DNCVPS Shirish Madhukarrao Chaudhari College, Jalgaon

Programe Outcomes for Commerce

Commerce Faculty (U.G)

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – English For Business **Paper Code – 101**

1. Introduce communication theory to students.
2. Inculcate various communication skills in English among students.
3. Introduce various soft skills to students.
4. Improve oral and written competency in English of students.
5. Develop linguistic competency of students through various grammatical and vocabulary Exercises

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – Local Language – Optional English **Paper Code – 102 a**

1. Introduce various famous entrepreneurs to commerce students.
2. Develop English reading and linguistic comprehension of students.
3. Improve professional and entrepreneurial attitude of students through success stories.
4. Acquaint Students with special challenges of starting new ventures
5. Know the qualities to become a successful entrepreneur

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – Local Language – Optional Marathi **Paper Code – 102 b**

1. Introduce various famous entrepreneurs to commerce students.
2. Develop English reading and linguistic comprehension of students.
3. Improve professional and entrepreneurial attitude of students through success stories.
4. Acquaint Students with special challenges of starting new ventures
5. Know the qualities to become a successful entrepreneur.

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – Business Economics Analysis -I **Paper Code – 103**

1) Acquaint students with new concepts of Economics.

2) Update the students about new changes brought in Indian Economy.

3) Introduced the students' behavior of consumer, producer in Economy, Price determination in market and also factor pricing.

4) Make students competent to become success in competitive examination.

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – Financial Accounting and Costing **Paper Code – 104**

1) Lay a foundation for understanding the Accounting Standards issued by the ICAI.

2) Gain the ability to solve problems relating to settlement of obligations on dissolution of partnership firm and also relating to their business combinations

3) To introduce the concepts used in Cost Accounting, elements of costs and the concept of cost sheet.

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – Computing Skill **Paper Code – 105**

1) Train to students in using Microsoft Office Software

2) Prepare in using key Google Services skills

3) Develop essential computing skills

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – Modern office Management **Paper Code – 106a**

1) Understand office systemPrepare in using key Google Services skills

2) Acquire knowledge of office meetings and proceedings

3) Know the secretarial procedure

4) Develop the interest in methods and procedures of office management.

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – Modern office Management **Paper Code – 106b**

1) Make students aware about e-commerce basics
2) Train students about e-business models, e-payments and e-communication
3) Prepare students for online payments and understand factors of effective web design.
4) Students will be able to understand key aspects of e-commerce
5) Students will be prepared in online pavements and e-communication

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – - Principles & Practices of Banking-I **Paper Code – 107a**

1) Students will be Knowledgeable about evolution of banking.
2) Understanding structure of Indian Banking

3) Enlighten the students with Introduction of banking concept and dynamic services.
4) Understanding primary and secondary functions of a bank.
5) Understanding the process of opening and operating procedure of bank accounts

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – - Marketing & Advertising **Paper Code – 107c**

1) Awareness about marketing & advertising.
2) Develop an analytical ability to plan for various marketing & advertising strategy
3) Know the relevance of marketing & advertising in modern competitive world
4) Understand basic concepts of marketing & advertising

Programme – Bachlour of Commerce **Class: Fy Bcom**

Course Name – - - Quantitative Techniques **Paper Code – 205**

1) Students will be able to understand essential quantitative techniques
2) Students will be ready with Data Presentation and Data Analysis Skills

S.Y.B.COM

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - - Business Skill **Paper Code – 301**

1) Understand the significance and essence of a wide range of soft skills
2) Learn how to apply soft skills in a wide range of routine social and professional settings.
3) Learn how to employ soft skills to improve interpersonal relationships.
4) Learn how to employ soft skills to enhance employability and ensure workplace and career success.

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - - Macro Economics **Paper Code – 302**

1) Understand the significance and Knowledge of Investment Functions
2) Learn how to implicate theories of employment an output.

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - - Business and Tax Laws **Paper Code – 303**

1) Describe the legal system and the legal environment of business.
2) Describe the relationship of ethics and law in business.
3) Define relevant legal terms in business.
4) Explain basic principles of law that apply to business and business transactions.
5) Describe business law in the Indian context.
6) Describe current law, rules, and regulations related to settling business disputes.
7) Understand different technical terminology used in this act
8) Discussed and consult businesses on related issues of business laws

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - - Corporate Accounting **Paper Code – 304**

1) Students will be able to handle issues related to corporate accounting.

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - Computing Management **Paper Code – 305**

1) Demonstrate a basic understanding of computer hardware and software.
2) Demonstrate problem-solving skills.
3) Apply logical skills to programming in a variety of languages.

4) Utilize web technologies.
5) Present conclusions effectively, orally, and in writing.
6) Demonstrate basic understanding of network principles.
7) Working effectively in teams.
8) Apply the skills that are the focus of this program to business scenarios.

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - Business Entrepreneurship **Paper Code – 306 a**

1) Understand different methods to assess the attractiveness of business opportunities
2) Understand what characterizes an attractive business opportunity and common pitfalls during the entrepreneurial process
3) To products or services to market
4) To understand different methods that can be used to minimize uncertainties at different stages of the entrepreneurial process
5) To understand the dynamics of how teams develop and function as well as the various types of conflicts that can arise during teamwork

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - Modern Banking & Financial System **Paper Code – 307 a**

1) Explain the various functions of money, and how money has evolved over time.
2) Show that modern banking systems include both privately owned commercial banks and government-owned central banks.
3) Explain how commercial banks create money through the process of taking deposits and making loans.
4) List what is included in the various measures of the money supply

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - Retail Management **Paper Code – 307 c**

1) Explain the central role of retail in industrialised societies, and the impact of key market/retail trends upon this sector in the local and global contexts.
2) Identify the key stakeholders and the roles/responsibilities of retail towards these stakeholders
3) Understand and apply appropriate frameworks to develop high level retail marketing strategy, and identify the role of marketing strategies in the building of brand equity and shareholder value in the retail industry

4) Evaluate the implementation of marketing strategy through the retail mix – including product and merchandise mix, pricing, location and store- design, promotions, and store management - to improve the total customer experience and retailer market competitiveness.
5) Interpret retail problems and be capable of critically evaluating and applying appropriate retail management models and theories to generate strategic and tactical solutions
6) Analyse how retail managers can make informed strategic choices in relation to managing channel partners, retail form (online vs. bricks and mortar), global sourcing, and managing staff to improve strategic outcomes.

Programme – Bachlour of Commerce **Class: Sy Bcom**

Course Name – - Cost Accounting **Paper Code – 405**

1) Student can get acquainted with basic calculation of wages and overheads.
2) Students get acquainted with introductory knowledge of Marginal costing technique and Budgetary control technique.

T.Y.BCOM

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Indian Economic Scenario **Paper Code – 501**

1) Student will be able To Understand Present Economic Scenario of Indian Economy.
2) Student will be able To Understand Population & Economic Development.
3) Student will be able To Understand Human Resource Development.
4) Student will be able To Understand Agriculture, Industry, and services sector in India

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Principles of Auditing **Paper Code – 502**

1) Understand the concept of Audit and its various types,
2) Prepare and implement an audit programme,
3) Pouch the transactions recorded in the books of accounts of an organisation,
4) Verify the assets and liabilities, and
5) Maintain the necessary documentation in relation to the audit,

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Business Management **Paper Code – 503**

1) Understand the significance and essence of management concepts, principles and skills.
2) Learn how to apply Management concepts, principles and skills in business setting and improving business environment.
3) Learn how to employ Management skills to enhance employability and ensure workplace and career success.

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Income Tax **Paper Code – 504**

1) Understand the various provisions relating to Income Tax
2) Determine the basic concepts of the Income Tax Act 1961
3) Describe the elementary knowledge of scheme of taxation in India
4) Compute Income and Tax of an Individual assesse under the Act 5. Utilize working knowledge with application skill.

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Human Resource Management **Paper Code – 505a**

1) Students can know concepts , principles and practices of HRM.
2) Familiar with concepts of HR Planning , job analysis, recruitment and selection.
3) Development in total personality of students as future human resource of India.
4) Acquaint the knowledge of recent trends in HRM.

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Advanced Accounting - I **Paper Code – 506a**

1) Understand the various concepts of Advanced Accounting
2) Utilize working knowledge with application skill of Advanced Accounting.
3) Preparing the Bank Companies Statements in accordance with the statutory requirements.
4) Prepare Statements regarding Royalty Accounts and Insolvency Accounts.
5) Understanding knowledge of Hire Purchase, Banking Companies and Farm Accounting

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Advanced Accounting - II **Paper Code – 507a**

1) Understand the various concepts of Corporate Sector Accounting.
2) Developing techniques of reconstruction of Companies financial statement.
3) Preparing the Reconstructed Financial Statements.
4) Understanding knowledge of Liquidation of Companies

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Business Administration -I **Paper Code – 506d**

1) To acquaint the students with the concepts and issues in Business Administration.
2) To enable the students to understand the nature and scope of Business Administration.

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Business Administration -II **Paper Code – 507d**

1) To acquaint the students with the concepts and issues in Business Administration.
2) To enable the students to understand the nature and scope of Business Administration.

Programme – Bachlour of Commerce **Class: Ty Bcom**

Course Name – - Goods & Services Tax (GST) **Paper Code – 604**

1) To develop basic understanding of procedural aspects of Goods & Service Tax Law.
2) To provide overview of various provisions under GST Law

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Department of Computer Science

F.Y.BSc. SEM – I	F.Y.BSc. SEM – II
CS 101: Essential of Computer Science • Understand the History of Computers. • Understand What is Computer and Basic concepts of computer. • Aware about various types of Computers, types of I/O devices. • Preparation of Algorithm and Flowchart of Program. • Learn computer networks, its types and basics of Internet. • Understand computer viruses and its types. • Demonstrate basics Understanding Computer H/W&S/W. • Knowledge of Installation of Software. • Demonstrate basics understanding network Principle.	**CS 201: Internet Computing** • Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions. • Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
CS 102: C Programming-I • As it is Universal Language, after completion of this course students are able to solve any kind of problem in any field. • Understand the basic programming construct. • Learn function oriented programming concepts required in all other languages.	**CS 202: C Programming Language-II** • As it is Universal Language, after completion of this course students are able solve any kind of problem in any field. • Understand the basic programming construct. • Learn function oriented programming concepts required in all other languages.
CS 103: LABLAB Course on Essentials of Computer & Part –B Lab Course on Programming in C I	**CS 203: LABPart-A Lab Course on Internet ComputingPart-B Lab Course on C-Programming-II**

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Department of Computer Science

F.Y.BSc. SEM – I	F.Y.BSc. SEM – II
• 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 • Enhance student's basic skills required for advanced programming.	• 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 • Enhance student's basic skills required for advanced programming.

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S.Y.BSc. SEM – III	S.Y.BSc. SEM – IV
CS-DSC 2 C : COMP 211 : Data Structure – I • Know what is data structure and basic algorithmic notations. • Analyze the time and space requirement of any algorithm. • Understand different linear data structures for conversion of mathematical expressions and polynomial representations. • Know the file structures.	**CS-DSC 2 D : Comp-221: Data Structure – II** • Know different non-linear data structures that can be used to represent hierarchical relationship between objects. • Traverse and represent the graphs in computer. • Understand the different approaches of sorting and searching elements in the arrays. • Understand different techniques of designing thealgorithms.
COMP 212 : CS-DSC 2 C : COMP-212 : Programming in C++-I • Be familiar with Object Oriented Programming Environment. • Differentiate between Structure oriented programming and object oriented programming. • Understand different object modelling techniques and analysis like Generalization , Aggregation and Metadata.	**CS-DSC 2 D : COMP-222 : Programming in C++-II** • Explore polymorphism using Function and Operator Overloading. • Write programs for handling runtime errors using exception. • Understand the concepts of pointers in C++. • Understand the different aspects of hierarchy of classes and their extensibility.

S.Y.BSc. SEM – III	S.Y.BSc. SEM – IV
• Write Reusable, Extensible and Robust programs inC++.	• Write generic programs using templates andSTL.
CS SEC-I (Skill Enhancement Course-I)Software & Hardware Installation Skills • On completion of the course, students are familiarOperating System Basics & Installation.	**CS SEC-II (Skill Enhancement Course-II) Network Security** • On completion of the course, students are familiar Need of Security & Anti-virus Software.
COMP 213: Practical Course • 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** • 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.

T.Y.BSc. SEM – V	T.Y.BSc. SEM – VI
CS-501 System Programming • Get aware about system software and their tools like Editors and Debug Monitors. • Get familiar with language processing activities. • Understand detail working of Assembler, Macro and Macro Preprocessor, Compiler and linker & Loader.	**CS-601 Operating System** • Know about functions and services of operating system. • Aware about different CPU scheduling algorithms • Get familiar with different memory management techniques. • Understand different disk and drum scheduling algorithms as well as deadlock concepts. • Get introductory knowledge about android operatingsystem.
CS-502 Database Management System • Get aware of Describing & storing data. • Know about E-R Model by overview of database design.. • Get familiar with Conversion of ER to Relational model. • Know about functional dependency and Data Normalization. • Understand Database Implementations. • Make use of Concurrency control, Backup & recovery for large or huge of databases. • Get aware about handling hugedatabases.	**CS-602 Relational Database Management System** • Understand features and data types in SQL server. • Create and manipulate databases for various applications. • Use procedures and trigger for performing complex operation on databases. • Handle errors using exception handlingconcepts.
CS-503 Software Engineering	**CS-603 Computer Network**

T.Y.BSc. SEM – V	T.Y.BSc. SEM – VI
• Get aware of evaluation of software and Software Development Life Cycle (SDLC). • Know about Software Development Model. • Get knowledge of Requirement Analysis and Specification in software engineering . • Learn use of Fact finding Techniques , Types of Requirement Modeling and Data Modeling Concepts. • Get knowledge of Design Concepts in software engineering. • Know about Cohesion & Coupling , Decision Table & Decision Tree, Data flow Diagram • Know about Software Coding & Testing. • Get aware about Elements of Software QualityAssurance.	• After completion of the course Students understand the information exchange done across the network with the help of OSI & TCP/IP models • Student understands how errors are captured & handled in network. • Student understands various attack & its prevention techniques
CS-504 Computer Aided Graphics • Differentiate between interactive and non interactive graphics. • Explore different line and circle drawing algorithms. • Perform 2D and 3D transformation on different images. • Know about detail working of image clipping and windowing. • Understand raster graphics and hidden surfaceelimination.	**CS-604 Theoretical Computer Science** • Understand what is Push down Automata and its applications. • Understand concepts of Context free grammar and normalization of CFG. • Convert regular expression to Finite Automata. • Design Turing Machines for various applications like enumerator, function computer and universal Turing machine.

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Department of Computer Science

T.Y.BSc. SEM – V	T.Y.BSc. SEM – VI
CS-505 Python Programming I • At the end of the course, the student will be able to • Explain basic principles of Python programming language • Construct and apply various filters for a specific task. • Apply the best features of mathematics, engineering and natural sciences to program real life problems.	**CS-605 Python ProgrammingII** • At the end of the course, the student will be able to Explain basic principles of Python programming language • Implement object oriented concepts, database applications. • Construct regular expressions for pattern matching and apply them to various filters for a specific task. • Design and implement Database Application and Content providers. • Apply the best features of mathematics, engineering and natural sciences to program real life problems
Elective -B UG-CS-506 B) JAVA Programming-I • Get knowledge JDK Environment. • Explore polymorphism using Function and Operator Overloading ,overriding . • Understand the different aspects of hierarchy of classes and their extensibility . • Understand the concepts of streams and files . Write programs for handling runtime errors usingexception.	**Elective - B CS-326 B) JAVA Programming-II** • Program using graphical user interface with Swing classes. • Handle different kinds of events generated while handling windows. • Create programs using menus and dialog boxes. • Program for websites using applets.Understand java concepts like JDBC.
CS-Lab-507 Lab on Python Programming I	**CS-Lab-507 Lab on Python Programming II**

T.Y.BSc. SEM – V	T.Y.BSc. SEM – VI
• Oncompletion of the course, students are able to develop programs to provide basic applications for develop the Python programs for searching, sorting, with help of fundamental concepts like lists, dictionary. • understand the concepts of functions scoping, recursion, list mutability, regular expression in Python programming.	• Oncompletion of the course, students are able to develop programs to learn to define their own classes, methods and modules according to the requirement of the problem and use of exception handling concepts. • define regular expression and develop GUI programs using Tkinter.
CS-Lab-508LabonComputerAidedGraphics • Oncompletion of the course, students are able to develop different programs for demonstrating different Computer graphics algorithms like circle, line drawing and clipping and filling.	**CS-Lab-608 Lab on Relational Database Management System** • On completion of this course, students will be able to : • To use SQL & PL/SQL. • To perform advanced database operations. • Create database tables in postgreSQL. • Write and execute simple, nested queries
Elective -B CS-Lab-509 B) Lab on JAVA Programming – I • 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 -B CS-Lab-609 B) Lab on JAVA Programming – II** • 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 Database Management System (DBMS) • Understand a core concept of DBMS. • Study to Distributed Database. • Understand a Tier architecture of DBMS. • Understand Mobile Database & MultimediaDataBase.	**CS-201 Compiler Construction** • Know role of compilers in program execution. • Understand detail program execution using lexical and syntax analysis • Be aware of code generation and optimization. .
CS-102 Automata Theory and Computability • Understand what is Push down Automata and its applications. • Design Turing Machines for various applications like emunerator, function computer and universal turing machine. • Study Post correspondence problem, decidability of membership, emptiness and equivalence problems of natural languages. • Get familiar with Computability and complexity measures. • Understand what is DNA and Membrane Computing.	**CS-202 Artificial Intelligence** • Understand artificial intelligence and AI problem solving techniques. • Explore logic for solving various AI problems. • Grasp the techniques of knowledge representation in machine. • Comprehend advanced machine learning techniques such as fuzzy logic and genetic algorithms.
CS-103 Operating System • Study files subsystem for UNIX operating system. • Understand detail working of UNIX operating system.	**CS-203 Design and Analysis of Algorithms** • Design efficient algorithms using various algorithm designing techniques.

F.Y.MSc. SEM – I	F.Y.MSc. SEM – II
• Understand process and memory management techniques. • Study Linux shell command.	• Comprehend dynamic programming using control abstraction and longest common subsequence. • Classifying any problem as NP complete and NP hard
CS-104 Object Oriented Programming using JAVA • Explore basic programming techniques • Explore programming techniques of Java swing. • Be aware about Java Enterprise applications. And new Tech. • Know about JDBC. • Understand a Framework. • Study a Session Concept.	**CS-204 Python Programming** • understand the fundamental concepts of Python programming. • learn that how python programming supports some constructs of functional programming. • work with strings, lists, tuples, dictionaries, and files. • define their own classes, methods and module for solving real world problems. • use regular expression for searching patterns in given strings.
CS-105- LAB - I Lab Object Oriented Programming using JAVA • Gain knowledge about basic Java language syntax and semantics to write Java programs • Understand the fundamentals of object-oriented programming in	**CS-205- LAB - III Lab on Design and Analysis of Algorithms (DAA)** • Oncompletion of the course, students are able to build the program that can solve the problems which requires

F.Y.MSc. SEM – I	F.Y.MSc. SEM – II
Java, including defining classes, objects, files, invoking methods etc and exception handling mechanisms. • Understand the principles of inheritance, packages and interfaces • Using Swing library and various GUI components, Applet programming, JDBC, generic programming and multithreaded programming	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 DBMS • Oncompletionofthecourse,studentsareabletobuildandmaintainthedatabaseshandlingreallifeapplicationsanddailyneeds	**CS -206-LAB - IV Lab on Python Programming** • develop the Python programs for searching, sorting, with help of fundamental concepts like lists, dictionary. • understand the concepts of functions scoping, recursion, list mutability, regular expression in Python programming. • learn to define their own classes, methods and modules according to the requirement of the problem and use of exception handling concepts. • define regular expression and develop GUI programs using Tkinter.
AC-101 Audit Course Practicing Cleanliness • Cleanliness means that there is no dirt, no dust, no stains, no bad smells. The goals of cleanliness are health, beauty, absence of	**Audit Course AC-201 (A) : Soft Skills** • They are essential for designing, delivering, and evaluating effective learning experiences, especially for soft skills

F.Y.MSc. SEM – I	F.Y.MSc. SEM – II
offensive odour and to avoid the spreading of dirt and contaminants to oneself and others. With the help of cleanliness, we can keep our physical and mental health clean**,** which will make us feel good.	courses. • Soft skills are the interpersonal, communication, and self-management abilities that help people work well with others and achieve their goals. • In this article, you will learn some examples of learning outcomes for soft skills courses in different domains, such as leadership, teamwork, communication, and problem-solving. **Audit Course AC-201 (C) : Practicing Yoga** • yoga as a safe and potentially effective therapy for children and adolescents coping with emotional, mental, physical, and behavioral health conditions. • Yoga can help children learn to self-regulate, focus on the task at hand, and handle problems peacefully. • Yoga may also improve balance, relieve tension, and increase strength when practiced regularly.

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S.Y.MSc. SEM – III	S.Y.MSc. SEM – IV

S.Y.MSc. SEM – III	S.Y.MSc. SEM – IV
CS-301 Web Application Development Technology • To learn .Net Framework • Creating ASP.Net web applications using standard .net controls. • Develop database applications using ADO.Net • Use Web Services and develop simple and complex applications using .Net framework • Develop a data driven web application. • Connecting to data sources and managing them	**CS-401 Natural Language Processing** • Understand languages and linguistic background • Be familiar with applications and research background in NLP. • Grasp mathematical foundation related to NLP like probability, bays theorem and machine learning. • Know about linguistics essentials and grammar as part of speech and parsing and differentiating them. • Aware about word morphology and N-GramModels.
CS-302 Digital Image Processing • Understand the application of digital image processing. • Explore knowledge about image processing fundamentals. • Get aware about image sampling and quantization and operation on images • Understand histogram processing and various image filtering algorithms. • Know about various noise models and transformation techniques. • Be aware of various morphological techniques and segmentation schemes.	**CS-402 Data Warehousing and Data Mining.** • Explore the concepts of data mining and data preprocessing. • Understand concept of association rule mining. • Grasp classification and prediction and analysie different issues related to them. • Know about advanced data mining techniques such as spatial data mining and understand the concept of bigdataanalysis. • Identify different cluster analysis techniques.

S.Y.MSc. SEM – III	S.Y.MSc. SEM – IV
CS-303 Software Engineering • Know the requirements of developing software. • Be aware of various models required for software development. Test the developed software for its functionality and performance. • Understand software quality and quality measures. • Grasp the software configuration management and projectplanning..	**CS-403 Optimization of Algorithm** • Understanding classification and limitation of quantitative techniques. • Take hold of linear programming problem solving techniques. • Solve various kinds of transportation problems using different techniques. • Explore concepts in game theory . • Be aware about the network models, sequencing models and simulaonmodels.
CS-304 Windows, WCF and WPF Programming • Familiar with windows environment and child window controls. • Understand windows communication foundation using WCF contracts, clients and services security. • Understand windows presentation foundationprogramming.	**CS-404-LAB–VIILabonData Warehousing and DataMining** • Students are able to analyze the processing and classification techniques using WEKA tool.
CS-305-LAB – V Lab on Web Application Development Technology • Oncompletion of the course, students are able to develop program having graphical user interface for variousapplications.	**CS -405 Mini Projects** • Deal with real world data. • Familiar about real time IT industry environment. • Experience about applying the knowledge they got until now. • Build a whole real time working system which will satisfy all

S.Y.MSc. SEM – III	S.Y.MSc. SEM – IV
	customer's needs.
CS -306-LAB –VILab on Digital Image Processing • Familiar with MATLAB environment. • Explore various algorithms for digital image processing using MATLAB..	**Audit Courses AC-401 (C) : Seminar plus Review** • Oncompletion of the course, students are able to great forums for the discussion of topics and ideas. • With the advancement in technology, the assurance of lifelong teaching as well as learning in formats, both within and outside academic walls is finally being fulfilled.
Audit CoursesAC-301 (A) : Computer Skills • **Systems Thinking.** Analyze, design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.	

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Department of Computer Science **(BCA)**

FYBCA SEM-I	FYBCA SEM-II
BCA 101 - Fundamentals of Accounting • To understand fundamental concepts of financial accounting. • To understand the basics of cost accounting. • To maintain and record financial transactions in books of accounts. • To prepare final accounts of sole proprietary business. • To prepare Cost Sheet and record the transactions of materials.	**BCA 201 –Professional Communication** • To develop his verbal and non verbal communication ability • To communicate with people effectively and confidently. • To draft effective business correspondence documents. • 4. To make and present well designed and informative presentations
BCA 102–Fundamentals of Computer • Acquire the knowledge of fundamentals of Computer and Operating System. • Develop problem solving skill through algorithms and flowcharts. • Understand the basics of computer networking and internet. **CS 102: C Programming-I** • As it is Universal Language, after completion of this course students are able to solve any kind of problem in any field. • Understand the basic programming construct. • Learn function oriented programming concepts	**BCA 202–Database Management System** **W.E.F. 2022-23** • Introduction to the basic concepts of database management systems. • Learning to design databases using ER modeling. • Learning to apply integrity constraints. • To understand and demonstrate database schema. • Understand and demonstrate Relational databases, SQL.

FYBCA SEM-I	FYBCA SEM-II
required in all other languages.	
BCA 103 - Programming in C - I • Understand the basic concepts of C Programming for problem-solving and Illustrate the C data types, syntax and constructs. • Illustrate C for decision making, branching and looping statements • Understand the concept of Array and Strings to solve different problems.	**BCA 203–Programming in C – II** • Apply the concepts of Function modules, its usage • Apply the concepts of memory allocation using Pointers • Understand the concepts of structures and unions: declaration, initialization and implementation. • Learn to draw different graphics objects. • 5. Learn to store and apply the data using files.
BCA 104 - Web Design - I • Acquainted with elements, Tags and basic structure of HTML files. • Up skills the knowledge of basic and advanced web designing. • Students were implement effective use of List and Tables. • Students were implement effective web page navigation. • Students were capable to design web page layout • Students were understood and implement use of style sheet.	**BCA 204–Web Design - II** • Student were able to embed JavaScript in web page • Students successfully added interactivity in web page • Students were applied validation on web form • Students were implemented different events. • Students were familiar with bootstrap framework.
BCA 105 - Lab on Computer Fundamental • Students can able to understand the installation of operating system. • Students can understand basic DOS command, and different browser. • Student understand different platforms, Internet, mails, tables	**BCA 205 - Lab on DBMS** • Students can able to create the database. • Students can understand basic database commands. • Students can understand constraint. • Students capable to design SQL using different clause.

Dhanaji Nana ChaudhariVidyaPrabodhiniSanchalit
ShirishMadhukarraoChaudhari College, Jalgaon
(NAAC Accredited Grade 'B' & Certified ISO 9001:2015)
Department of Computer Science **(BCA)**

FYBCA SEM-I	FYBCA SEM-II
• Students can learn text formatting and table formatting. • Students capable to design power point presentation, tables, shapes, smart arts and • charts	
BCA 106 - Practical on Web Design - I • Students were able to design consistent look and feel web pages. • Students were capable to use multimedia in web page. • Students were implement effective web page navigation. • Students were capable to design web page layout • 5. Students were implement use of style sheet.	**BCA 206–Lab On C Programming - II** • Student were able to understand the concept of Function techniques • Students were able to understand the storage classes • Students were able to understand pointer and its uses. • Students were able to design the basic graphics objects • 5. Students were understand the operations on file and command line argument
BCA 107–Lab on C Programming • Students understand the input output functions. • Students can understand the use of various operator. • Students can understand the use of control statements. • Students can design the various expressions in C • 5. Students can understand the array and its type.	**BCA 207–Lab on OnWeb Design - II** • Student were able to develop web page using JavaScript • Students successfully added interactivity features in web page • Students were implemented validation on web form • Students were implemented different events. • Students were familiar with bootstrap framework.

FYBSc Electronics Sem:I

ELE-101 & 102 Network Analysis and Basics of Digital Electronics

1. Apply knowledge to develop circuits using electronic devices.
2. Apply the concept and knowledge of electronics devices to real life problems.
3. Simulate complex circuits and understand the behaviour of the systems.
4. Understand and analyse, linear and digital electronic circuits.
5. Review, prepare and present technological developments.

ELE-103: ELECTRONICS LAB-I

1. Familiarize with basic electronics components, testing and measuring instruments.
2. Understand the practical use of various networks theorems
3. Study the electronics circuits analysis and verification of the circuits
4. Have the knowledge of passive filters and skill to build and test the circuits
5. Familiarize with logic gate ICs and have the knowledge of truth tables of logic gates.
6. Study various digital combinational circuits.

FYBSc Electronics Sem:II

Ele-201& 202 Analog Electronics and Digital Circuits

1. Apply the concept and knowledge of digital integrated circuit chips to develop new systems.
2. Apply practical knowledge to solve real life problems of the society.
3. Understand of the course and create scientific temperament and give exposure to the students for independent use of digital integrated circuit chips for innovative applications.
4. Model complex circuits and simulate them.
5. Handle simulation software to analyse analog and digital electronics circuits.

ELE-203: ELECTRONICS LAB-2

1. Familiarize with various Semiconductor devices.
2. To understand the behavior of semiconductor devices.
3. Understand the practical use of various semiconductor devices.
4. Familiarize with combinational and sequential circuit ICs.
5. Design of various combinational and sequential circuits.
6. Study various data processing circuits.

SYBSc Electronics Sem:I

Ele 301& 303 ANALOG COMMUNICATION and MICROPROCESSORS

1. Apply knowledge to develop circuits of analog modulation and demodulation.
2. Apply the concept and knowledge of microprocessors to real life problems.
3. Analyse modulation circuits and understand the behaviour of the systems.
4. Understand and analyse 8085 microprocessor and its programming.
5. Review, prepare and present technological developments.

ELE-303: ELECTRONICS LAB

1. They will familiarise to analog modulation and demodulation.
2. Apply the concept and knowledge of microprocessors to real life problems.

SYBSc Electronics Sem:II

Ele-401 & 402 Digital Communication and Microcontrollers

1. Apply the concept and knowledge of digital communication to develop new systems.
2. Apply practical knowledge of microcontrollers to solve real life problems of the society.
3. Understanding of the course and create scientific temperament and give exposure to the students for independent use of microcontroller for innovative applications.
4. Gain knowledge of microcontroller programming.
5. Handle hardware and software to shoot problems of the society.

ELE-403: ELECTRONICS LAB

1. They will familiarise to communication and automation.
2. Apply the concept and knowledge of microcontroller to real life problems.

TYBSc Electronics Sem:I

ELE- 501: Semiconductor Electronics

1 Estimate the number of carriers at a given temperature for a semiconductor.

2 Understand the importance of doping to change carrier density.

ELE 502: Advanced Digital System Design using VHDL

1 Student will able to design the circuits according to need

2 Student will able to write a code for digital circuits with different modeling style

ELE 503: Advanced Microprocessor

1 Student will be able to Aware about the microprocessor and its architecture considerations & Capable to analyze the operating modes

2 Understand the assembly language programming

3 Student will be able to understand the advanced microprocessor 80386 and operation of paging mechanism.

4To gain the Knowledge about the Pentium series processor

ELE – 504: Electronic Instrumentation

1 Learn about different types of transducers and their working principle.

2 Know the different electronics measuring instruments and develop the skill to handle them.

3 Aquent the knowledge of testing instruments.

ELE- 505 : Medical Electronics

1 Learn biological signals present in human body

2 Learn the various blocks of biomedical sensors

3 The electrodes which are normally used to measure the biological signals

4 Understand the working principles of various therapeutic and monitoring systems

5 Understand recording and analysis of prominent biosignals of human

6 Understand the measurement and analysis techniques for physiological parameters

7 Understand the patient imaging and monitoring systems

ELE 506 (A): Embedded C

1. Learn structure oriented programming concepts required in all other languages.

2. After completion of this course students are able to built real world applications based on embedded system and automation

TYBSc Electronics Sem:II

ELE – 601 Power Electronics

1 Student has fundamental knowledge of semiconductor power electronic device

2 Students can apply this knowledge for designing power electronic circuits

ELE 602: Consumer Electronics

1 Understand the various type of microphones and loud speakers.

2 To identify the various digital and analog signal.

3 Understand the various type of consumer goods and acquaint the skill of fault findings.

4 Develop the skill of electronics appliances like Set Top Box, CATV and Dish TV, water purifier, Air conditioner etc.

5 Acquaint the knowledge of different types of Television Technology.

ELE 603: Microprocessor Interfacing Techniques

1 Student will be able to Aware about the concept of microprocessor and its interfacing & Capable to analyze the operation and priorities of Interrupt

2 Understand the concept of memory mapping & DMA

3 Student will be able to understand the ADC & DAC interfacing

4 To gain the Knowledge about the programmable interval timer and communication interface 8251 & analyze the operating modes.

ELE 604: Computer Network

1 Recognize the technological trends of Computer Networking.

2 Discuss the key technological components of the Network.

3 Evaluate the challenges in building networks and solutions to those.

ELE 605: Embedded Systems

1 To gain the knowledge about the 8051-microcontroller programming such as timer & counter and serial port programming

2 Understand the basic concept of interfacing with microcontroller

3 Understand the interfacing principle with Stepper motor and temperature sensor

4 To gain the Knowledge about the serial peripheral interface and two wire interface.

ELE-606 (A) Electrodynamics

1 Apply Gauss Law, Amperes Force Law, Lorentz's force, Biot-Savarts Law, Faraday's Law for solving the problems in Electrostatic and Electromagnetic Fields.

2 Apply the principle of electrostatic to the solutions of problems related to electric field and electric potential, boundary value problem in electrostatic field.

3 Understand the concept of Faradays law, Lenz's Law and Maxwell Equation

4 Apply the Maxwell's equation in free space, linear isotropic media and varying fields, energy and electrostatic fields.

F. Y. B. Sc.Physics

Semester I

PHY 101: Basic Mechanics

1. Apply the concept and knowledge of Basic Mechanics to understand and solve real life problems.
2. Understanding of the course will create scientific temperament

PHY 102: Dynamics and Properties of Matter

1. Apply the concept and knowledge of Dynamics and Properties of Matter to understand and solve real life problems.
2. Understanding of the course will create scientific temperament.

PHY 103: LAB II

1. To demonstrate their practical skills.
2. To understand and practice the skills while doing Physics practical.
3. To understand the use of apparatus and their use without fear.
4. To correlate Physics theory concepts through practical.
5. Understand the concepts of errors and their estimation.

Semester II

PHY 201: Electricity and Electrostatics

1. Apply the concept and knowledge of Electricity and Electrostatics to understand and solve real life problems.
2. Understanding of the course will create scientific temperament.

PHY 202: Dielectrics, Magnetism and Electromagnetism

1. Apply the concept and knowledge of Dielectrics, Magnetism and Electromagnetism to understand and solve real life problems.
2. Understanding of the course will create scientific temperament.

PHY 203: LAB II

1. To demonstrate their practical skills.
2. To understand and practice the skills while doing Physics practical.
3. To understand the use of apparatus and their use without fear.
4. To correlate Physics theory concepts through practical.
5. Understand the concepts of errors and their estimation.

S. Y. B. Sc. Physics

Semester III

PHY 301: Thermodynamics and Kinetic theory of gases

1. Apply the concept of use of knowledge of Thermodynamics and kinetic theory of gases to real life problems.
2. Understanding of the course will create scientific temperament.

PHY 302 (B): Instrumentation

1. Apply the concept of use of knowledge of Instrumentation to real life problems.
2. Understanding of the course will create scientific temperament.

PHY 304: Skill Enhancement Course I (SEC-I)

The aim of this course is not just to impart theoretical knowledge to the students but to providethem with exposure and hands-on learning wherever possible

Semester IV

PHY 401: Waves, Oscillations and Acoustics

1. Apply the concept of use of knowledge of Waves and Sound to real life problems.
2. Understanding of the course will create scientific temperament.

PHY 402: Optics and LASERS

1. Apply the concept of use of knowledge of Optics and LASERS to real life problems.
2. Understanding of the course will create scientific temperament.

PHY 404: Skill Enhancement Course II

The aim of this course is to enable the students to design and trouble shoots the electrical circuits,networks and appliances through hands-on mode

F Y. BSc Chemistry

CH: 101 Physical and Inorganic Chemistry

1) To expose & develop interest in the field of chemistry. 2) To develop ability & to acquire the knowledge of terms, facts concept processes techniques & principles of subject. 3) To understand the fundamental principle and chemical analysis

CH: 102 Organic and Inorganic Chemistry

1) To develop skills required in chemistry such as the proper handling of apparatus & chemical analysis 2) To develop ability to apply the knowledge of contents of principles of chemistry

CH: 201 Physical and Inorganic Chemistry

1) To develop problem solving skills in students. 2) To develop proper aptitude towards the subject. 3) To develop ability to apply the knowledge of contents of principles of chemistry.

CH: 202 Organic and inorganic chemistry

1) Determine analyses and evaluate the interpretation ships involve in chemistry. 2) Develop thirst of chemical knowledge, become flexible and persistence learners and appreciate the need for lifelong learning. 3) Develop and understanding, interest of Hydrocarbon Chemistry.

SY BSc. Chemistry

CH-301: Physical and Inorganic Chemistry

1) Know the qualitative properties of solution, the depression in freezing point, elevation in boiling point and osmotic pressure. Calculate molar and normal solution of various concentrations. 2) Explains the application of colligative properties in determining molecular mass. 3) Know the qualitative properties of solution, the depression in freezing point, elevation in boiling point and osmotic pressure. 4) Compares the general characteristics electronic configuration of lanthanides and actinides, uses of lanthanides and actinides.

CH-302: Organic and Inorganic Chemistry

1) This course gives the quantitative ideas about the synthesis, properties and uses of such heterocyclic compounds like pyrole, pyridine qunolene, thiophene, furan etc.. Different methods for the preparation of important Hetero cycles and their important reactions. Aromaticity, Huckel's rule and its applications 2) Explains the different types of structural and stereo isomers CO2 Represent organic molecules by Fischer, Flying wedge, Sawhorse and Newman projection formulas , Conformational isomerism of ethane, n-butane, cyclohexane, Conformational analysis of 1,4 cis and trans disubstituted cyclohexane. 3) Explains the theories of acids and bases. Different solvents and

solubility. Hard and soft acids and bases: definitions, Pearson HSAB concept, theories of Hardness and softness, application and limitation of HSAB concepts

CH-304 Basic Analytical Chemistry

1) Develops accuracy and precision in doing experiments, understands the different errors and methods for minimizing errors. Explanation of MSDS. Explain significant figures, absolute error, relative error, mean, median, Give the theory behind the qualitative and quantitative analysis conducted in the laboratory. Study the importance of safety and security, responsibility types of hazards and risk in chemical laboratory. Understand the use of personal protective and other safety equipment's, handling of chemical in laboratory. 2) Understand the route of explores for toxic chemicals. Learn good laboratory practices and its applications. 3) Students are enabling to aware about PH, POH, derivation of Henderson's equation, Conduct acid base titrations, Different indicators used in titrations, 4) complex metric titrations, Applications of titrations 5) Students are enable to aware about Classification of chromatography, Mobile phase and stationary phase, Study the instrumentation, sample injection system, columns for HPLC and GC, Solvent treatment system and choice of mobile phase. To give an extended knowledge about chromatographic

CH-303 Chemistry Practical

1) Determine the miscibility temperature of phenol–water system 2) Experimental demonstration of Conductometric and Potentiometric titrations of strong acid against strong base, weak acid against strong base. 3) Simple Organic and Inorganic derivatives preparations

CH-401: Physical and Inorganic Chemistry

1) Free energy and equilibrium, Gibbs and Helmholtz energies, spontaneous and non spontaneous reactions, changes in enthalpy, Entropy and free energy of reactions, Derivations of Clauses and Celsius chaperon equations. 2) Electrochemistry discussed electrical properties of ionic solutions. Different types of cells and their formulations, applications. Solve the cell reactions and calculate cell EMF. 3) Double salts and coordination compounds, coordination complexes and complex ions, coordination number, Unidentate, bidentate and polydentate ligands, chelating ligand and chelates, physical methods used in study of complex, Nomenclature of coordination compounds. 4) Therotical knowledge about metals, non-metals and semiconductors. Understand the p-type semiconductor and n-type semiconductor. Their preparations and uses.

CH-402: Organic and Inorganic Chemistry

1) Synthesis of organic reaction is itself involves a large part of organic chemistry. This is called synthetic organic chemistry. This chapter involves different synthetic reagents for synthesis of malonic ester and Acetoacetic ester. 2) Organometallic compounds are very important in biological

bodies like hemoglobin, 3) chlorophylls, Vitamin B12 and also they can be used as chemical reagent. This course discussed about the synthesis and properties of these organometallics of Zinc, Magnesium, Lithium and Copper. 4) to understand deferent theories like MOT, VBT, CFT, LCAO, Compare MO and VB theory, Know the meaning of various terms involved in coordination Chemistry ,To understand Werner's formulation of complexes and identify the types of valences, Know the limitations of VBT, Know the shapes of d-orbitals and degeneracy of d-orbitals,

CH-403 Chemistry Practical

1) Experiments based on Gravimetric and Colorimetric analysis. 2) Gravimetric estimation of Barium, Sulphate, Calcium using silica crucible 3) Organic qualitative analysis in small quantity helps in type determination and reducing the consumption of chemicals. 4) Determine the physical constants like boiling point and melting point of organic compounds. 5) Recrystallisation of organic compounds from alcohol and water. 6) Identify the organic compounds. 7) Paper chromatography

T. Y. BSc

CH-501 Principles of Physical Chemistry-I

• Understand the significance of wave function and postulates of quantum mechanics. • Deduce rate equations and half-life equations for first and second order reactions • Draw and explain the one and two component system phase diagrams. • Explain the principles of electrode processes and apply them during Practicals.

CH-601 Subject- Principles of Physical Chemistry-II

•Analyze the rotational spectra of diatomic molecules and determine the bond length. • Explain and apply the radioactivity principles for various chemical and biological investigations. • Describe the mechanism of fluorescence, phosphorescence and photochemical reactions. •Analyze the given crystal structure and determine the indices of planes, interplaner distances and type of crystal structure.

CH-502 Subject-Inorganic Chemistry

• Learn about the VSEPR theory and how it can be used to explain molecular shapes. • Learn about the VBT to describe the formation of covalent bonds in terms of atomic orbital overlap. • Learn about stability of complexes using CFSE. • Learn about MOT to draw energy diagrams and to predict bond order.

CH-602 Subject- Chemistry of Inorganic Solids

• Learn about basic principles and synthesis of nanomaterials. • Learn about classification, composition and processing of cement. • Learn about classification and composition of alloys. • Learn about types manufacture and applications of fertilizers.

CH-503 Subject- Organic Reaction Mechanism

Students will learn organic reactions like nucleophilic substitution, electrophilic substitution, nucleophilic addition, electrophilic addition and elimination. • Students will be able to write/ explain mechanisms of those types of reactions. • Students will understand how a reaction takes place in one or more steps. • Students will understand the types of intermediates formed in different reactions. • Students will learn how reagent attacks the substrate molecule and accordingly how bonds break and formed. • Students will learn how change in structure of substrate, reagent and solvent changes the product formed and its stereochemistry. • Students will be able to predict the products and to suggest the mechanisms.

CH-603 Subject- Spectroscopic Methods of Structure Determination

• Students will learn interaction of radiations with matter. They will understand different regions of electromagnetic radiations. They will know different wave parameters. • Students will learn principle of mass spectroscopy, its instrumentation and nature of mass spectrum. • Students will understand principle of UV spectroscopy and nature of UV spectrum. They will learn types of electronic excitations. • Students will be able to calculate maximum wavelength for any conjugated system. And from the value of λ-max they will be able to find out extent of conjugation in the compound. • Students will understand principle of IR spectroscopy, types of vibrations and the nature of IR spectrum. • From IR spectrum, they will be able to find out IR frequencies of different functional groups. And thus, they will be able to find out functional groups present in the compound. • Students will understand principle of NMR spectroscopy and will understand various terms used in NMR spectroscopy. They will learn measurement of chemical shift and coupling constants. • Students will be able to interpret the NMR data and they will be able to use it for determination of structure of organic compound. • Students will be able to determine structure of simple organic compounds on the basis of spectral data such as λ max values, IR frequencies, chemical shift (δ values)

CH-504 Subject- Industrial Chemistry

• Basic requirements of Chemical Industry, different terms, operations and processes involved in chemical Industry. • Describe Copy Right Act, Patent Act and Trade Marks, Bureau of Indian Standards (BIS) and International Organization for Standardization (ISO). • Basic requirements of Chemical Industry, different terms, operations and processes involved in chemical Industry. •

Describe Copy Right Act, Patent Act and Trade Marks, Bureau of Indian Standards (BIS) and International Organization for Standardization (ISO).

CH-604 Subject- Chemistry of Industrially Important Products

• Describe the industrial production of a number of important organic and inorganic compounds / chemicals and products of end use. • Gain comprehensive knowledge of cutting-edge developments in a field of different chemical industries. • Importance of Cosmetics Industry and a general study including preparation and uses of the Hair dye, hair spray, shampoo, suntan lotions, lipsticks, talcum powder, nail enamel, creams (cold, and shaving creams). • Perfumes and identify the distinguishing features of its components and also an essential oils and their importance in cosmetic industries with reference to Eugenol, Geraniol, sandalwood oil, eucalyptus, rose oil, 2- phenyl ethyl alcohol, Jasmone, Civetone, Muscone etc. • Know about pesticides both natural and synthetic, benefits and adverse effects of it, also synthesis, manufacture and uses of pesticides viz. Organochlorines (DDT, Gammexene,); Organophosphates (Malathion, Parathion); Anilides (Alachlor and Butachlor). • Definition, classification, raw material used in soaps and detergents, reaction involved in it, Manufacture of Soaps and cleansing action of soaps and detergents. • Definition, properties of good dyes, relation between colour and constitution, classification of dyes according to their mode of application and chemical constitution. • Importance's, definition and meaning of the different terms involved in Drugs and Pharmaceuticals Industry and also synthesis, uses, properties and industrial manufacture of Paracetamol, Aspirin, and Chloramphenicol.

CH-505 Subject- Analytical Instrumentation

• Explain the fundamentals of analytical methods and instruments for qualitative and quantitative Analysis. • Express the role of analytical chemistry in science. • Students will be able to function as a member of an interdisciplinary problem-solving team.

CH-605 Subject- Analytical Techniques

• Compare the Instrumental methods and non-instrumental methods and their advantages. • Solve the problem of detection and separation using analytical instruments. • Students will be able to explore new areas of research in bothchemistry and allied fields of science and technology. • Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.

CH-506(B) Subject- Green Chemistry

• With this course, the graduate students will be able

to understand the twelve principles of green chemistry that will help to build the basic understanding of toxicity, hazards and risk of chemical substances. • The course will help to understand stoichiometric calculations and relate them to green chemistry metrics. The students will learn about atom economy and understand its importance over percentage yield. • The students will learn to design safer chemicals, products and processes that are less toxic than the conventional chemistry, understand significance of catalysis, use of renewable feed stock, renewable energy sources, importance of green solvents, etc. • The course will train the students to appreciate green chemistry and boost the students to think and develop the skills to innovate and search for the solutions to environmental problems. • Green chemistry is only way of future chemistry to ensure sustainability with absolute zero waste. The success stories and real-world cases will motivate the young generation to practice green chemistry.

CH-606(A) Subject- Polymer Chemistry

• Define terms like monomer, polymer, polymerization, polydispersity index, etc., classify polymers based on their origin, native backbone chain, and thermal response. • Know glass transition temperature and its determination, various ways to express molecular weights of polymers and polydispersity index. • Identify different mechanisms of polymerizations viz. free radical, ionic, and condensation polymerizations. • Distinguish techniques of polymerization based on physical conditions required for the preparation of polymers in laboratory or industry. • Familiar with preparation, properties, and applications of industrially important selected polymers.

FYBSc Microbiology

MB 101: Microbial History, Diversity and Taxonomy (Theory)

- 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
- How the subject emerged as new branch of biology
- Learn ancient view about life continuity and concept of experiment
- Aware about historical developments and their applications as technology
- Cognizant about contribution of various pioneers of microbiology
- Aware about diversity of microorganism
- Study impact of microbes on earth atmosphere, health and technology development
- Recognize the scope of microbiology in all spheres of life and industrial sector
- Analyze the ways to classify the living system
- Understand the taxonomy (identification, binomial nomenclature, and Classification schemes/keys) and comprehend the various approaches of microbial taxonomy.

MB 102: Microscopy and Basic Bacteriology (Theory)

- 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
- Learn aseptic techniques and be able to perform routine culture handling tasks safely and effectively
- Comprehend the various methods for identification of unknown microorganisms
- Understand the modes of nutrition in microbial metabolism and able to classify the bacteria based on nutrition
- Know the various Physical and Chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement.

MB 103: Microbiology Practical Paper - I (Practical)

- Demonstrate ability to formulate hypotheses and design experiments based on the scientific method.

- To 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
- Communicate and collaborate with other disciplines
- To effectively communicate fundamental concepts of microbiology in written and oral format.
- To identify credible scientific sources and interpret and evaluate the information therein.
- Understand the relationship between science and society
- Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures
- Understand the basic microbial practices and study the comparative characteristics of prokaryotes and eukaryotes
- 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
- Prepare and view specimens under bright field microscope.
- Aware and train in aseptic handling of microbial specimens. Practice safe microbiology, using appropriate protective and emergency procedures.
- Use appropriate microbiological and molecular lab equipment and methods.
- Document and report experimental protocols, results and conclusions

MB 201: Basic Biochemistry and Cytology (Theory)

- Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural architecture and differences among bacteria/archaea
- Know basic knowledge pertinent to cell biomolecules as such

MB 202: Microbiological Techniques (Theory)

- 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
- Know various bacteria based on nutritional needs and also understand various physical and chemical means of sterilization
- Discern knowledge about sterility assessment of sterilizing agents

MB 203: Microbiology Practical Paper - II (Practical)

- Inculcate scientific thinking: a. Student can adapt the ability to apply the process of science, demonstrate an ability to formulate hypotheses and design experiments based on the scientific method b. Analyze and interpret results from a variety of microbiological methods and apply these methods to analogous situations c. Adapt quantitative reasoning and graphing skills to solve problems in microbiology.
- Introduce microbiology Laboratory Skills, Perform advanced staining methods
- Use pure culture and selective techniques to isolate, enumerate, enrich and isolate microorganisms and to use appropriate methods to identify microorganisms (media-based)
- Become conversant in basic biochemical methods in microbiology
- Demonstrate practical skills in microscopy and their handling techniques and staining procedures
- Practice aseptic techniques and be able to perform routine culture handling tasks safely and effectively
- Understand preparation of standard solutions required in various assays.

SYBSc Microbiology

MB - 301: Basic Microbial Enzyme and Metabolism

- understand the basic of microbial enzymology, nature of enzyme, their nomenclature, working mechanism, classification based on their action etc.
- know how about different parameters affecting the activity of enzyme.
- learn about nutrient uptake by microbes, various mechanism used to transport ions and molecules in microbial cells.
- aware about concept of metabolism and its basic types.
- cognizant about various pathways used by microbes to break down molecule and generate ATP as a source of energy.
- aware about the regulations and energetics of various pathways.
- understand aerobic, anaerobic respiration and fermentation.

MB - 302: Microscopy and Microbial Ecology

- demonstrate theory in microscopy and acquaint with advanced microscopy.
- know the basic concepts of microbial ecology such as biotic and abiotic factors, microbial interactions etc.
- learn the establishment of symbiosis, some positive and negative interactions.

- comprehend the various symbiotic interactions of microbes with plants, animals and other microbes.
- understand the microbial interactions in extreme habitats.
- know the detail concept of biotopes.

MB SEC- I: Microbiological Analysis of Air, Water and Soil

- competently explain various aspects of environmental microbiology
- aware about the pollution, Water and air-borne diseases and their transmission, methods of determination of sanitary quality of water and sewage treatment methods employed in waste water treatment.
- appreciate the diversity of microorganisms and learn the abundance, distribution and significance of microorganism in the environment such as bioremediation and plant microbe interactions

MB - 401: Genetics and Immunology

- understand the basic of microbial enzymology, nature of enzyme, their nomenclature, working mechanism, classification based on their action etc.
- understand the concepts like gene, chromosome, Structural organization of chromosome, extra chromosome: plasmid and its types
- know general terms used in genetics
- aware about genetic code
- learn mutation, type, agent causing mutation and their mechanism, test to detect mutation etc.
- learn about infection: mode and source.
- understand antigen, antibody and their role in immunity and immune response.
- know about antibody diversity.
- understand blood grouping system.
- cognizant about vaccine, anti-sera and toxoid

MB - 402: Basic Industrial Microbiology

- understand the basics of fermentation technology, screening techniques, microbial culture preservation techniques etc.
- know the concepts of inoculum development and media sterilization for fermentation process.
- learn about the typical structure of fermenter and its parts, types of fermentation processes and synchronous growth.
- aware about the detail downstream process of fermentation of important microbial products.

MB - 403: Practical Paper – IV

- Structure and functions of nucleus and volutin granules.
- Able to carry out titrations skillfully.
- Understand structure, working principle and significance of each and every part of fermenter.
- Know chromatography techniques.
- Students can be able to detect blood groups and perform cross-matching.
- Understand concept of stock solutions and can prepare required stock concentration by proper dilutions.
- Get knowledge about enzymes; successfully detect various enzymes produced by microorganisms.

SEC-II: Biofertilizers and Biopesticides

- Completion of the course will give an overview of relevant use of microbial biofertilizers and biopesticides.
- The students will become familiar with the vast reserves of available microbial biodiversity that provide abundant opportunities to harness the ability of micro -organisms and their chemical constituents
- To sustainably minimize damage from pests or increase agricultural productivity and production.

TYBSc Microbiology

MB 501- Microbial Genetics

- Acquaint with the concepts of Gene transfer and its Central Dogma.
- Able to learn the principles and applications of various molecular techniques.
- Students shall have the basic knowledge of operon and r-DNA technology.

MB 502- Bioprocess Technology

- Know a bioreactor, its parts, types and working.
- Get knowledge about the significant processes in a bioreactor like strain
- improvement, inoculum development sterilization and scale-up.

MB 503- Metabolism

- Get well versed with the catabolic and anabolic pathways.
- Understand the concept of ETC and principles of thermodynamics.
- Apply the principles of metabolism in various bacteria.

MB 504 - Basic Immunology

- Get acquainted with Antigenicity and Immunogenicity.
- Know the role of immune cells and organs and the functional mechanisms of each.
- Understand the structure and role of MHC and APC.

MB 505- Medical Microbiology-I

- Get a clear vision about various aspects of infectious diseases.
- Understand the principles of immunological phenomena associated with the infectious
- diseases.
- Carry out fundamental or applied research in the field of Medical Microbiology.

MB 506 (A) - Food Microbiology

- Know the concepts related to popular milk products, milk examination and spoilage.
- Comprehend knowledge regarding fermented food products, food spoilage and
- infection.
- Understand diverse strategies for food preservation.

MB 506 (B)- Pharmaceutical Quality Control & Quality Assurance

- Understand microbial spoilage and preservation of pharmaceutical formulations during
- production and in products.
- Get hands-on knowledge of various methods / processes required in pharmaceutical
- quality control and assurance.
- Acquire knowledge of GMP practice, CGMP, FDA, GLP and Pharmacopeia

MB 507 - Methods in Medical Microbiology – I

- Achieve skill in pure culture techniques.
- Learn principles underlying diagnostic tests and handle kits for diagnosis of diseases.
- Know various stages involved in malarial and diarrhoeal infections.

MB-508: Methods in Industrial Microbiology-I

- Understand the operations in fermentation processes
- Inculcate the salient features of quality management and regulatory processes.
- Use computer for data generation and maintenance.

MB-509: Methods in Applied Microbiology-I

- Isolate and identify agriculturally important microbes like *Azotobacter* and cellulolytic

- microbes.
- Detect food poisoning causing microbes and perform the tests to determine quality
- control of dairy product (milk).
- Synthesize nanoparticles by biological method/s and characterize them using UVVisible
- Spectrophotometry.

MB 601- Molecular Biology

- Get well versed with the regulatory mechanisms of Lactose and Tryptophan operon.
- Understand the principles and applications of advanced molecular techniques.
- Know the methodology involved in engineering of genes and its practical
- applications.

MB 602- Fermentations

- Understand fermentation processes involved in the production of various products.
- Get acquainted with the needs of a fermentation industry.
- Know about the large-scale production of various valuable products.

MB 603- Enzymology

- Know the role of coenzymes in enzyme action.
- Understand the regulation of enzymatic reactions pertaining to allosteric proteins and
- covalent modification.
- Acquire knowledge about purification of enzymes by various methods,
- immobilization of enzymes and enzyme engineering techniques.

MB 604: Advanced Immunology

- Be well versed with protective immunity and tolerance in the body.
- Gain knowledge about the serological tests and their applications.
- Know the path that may help to overcome the challenges in the synthesis of novel
- vaccines.

MB 605-Medical Microbiology – II

- Justify the variation between viral, bacterial and other diseases.
- Explain prognosis of diseases and understand the role of medical microbiology in
- public health.

MB 606 (A) - Agricultural Microbiology

- Understand classification of plant pathology with regional plant diseases.
- Know the concepts related to methods of plant disease control.
- Comprehend knowledge regarding Agricultural Microbiology.

MB 606 (B)- Regulatory Practices and IPR

- Understand role of regulatory practices in Pharmaceutical Industry and become aware
- of the patents norms.
- Have knowledge pertaining to Intellectual Property Rights and their protection.
- Be endowed with the legislature to be followed during the generation of genetically
- modified plant and animals.

MB 607 - Methods Medical Microbiology – II

- Perform pure culture techniques and apply them for pathogenic bacteria.
- Inculcate the technique involved in collection of mouth and skin samples using swabs
- for diagnostic purpose.
- Perform diagnostic tests for Syphilis and AIDS.

MB-608: Methods Industrial Microbiology-II

- Design bioprocesses for commercially valuable products.
- Learn techniques for validation of instruments used in fermentation industry.
- Investigate the role of immobilization in enzyme activity and apply it for various
- purposes.

MB-609: Methods in Applied Microbiology-II

- Isolate and screen microbes involved in bioremediation processes like dyes and lignin
- degradation.
- Isolate and identify rhizospheric microbes which are important for crops
- Analyse the quality of wastewater / liquid effluent and make charts of safety handling of
- hazardous materials and MSDS.

MSC Microbiology

MB - 101: Microbial Taxonomy and Diversity

- Differentiate various groups of microbes and microbial taxonomy
- Acquire knowledge on adaptability of extremophiles and microbial diversity
- Acquaint with the scope of microbiology in different diversified areas.

MB-102: Microbial Physiology and Biochemistry

- Acquire knowledge on metabolism of biomolecules
- Familiarise with amino acids, proteins, lipids, nucleic acids and enzymes
- Understand biochemical reactions in microbial cells and metabolic pathway diversity

MB-103: Methods in Microbiology

- Develop expertise in basic analytical techniques of microbiology.
- Get knowledge in the analysis of biomolecules
- Carry out microbial techniques related to isolation, identification of algae, fungi, archea

MB - 105: Bioinstrumentation

- Acquire knowledge on basic biophysical and biochemical aspects
- Learn purification of molecules, analytical tools, electrophoretic separation
- Learn how to interpret protein mobility on page under native and SDS

MB – 201: Molecular Biology and Bioinformatics

- Receive elaborate knowledge on nucleic acids and molecular mechanisms in bacteria
- Understand gene expressions and signal sequences in bacteria
- Get thorough knowledge about fundamental aspects on bioinformatics

MB - 202: Microbial Enzymology

- Understand fundamental as well as kinetics of enzyme catalysed reactions
- Apply the knowledge to explore applications of various enzymes
- Identify how extremophiles act as a source of extremozyme.

MB - 204: Methods in Molecular Biology and Immunology

- Undertake gene transfer in different bacteria and make use of PCR amplification of DNA.
- Apply molecular diagnostic and immunodiagnostic techniques.

MB - 205: Methods in Enzymology

- Isolate, purify enzyme of interest from microbial system, characterize the
- enzyme and trace out application(s) of that enzyme
- Use the technique of enzyme assay to determine its specific activity, pH and temperature optima, Km, Vmax, Kcat of enzyme and activation energy using Arrhenius plot.
- Immobilize enzyme for particular application and familiarize with algorithm for protein

MSc II Microbiology

MB – 301: Pharmaceutical Microbiology

- Get in-depth knowledge on different categories of antibiotics and biopharmaceuticals.
- Understand drug design, quality control and regulatory elements of pharmaceutics.
- Discriminate conventional and combinatorial tools used in drug discovery.

MB – 302: Applied Molecular Biology

- Learn basic ideas on cloning vehicle.
- Know more about cDNA and amplification products.
- Understand the construction of recombinant DNA and molecular biology tools.

MB-304: Methods in Bioinformatics

- Access information from databases and interpret phylogenetic tree to gain insight into evolutionary path.
- Understand various algorithm.
- Practice biostatistics for interpretation of experimental data.

MB-305: Methods in Applied Microbiology

- Undertake quality control tests of pharmaceutical products.
- Carry out sterility testing and maintain sterility in the production area of pharma products.
- Understand various types of regulatory approvals required for pharmaceutical products.

MB - 303: Applied and Environmental Microbiology

- Understand significance of microbes in food, wastewater treatment and clean-up
- Describe use of microbes in solid and liquid waste treatment as well as bioremediation of toxicants, thereby acquire knowledge about microbial potentials
- Understand the relevance of microbial standards for food quality assurance.

MB – 401: Fermentation Technology

- Learn industrially relevant microbial products and their production process
- Get knowledge about bioreactor configuration, recovery of fermentation products
- Understand IPR and regulatory procedures required for final product.

MB - 402: Microbial Genetics

- Receive elaborate knowledge on mutation analysis, genome and its replication

- Understand about gene regulation and repair mechanisms in DNA damage
- Get in-depth knowledge on gene transfer mechanisms in microbes and able to explain how plasmid copy number is regulated.

MB - 404: Methods in Biotechnology

- Perform gene transfer, GFP gene cloning and carry out southern blotting
- Understand plant microbe relations

- **MB – 405: Laboratory course (Project Dissertation)**

- Conceive a problem based on published research and carry out comprehensive survey of literature
- Plan and carry out task in given framework of dissertation and present the work in written and viva
- Use a holistic view to critically, independently and creatively identify, formulate and deal with complex issues.
- Learn handling of instruments, use of chemicals and how to conduct the experiments
- Learn how to present the project in power point and answer the queries to examiners as well as science of writing

MB – 403: Agricultural Microbiology

- Understand ecology and how plant microbe interaction occurs
- Describe pathogenic interactions with plant and how biocontrol arrest pathogens
- Gain insight into genetics of host pathogen relation, plant resistance to pathogens.

FYBSc Mathematics Sem I

MTH 101: Matrix Algebra

1) understand concepts on matrix operations and rank of the matrix.
2) understand use of matrix for solving the system of linear equations.
3) understand basic knowledge of the eigen values and eigen vectors.
4) apply Cayley-Hamilton theorem to find the inverse of the matrix.
5) know the matrix transformation and its applications in rotation, reflection, translation.

MTH 102 –Calculus of Single Variable

1) understand basic concepts on limits and continuity.
2) understand use of differentiations in various theorems.
3) know the Mean value theorems and its applications.
4) make the applications of Taylor's, Maclaurin's theorem.
5) know the applications of calculus.
6) Determine the derivative of a function using the limit definition.
7) Interpret the derivative as the slope of a tangent line to a graph, the slope of a graph at a point, and the rate of change of a dependent variable with respect to an independent variable
8) Use the first and second derivatives to analyze and sketch the graph of a function, intervals on which the graph is increasing, decreasing.

MTH 103(A): Coordinate Geometry

Students can visualize geometrical concepts and draw two dimensional figures and can find their standard forms by shifting and rotation of axes. Students also can draw three dimensional figures and their equations particularly Sphere, Cone and Cylinder.

MTH 103(B): Discrete Mathematics

Students are able to understand the concepts of relations, coding and decoding, mathematical logic, Boolean algebra.

FYBSc Mathematics Sem II

MTH 201: Ordinary Differential Equations

1) understand basic concepts in differential equations.
2) understand method of solving differential equations
3) understand use of differential equations in various fields.

MTH 202: Theory of Equations

Students can find out roots of any equation of degree less than or equal to five. Theory of equations is highly useful in various subjects like algebra, linear algebra, calculus, ordinary and partial differential equations etc.

MTH 203(A): Laplace Transforms

1) Know about piecewise continuous functions, Dirac delta function, Laplace transform and its properties.
2) Know about Unit step, Periodic, Error, Gamma and Null functions.
3) Understand Laplace and Inverse Laplace transforms.
4) Know the basic properties of Laplace and inverse Laplace transforms.
5) Calculate the Laplace transform of basic functions using the definition.
6) Find the Laplace transform of derivatives of functions.
7) Compute inverse Laplace transforms.
8) Solve ordinary differential equations using Laplace transforms.

MTH-203(B) Numerical Methods

1) Understand basic concepts of methods of solutions of equations viz. bisection, iteration, Newton-Raphson methods and method of false position.
2) Understand methods of curve fitting viz. Gauss's forward and backward difference formulae and Lagrange's interpolation formula.
3) Use of curve fitting such as least square, polynomials and exponential fittings for set of given dada.
4) Use Taylor's series, Euler's method, Modified Euler's methods, RangeKutta methods for solving ordinary differential equations.

SYBSc Mathematics Sem III

MTH -301: Calculus of Several Variables (Period: 30 Clock hours)

1) limit and continuity of functions of several variables
2) fundamental concepts of multivariable Calculus.
3) series expansion of functions.
4) extreme points of function and their maximum, minimum values at those points.
5) meaning of definite integral as limit as sums.
6) how to solve double and triple integration and use them to find area by double integration and volume by triple integration.

MTH -302(A): Group Theory (Period: 30 Clock hours)

1) understand group and their types which is one of the building blocks of pure and applied mathematics.
2) understand Lagarnge, Euler and Fermat theorem
3) understand concept of automorphism of groups
4) understand concepts of homomorphism and isomorphism
5) understand basic properties of rings and their types such as integral domain and field.

MTH -302(B): Theory of Groups and Codes (Period: 30 Clock hours)

1) understand group structures which is useful to understanding ideas of modern mathematics.
2) understand solutions to polynomial equations
3) understand permutation groups
4) understand concepts of homomorphisms and isomorphisms
5) Students will understand basic concepts in codding theory.

SYBSc Mathematics Sem IV

MTH -401: Complex Variables (Period: 30 Clock hours)

1) The course is aimed to introduce the theory for functions of complex variables
2) Students will understand the concept of analytic function
3) Students will understand the Cauchy Riemann Equations
4) Students will understand harmonic functions
5) Students will understand complex integrations
6) Students will understand calculus of residues.
7) Students will acquire the skill of contour integrations.

MTH-402(A): Differential Equations (Period: 30 Clock hours)

1) Students will aware of formation of differential equations and their solutions
2) Students will understand the concept of Lipschitz condition
3) Students will understand method of variation of parameters for second order L.D.E.
4) Students will understand simultaneous linear differential equations and method of their solutions
5) Students will understand Pfaffian differential equations and method of their solutions
6) Students will understand difference equations and their solutions

MTH 404: Vector Calculus (Period: 30 Clock hours)

1) understand scalar and vector products
2) understand vector valued functions and their limits and continuity and use them to estimate velocity and acceleration of partials.
3) Calculate the curl and divergence of a vector field.
4) Set up and evaluate line integrals of functions along curves.