famous Fermat's theorem.<br>• To learn how to solve various types of equations.<br>• It is used in Cryptography, Computer Science, etc. |
| **MTH-103(A): Coordinate Geometry:**<br>• Understanding the concept of distance between two points<br>• Understanding the concept of slope<br>• Understanding the change of origin and change of scale.<br>• Learn various forms of straight lines. | **MTH-203(A): Laplace Transforms:**<br>• To know Method of changing equations from one form to another easier form<br>• It is used to solve both ordinary and partial differential equations.<br>• Applications are in all branches of engineering.<br>• To learn properties of Laplace transforms. |

## Mathematics

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| • Learn about various conic sections.<br>• It is used in Mechanics and Astronomy.<br><br>**MTH-103(B): Graph Theory:**<br>• Understand the basics of graph theory.<br>• To learn operations on graphs.<br>• To learn about connected graphs.<br>• To understand various problems related with planar graphs<br>• To understand trees and spanning trees.<br>• It is used in Genomics, networks, etc. | • To learn properties of inverse Laplace transforms.<br><br>**MTH-203(B): Numerical Analysis:**<br>• It is used for solving a system of equations<br>• It has application in all branches of engineering.<br>• To know how to find the roots of transcendental equations.<br>• To learn how to interpolate the given set of values<br>• To understand the curve fitting for various polynomials<br>• To learn numerical solution of differential equations. |

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| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **MTH 231: Calculus of Several variables:**<br>• It is used in almost all branches of engineering.<br>• It deals with calculus of several variables.<br>• To understand the importance of Taylors series.<br>• To understand Mean value theorem.<br>• To find area by double integration.<br>• To find volume by triple integration. | **MTH 241: Complex Variables:**<br>• It is widely used in Fluid Mechanics and Electrical engineering.<br>• To learn properties of complex numbers.<br>• To understand the use of complex numbers in the field of Calculus.<br>• To learn the importance of analytic functions.<br>• To gain knowledge of singularities and residues.<br>• To apply the knowledge of residues in complex integration. |

## Mathematics

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **MTH-232(A): Algebra:**<br>• Algebra is science of operations<br>• It is widely used in Computer science and T.<br>• It is also useful for logic and fuzzy set theory<br>• To understand the concept of groups.<br>• To learn homomorphism and isomorphism.<br>• To under the structure of ring and integral domain.<br><br>**MTH-232(B): Theory of Groups:**<br>• To learn computations using algebra.<br>• It is mainly used in Computer science and T.<br>• It is also useful for logic and fuzzy set theory<br>• To understand the concept of groups.<br>• To learn homomorphism and isomorphism.<br>• To learn group codes and how to encode and decode. | **MTH 242(A): Differential Equations:**<br>• It is used in all branches of engineering.<br>• It is useful for methods of momentum and energy transfer.<br>• To study existence and uniqueness about solutions.<br>• To learn about the simultaneous differential equations.<br>• To understand the methods of solution for total differential equations.<br>• To study properties of Beta and Gamma functions.<br><br>**MTH 242(B): Differential and Difference Equations:**<br>• It is useful for methods of momentum and energy transfer.<br>• To study existence and uniqueness about solutions.<br>• To learn about the simultaneous differential equations.<br>• To understand the methods of solution for total differential equations<br>• It is widely used in Civil engineering, Mechanical engineering, etc.<br>• To understand definition and properties of difference equations. |

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# Statistics

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **ST-101 Descriptive Statistics- I**<br>• Understand about the collection of the data, condensation and summarisation into a compact form<br>• Understand about the representation of data in a neat, compact and clear form<br>• Compare the two or more data sets<br>• Help in planning, investigation and sample surveys<br>• Explore about the various Statistical institutes and organizations: ISI, NSS, Bureau of Economics and Statistics in States, Indian Institute of Population Sciences(IIPS)<br>• Compute of measures of central tendency, Dispersion, Skewness and Kurtosis | **ST-201: Descriptive Statistics-II**<br>• Understand the concepts of symmetry and peakedness of frequency distribution<br>• Understand the concepts of Bivariate data, Correlation, types of correlation<br>• Estimate, predict and forecast the observed datasets<br>• Identify the relationship between different factors<br>• Identify the association of two attributes and Independence (if any)<br>• Compare two or more data sets using appropriate tools such as correlation, regression, covariance etc. |
| **ST-102 Probability and Probability Distributions-I**<br>• Understand the concepts of Sample space and events, theory of Permutation and Combinations<br>• Understand the concept of Probability, Conditional probability of an event, Independence of events<br>• Compute probability and apply Bayes' theorem in real life situations problems<br>• Understand the concepts of random variable, discrete random variable, Probability mass function | **ST-202 Probability and Probability Distributions-II**<br>• Understand the concepts of Univariate Random Variable and bivariate random variable<br>• Compute probabilities of events in bivariate probability distribution<br>• Understand about the application of standard discrete distributions in real life situations<br>• Model sampling from Discrete Uniform, Binomial and Hypergeometric distributions<br>• Understand the concept of standardized random variable. |

## Statistics

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| • Fundamental/Basic Statistical Analysis using Statistical Software MS-Excel<br>• Understand the concepts of median and mode of discrete random variable | • Able to analyze the data using Statistical Software such as MS-Excel etc. |

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| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **ST-231 Probability Distributions-I**<br>• Understand the fundamentals of random variable (Moments and Cumulants)<br>• Compute Expected value, Finding MGF(Moment), CGF(Cumulant), PGF(Probability), FMGF(Factorial Moment); GF=Generating Functions<br>• Develops ability to solve gamma-beta functions<br>• Describe Poisson, Geometric distribution; their real-life situations and other basic relevant properties<br>• Understand Normal distribution (Continuous); real-life situations and other basic relevant properties<br>• Develop problem-solving techniques needed to accurately calculate, apply and interpret probability of a given event/selected probability distribution(s)<br>• Understand underlying assumptions for common probability | **ST-241: PROBABILITY DISTRIBUTIONS-II**<br>• Understand the fundamentals bivariate continuous probability distribution<br>• Compute mean, variance, median, mode, MGF, CGF, PGF of Gamma, Exponential, Beta (of both kinds), chi-square, t and F distributions (wherever it exists)<br>• Distinguish between two kinds of beta variates<br>• Use of tables for calculation of probabilities<br>• Understand interrelations among Normal, distribution<br>• Understand additive property of Gamma, chi-square distribution, Lack of memory property of exponential distribution, reciprocal property of F distribution |

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| distributions and their usage. | |
| **ST-232: Statistical Methods-I**<br>• Understand the notion of multiple linear regression models, Yule's notation<br>• Compute and interpret Multiple & Partial correlation coefficient; coefficient of Determination; study their properties<br>• Understand the meaning, usefulness of Time series and its components (trend and other types of variations); study additive and multiplicative models<br>• Understand the meaning and purpose of Statistical Process Control, quality of a product, need of quality control, chance and assignable causes<br>• Derive 3s control limits (when standards are given/ not given); Draw control charts for variables and attributes<br>• Understand meaning of statistical decision theory, acts, states of nature, outcomes, pay-off and opportunity loss(regret)<br>• Take decisions under certainty, uncertainty and risk using various decision rules | **ST-242: Statistical Methods-II**<br>• Understand the concept of statistic, estimator, sampling distribution of statistic<br>• Perform test of hypothesis: null Vs alternative, compute error, find critical region<br>• Carryout Large sample tests (tests based on normal distribution)<br>• Carryout tests based on distribution<br>• Carryout tests based on distribution<br>• Perform ANOVA (Analysis of Variance) on one-way and two-way model |

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# Botany

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **Bot. 101: Microbial Diversity, Algae & Fungi**<br>• To study the diversity among Microbes.<br>• To study systematic, morphology and structure of Bacteria, Viruses, Algae and Fungi.<br>• To study the life cycle pattern of Bacteria, Viruses, Algae and Fungi.<br>• To study the useful and harmful activities of Bacteria, Viruses, Algae and Fungi | **Bot. 201: Diversity of Archegoniates**<br>• To study salient features of Archegoniates.<br>• To make students aware of the status of higher cryptogams& gymnosperms as a group in plant kingdom.<br>• To study the life cycles of selected genera.<br>• To study economic and ecological importance of Archegoniates. |
| **Bot. 102: Plant Taxonomy**<br>• To study the diversity of angiosperms.<br>• To study the comparative account among the families of angiosperms.<br>• To study the economic importance of the angiospermic plants.<br>To study the distinguishing features of angiosperm families. | **Bot. 202: Plant Ecology**<br>• To know scope and importance of the discipline.<br>• To study plant communities and ecological adaptations in plants.<br>• To know about conservation of biodiversity.<br>• To study the botanical regions of India and vegetationtypes of Maharashtra. |
| **Bot. 103: Practical** | **Bot. 203: Practical** |

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| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **BOT.-231: Bryophytes and Pteridophytes**<br>• Understand the morphological diversity of Bryophytes and Pteridophytes.<br>• Understand the economic importance of the Bryophytes and Pteridophytes. | **BOT.-241: Plant Physiology**<br>• Know importance and scope of plant physiology.<br>• Understand the plants and plant cells in relation to water.<br>• Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways. |

## Botany

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| • Know the evolution of Bryophytes and Pteridophytes. | • Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.<br>• Learn about the movement of sap and absorption of water in plant body.<br>• Understand the plant movements. |
| **BOT.-232: Morphology of Angiosperms [60 Lectures]**<br>• Understand the habit of the angiosperm plant body.<br>• Know the vegetative characteristics of the plant.<br>• Learn about the reproductive characteristics of the plant.<br>• Understand the plant morphology. | **BOT.-242 Taxonomy of Angiosperms**<br>• Understand the diversity of angiosperms.<br>• Understand the comparative account among the families of angiosperms.<br>• Know the economic importance of the angiosperm plants.<br>• Understand the distinguishing features of angiosperm families. |
| **BOT.-233 Lab** | **BOT.- 243 Lab** |

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# Zoology

| F.Y.BSc. SEM – I | F.Y.BSc. SEM – II |
|---|---|
| **ZOO 101 : ANIMAL DIVERSITY I**<br>• Describe general taxonomic rules on animal classification<br>• They the the basic difference and fetures of various animals from categorigy like Protista, Porifera, Cnidaria etc. | **ZOO 201 Comparative Anatomy of Vertebrates**<br>• Students comparatively study of digestive system, Skeletal system, Respiratory System , Circulatory System etc. |
| **ZOO 102 Animal Diversity II**<br>• Students aware about general rules on animal class classification like Protochordates, Agnatha, Pisces, Reptiles, Reptiles | **ZOO 202 Developmental Biology of Vertebrates**<br>• Students studied the various stages of Biological development of Vertebrates like early and late Embryonic development |
| **ZOO 103 Animal Diversity I & II**<br>• Students increase their knowledge of various specimens like Invertebrates, Vertebrates, poisonous and non-poisonous snakes | **ZOO 203 Comparative Anatomy & Developmental Biology of Vertebrates**<br>• Students increase their practical ability |

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| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| **ZOO 231: Non Chordates-II**<br>• Understand the Characters of class Asterias with help of animal Sea star.<br>• Understand the internal as well as external morphology of that animal.<br>• To study and understand the concepts-Metamorphosis, regeneration and autotomy.<br>• Understand the Mouthparts of insects.<br>• Understand the Canal system in sponges.<br>• Understand the Locomotion in Protozoa. | **ZOO 241: Chordates –II**<br>• To study and understand the external as well as internal characters of class Aves,by studying animal Columbia livia domestica.<br>• Understand the various systems of pigeon.<br>• Understand the General Topics like Accessory respiratory organs in fishes.<br>• Able to know the reptiles of Mesozoic era.<br>• Understand the adaptations in aquatic mammals. |

## Zoology

| S.Y.BSc. SEM – III | S.Y.BSc. SEM – IV |
|---|---|
| • To observe and study the Foot in Mollusca. | |
| **ZOO 232: Medical Zoology**<br>• Understand the scope and branches of Medical Zoology.<br>• To aware the students for various parasites and diseases which spreads in human with the help of study of host-parasite relationship.<br>• To increase awareness for the health in students.<br>• Understand the various disease causing vectors like Mosquitoes.<br>• To aware about the typhoid, cholera like disease.<br>• Understand the importance of medical diagnostic and also understand the term forensic Entomology. | **ZOO 242: Applied Zoology**<br>• Introduce the term apiculture to the students.<br>• To aware the students and provides the economical importance of Apiculture.<br>• Understand the Bee keeping equipments and apiary management.<br>• To study and understand the various species of Bees. |
| **ZOO 233: Practical**<br>• Understand the external characters and water vascular system in sea star .<br>• Understand the locomotion in protozoa and Modification of foot in molluscs.<br>• To understand the viruses like chikungunya, Swine flu, tetanus.<br>• To aware the students for virus carrying vectors, like Aedes, culex and anopheles.<br>• To understand the various diseases diagnostic methods. | **ZOO 243: Practical**<br>• Study of Evolutionary history of animals.<br>• Understand the types of fins.<br>• Understand the adaptation in Aquatic mammals ex. whale and seal.<br>• Study and understand the diseases, pest, parasites and predators of Honey Bee.<br>• To study and aware the students for honey bee products and their uses.<br>• To aware the students for Adulteration. |

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# Language

## English

- To introduce the students with writing and reading skill
- To acquaint the students with the use of English language through different means
- To acquaint the students with the creative use of English language

## Marathi

- सदर अभ्यासक्रमात व्यक्तिचित्रणात्मक कथांचा समावेश केलेला आहे. त्यामाध्यमातून साहित्याच्या जाणीवेसोबतच सामाजिक जाणीवही विकसित करण्याचा प्रयत्न आहे.
- सदर अभ्यासक्रम मराठी भाषेच्या संवाद आणि लेखन कौशल्यांचा परिचय करून देणारा आहे.
- भाषण, सादरीकरण (presentation), वादविवाद, सूत्रसंचालन, गटचर्चा अशी संवाद कौशल्ये विद्यार्थ्यांनी आत्मसात करावीत यासाठी प्रेरक ठरणारा सदर अभ्यासक्रम आहे.
- व्यावहारिकदृष्ट्या उपयुक्त ठरतील अशा जाहिरात आणि कार्यालयीन पत्रव्यवहार लेखन कौशल्यांचा सराव करून घेणारा अभ्यासक्रम आहे.
- विद्यार्थ्यांची संवाद आणि लेखन या अनुषंगाने भाषिक क्षमता विकसित व्हावी यासाठी प्रोत्साहन देणारा सदर अभ्यासक्रम आहे. .