

Program Outcomes

Students of all undergraduate general degree **Programs in Science** at the time of graduation will be able to:

PO1: Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decision (intellectual, organizational, and personal) from different perspectives.

PO2: Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.

PO3: Social Interaction: Elicit views of others, mediate disagreements and help reach conclusion and help reach conclusions in group settings.

PO4: Effective Citizenship: Demonstrate empathetic social concern and equality centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5: Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.

PO6: Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

PO7: Self-directed and Life-long Learning: Acquire the ability to engage independent and life-long learning in the broadest context socio-technological changes.

Programme Specific Outcome

PSO1: Understand, analyse and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer-based systems of varying complexity.

PSO2: Apply standard Software Engineering practices and strategies in software project development using open-source programming environment to deliver a quality product for business success.

PSO3: Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

PSO4: Apply the knowledge of Technology, Mathematics, Networks and computing in the core information technologies.

PSO5: Identify, design, and analyse complex computer software systems and implement and interpret the results from those systems.

PSO6: Analyse the local and global impact of computing on individuals, organizations, and society.

Course Outcomes

FYBSC IT – SEM 1

Subject: Imperative Programming

Course Outcomes:

- CO1** To develop the programming skills using fundamentals of basic c language.
- CO2** To understand the fundamentals of programming such as condition, iterative execution, variable.
- CO3** To impart the knowledge about pointers which is the backbone of effective memory handling.
- CO4** To teach the basics of pre-processors available with C compiler.
- CO5** To understand the procedural oriented programming concept.
- CO6** To enable Learners to develop the logic of the program.

Subject: Digital Electronics

Course Outcomes:

- CO1** Course Outcomes: concepts and techniques used in digital electronics.
- CO2** Have a detaild understanding of the fundamental
- CO3** Understand and Convert different type of codes and number systems which are used in digital communication and computer system.
- CO4** Analyze different typs of digital electronic circuit using various mapping and logical tools and know the techniques to prepare simplified circuit using various mapping and mathematical methods.
- CO5** Understand different types of logic gates and the relationship between logic gates.
- CO6** Develop a digital logic and apply it to solve real life problems.
- CO7** Understand, Analyze, design and implement combinational and sequential logic circuits.
- CO8** Enable students to develop skill to build digital circuits.

Subject: Operating Systems

Course Outcome:

- CO1** Analyse the structure and functions of operating systems.
- CO2** Understand role of operating system as process manager, resource manager, file system manager, memory manager and I/O manager
- CO3** Understand the Mutual exclusion and Deadlock detection
- CO4** Understand benefits of cloud and virtualization.
- CO5** Understand differences of three types of computing: multiprocessor, multicomputer and distributed systems

Subject: Discrete Mathematics

Course Outcome:

- CO1** Gain experience in using various techniques of mathematical induction to prove simple mathematical properties of a variety of discrete structures.
- CO2** Be able to apply basic counting techniques to solve combinatorial problems.
- CO3** Be able to specify and manipulate basic mathematical objects such as sets, functions, and relations and will also be able to verify simple mathematical properties that these objects possess.
- CO4** Be skillful in expressing mathematical properties formally via the formal language of propositional logic and predicate logic.
- CO5** Have substantial experience to comprehend formal logical arguments.

Subject: Communication Skills

Course Outcomes:

- CO1** Apply business communication strategies and principles to prepare effective communication for domestic and international business situations.
- CO2** Identify ethical, legal, cultural, and global issues affecting business communication.
- CO3** Utilize analytical and problem solving skills appropriate to business communication.
- CO4** Participate in team activities that lead to the development of collaborative work skills.

- CO5** Select appropriate organizational formats and channels used in developing and presenting business messages.
- CO6** Compose and revise accurate business documents using computer technology.
- CO7** Communicate via electronic mail, Internet, and other technologies.
- CO8** Deliver an effective oral business presentation.
- CO9** To be familiar with the complete course outline/Course Objectives/Learning Outcomes/Evaluation Pattern & Assignments
- CO10** To participate in an online learning environment successfully by developing the implication-based understanding of Paraphrasing, deciphering instructions, interpreting guidelines, discussion boards & Referencing Styles.
- CO11** To demonstrate his/her ability to write error free while making an optimum use of correct Business Vocabulary & Grammar.
- CO12** To distinguish among various levels of organizational communication and communication barriers while developing an understanding of Communication as a process in an organization.
- CO13** To draft effective business correspondence with brevity and clarity.
- CO14** To stimulate their Critical thinking by designing and developing clean and lucid writing Skills.
- CO15** To demonstrate his verbal and non-verbal communication ability through presentations.

FYBSC IT SEM 2

Subject: Microprocessor Architecture

Course Outcomes:

- CO1** To study segmented, pipelined architecture in microprocessors
- CO2** To study memory management in microprocessors
- CO3** To study multitasking functioning
- CO4** To study microprocessor assembly language
- CO5** Write assembly language program for microcontrollers.
- CO6** To take overview of multi core Architectures
- CO7** Draw and describe architecture of 8051 microcontroller.
- CO8** Interface various peripheral devices to the microcontrollers.

Subject: Web Programming

Course Outcomes:

- CO1** Understand Internet and Web Programming basic concepts.
- CO2** Understand the front end and back end Web Applications.
- CO3** Understand the latest web programming tools and techniques.
- CO4** Developing static and dynamic Web Applications.
- CO5** Integrating and blending latest web technologies for creating Web Applications.

Subject: Numerical and Statistical Methods

Course Outcomes:

- CO1** To develop the mathematical skills of the students in the area of numerical methods. Describe and discuss the key terminology, concepts, tools and techniques used in business statistical analysis.
- CO2** To know about various types of Errors, Calculate the error correction and get actual root of the equation.
- CO3** Understand different methods of solution of the equations and compare them.
- CO4** How to calculate and apply measures of location and measures of dispersion – grouped and ungrouped data cases.
- CO5** How to apply discrete and continuous probability distribution to various business problems.

- CO6** Student will be made aware of different numerical and statistical methods which are used in engineering field, with emphasis on how to prepare program for different methods.
- CO7** Solve a range of problems using the techniques covered.
- CO8** Discuss the uses and limitations of statistical analysis.

Subject: Green Computing

Course Outcomes:

- CO1** To understand what Green Computing is and how it can help improve environmental Sustainability.
- CO2** To understand the principles and practices of Green Computing.
- CO3** To understand how Green Computing is adopted or deployed in enterprises.
- CO4** Apply the Green computing practices to save energy.
- CO5** Discuss how the choice of hardware and software can facilitate a more sustainable operation.
- CO6** Use methods and tools to measure energy consumption.

Subject: Object Oriented Programming

Course Outcomes:

- CO1** To explore the principles of Object Oriented Programming (OOP).
- CO2** To understand object-oriented concepts such as data abstraction, encapsulation, inheritance, dynamic binding, and polymorphism.
- CO3** To use the object-oriented paradigm in program design.
- CO4** To lay a foundation for advanced programming.
- CO5** Provide programming insight using OOP constructs.

SYBSC IT Semester III

Subject: Python Programming

Course Outcomes:

- CO1** Comprehend the basics of python programming
- CO2** Ability to implement modular approach using python
- CO3** Efficiently implement various data structures provided by python
- CO4** Develop applications based on object oriented concept
- CO5** Develop application using GUI and databases

Subject: Data Structures

Course Outcomes:

- CO1** Ability to analyze algorithms and algorithm correctness.
- CO2** Ability to summarize searching and sorting techniques.
- CO3** Ability to describe stack, queue and linked list operation.
- CO4** Ability to gain knowledge of tree and graph concepts.
- CO5** Ability to analyze and choose appropriate data structure and algorithm for program development.
- CO6** Efficiently use sorting and searching algorithm and know their complexities.
- CO7** Improve coding skills by applying most suitable data structure for storage and access.
- CO8** Ability to use trees and graph structures for representing and using complex and non-line data organization.
- CO9** Demonstrate advantages and disadvantages of specific algorithms and data structures.
- CO10** Select basic data structures and algorithms for autonomous realization of simple programs or program parts.
- CO11** Determine and demonstrate bugs in progrsm, recognize neededbasic operation with data structures.
- CO12** Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.
- CO13** To use appropriate algorithmic strategy for better efficiency.

Subject: Computer Networks

Course Outcomes:

- CO1** Understand the importance of computer network and communications.
- CO2** Learn about transmission media and their characteristics
- CO3** Learn about role of various layers of ISO OSI Model in communications
- CO4** Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols.
- CO5** Demonstrate design issues, flow control and error control.
- CO6** Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.
- CO7** Knowledge about various protocols used in computer network.
- CO8** Demonstrate different routing and switching algorithms.

Subject: Database Management Systems

Course Outcomes:

- CO1** Understand the need of modelling data and then storing the data in organized manner
- CO2** Ability to create appropriate structure to map with specific type of data.
- CO3** Understand and apply the query processing knowledge for creation, manipulation, deletion and retrieval of data.
- CO4** Use latest methods of storage and retrieval of data as desired by the user.
- CO5** Develop models and management information systems as per requirements of clients.

Subject: Applied Mathematics

Course Outcomes:

- CO1** Enhancing the Logic building capability.
- CO2** Compute a given integral using the most efficient method.
- CO3** Use integrals to formulate and solve application problems in science and engineering.
- CO4** Matrices will help them better understand computer graphics.
- CO5** Laplace will be helpful in understanding Digital Signal systems.

Subject: COMPUTER GRAPHICS AND ANIMATION

Course Outcomes :

- CO1** To familiarize students with basic principles and techniques for computer graphics.
- CO2** To Provide knowledge of interactive computer graphics with techniques of clipping, three dimensional graphics and three dimensional transformations.
- CO3** To gain in-depth learning of various concepts and features such as: 2D viewing, 3D viewing, perspective, lighting, and geometry.
- CO4** This course will introduce students to all aspects of computer graphics including hardware, software and applications.
- CO5** To Provide knowledge of computer graphics system, design algorithms and two dimensional transformations.

Subject: SOFTWARE ENGINEERING

Course Objectives:

- CO1** Knowledge of basic SW engineering methods and practices, and their appropriate application.
- CO2** Describe software engineering layered technology and Process frame work.
- CO3** A general understanding of software process models such as the waterfall and evolutionary models.
- CO4** Understanding of software requirements and the SRS documents.
- CO5** Understanding of the role of project management including planning, scheduling, risk management, etc.
- CO6** Describe data models, object models, context models and behavioural models.
- CO7** Understanding of different software architectural styles.

Subject: CORE JAVA

Course Outcome:

- CO1** Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- CO2** Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- CO3** Be aware of the important topics and principles of software development.
- CO4** Have the ability to write a computer program to solve specified problems.
- CO5** Be able to use the Java SDK environment to create, debug and run simple Java programs
- CO6** Identify classes, objects, members of a class and relationships among them needed for a specific problem
- CO7** Write Java application programs using OOP principles and proper program structuring
- CO8** Demonstrate the concepts of polymorphism and inheritance
- CO9** Write Java programs to implement error handling techniques using exception handling

Subject: Computer Oriented Statistical Techniques

Course Outcome:

- CO1** Recognize the error in the number generated by the solution.
- CO2** Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Rapshon method.
- CO3** Apply method of interpolation and extrapolation for prediction.
- CO4** Recognize elements and variable in statistics and summarize qualitative and quantitative data.
- CO5** Calculate mean, median and mode for individual series.
- CO6** Outline properties of correlation and compute Karl-Pearson's coefficient of correlation.
- CO7** How to apply discrete and continuous probability distributions to various business problems.
- CO8** Perform Test of Hypothesis as well as calculate confidence interval for a population parameter for single sample and two sample cases. Understand the concept of p-values.
- CO9** Learn non-parametric test such as the Chi-Square test for Independence as well as Goodness of Fit.
- CO10** Compute and interpret the results of Bivariate and Multivariate Regression and Correlation Analysis, for forecasting and also perform ANOVA and F-test. Further, understand both the meaning and applicability of a dummy variable and the assumptions which underline a regression model. Be able to perform a multiple regression using computer software.

Subject: Introduction to Embedded Systems

Course Objectives:

- CO1** To have knowledge about the basic working of a microcontroller system and its programming in assembly language.
- CO2** To provide experience to integrate hardware and software for microcontroller applications systems.
- CO3** Understand what is microcontroller, microcomputer and embedded system.
- CO4** Become familiar with programming environment used to develop embedded systems.
- CO5** Understand key concepts of embedded systems like IO, timers, interrupts, interaction with peripheral devices.
- CO6** Learn debugging techniques for an embedded systems

- CO7** Ability to understand the internal architecture and interfacing of different peripheral devices with Microcontrollers.
- CO8** Ability to write the programs for microcontroller.
- CO9** Ability to understand the role of embedded systems in industry.
- CO10** Ability to understand the design concept of embedded systems.

TYBSC IT SEM 5

Subject: Software Project Management

Course Objectives:

- CO1** Professional terminologies of software industry.
- CO2** Problem solving algorithms and techniques.
- CO3** Understand the development work environment
- CO4** To make students realize software project management is not just theory subject to pass, instead it will help them live their professional life with ease.
- CO5** This subject makes a student realize that whether a student becomes a project manager in future or not, still even as an employee he/she should learn to be an efficient team player.

Subject: Internet of Things:

Course Objectives:

- CO1** This course focuses on the latest microcontrollers with application development, product design and prototyping.
- CO2** Ideally suited for engineering students and graduates with a basic understanding of electronics and microprocessors.
- CO3** The Internet of Things (IOT) is the next wave, world is going to witness.
- CO4** Today we live in an era of connected devices (mobile phones, computers etc.), the future is of connected things (Eg: home appliances, vehicles, lamp-posts, personal accessories, your pets, industrial equipment's and everything which you use in day-to-day life).
- CO5** Internet of Things is a term given to the attempt of connecting objects to the internet and also to each other - allowing people and objects themselves to analyze data from various sources in real-time and take necessary actions in an intelligent fashion.

Subject: Advanced Web Programming

Course Objectives:

- CO1** To familiarize students with Microsoft .Net, C#, and ASP.NET technologies.
- CO2** Enable learners to use Visual Studio -an advanced design tool
- CO3** To gain in-depth learning of various concepts and features of NET coding and developing of web applications.
- CO4** To Provide knowledge of different State management techniques
- CO5** To explore ADO.NET- a model for interacting with databases.
- CO6** Using XML various security fundamentals will be explored

Subject: Artificial Intelligence

Course Objectives:

- CO1** Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
- CO2** Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
- CO3** Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
- CO4** To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
- CO5** To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.

Subject: Linux System Administration:

Course Outcomes:

- CO1** To familiarize students with Linux Installation.
- CO2** Enable Students to Install RPM and use Red hat Package Management
- CO3** To Make Students Install Samba Server and the use of Samba Server
- CO4** To make Students Install Apache, Send Mail.
- CO5** Write Shell Scripts in Linux.

Subject: Enterprise Java:

Course Outcomes:

- CO1** Identify advance concepts of java programming with database connectivity.
- CO2** Design and develop platform independent applications using a variety of component based frameworks.
- CO3** Able to implement the concepts of Hibernate, XML& EJB for building enterprise applications.
- CO4** The objective is to equip the students with the advanced feature of contemporary java which would enable them to handle complex programs relating to managing data and processes over the network.
- CO5** The major objective of this course is to provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business.

TYBSC IT SEM 6

Subject: Software Quality Assurance

Course Outcomes:

- CO1** Ability to identify and apply modern software testing methods in software development
- CO2** Understand testing strategies and defect management
- CO3** Recognise the importance of software quality assurance
- CO4** Know about quality improvement, cost control and contribute toward efficient delivery of software solutions

Subject: Security in Computing

Course Outcomes:

- CO1** Insight into secure design principles and defense models.
- CO2** Knowledge about storage and database security.
- CO3** Implement IDS, Firewalls and wireless security.
- CO4** Skills to implement secure cloud environment for web and application security
- CO5** Ability to implement physical security for implementing secure information environment.

Subject: Business Intelligence

Course Outcomes:

- CO1** Ability to use decision support system for BI Applications
- CO2** Ability to develop and use mathematical models for data mining and data preparations
- CO3** Know how and when to apply classification and clustering techniques for solving BI problems
- CO4** Explore insights into important emerging applications of BI
- CO5** Developing skills to design expert system solutions for business applications

Subject: Principles of Geographic Information Systems:

Course Outcomes:

- CO1** Explore mapped data, Spatial Data Types, Data Creation, Georeferencing, Spatial Analysis
- CO2** Relate GIS with remote sensing technologies with recent trends in geospatial analysis
- CO3** Analyze spatial data, using QGIS analysis tools
- CO4** Develop and Manage Geodatabases for real world data
- CO5** Create maps, images and apps to communicate spatial data in a meaningful way to others

Subject: Enterprise Networking

Course Outcomes:

- CO1** Understand Network Topology and Network Design
- CO2** Enumerate the role of various Enterprise LAN technologies, components and their use.
- CO3** Ability to design and implement Data Centers
- CO4** Ability to configure and apply WAN Technology
- CO5** Gain Insight into various protocols and their applications?
- CO6** Understand the role and implementation of Management Security.

Subject: IT Service Management

Course Outcomes:

- CO1** Ability to deal with the convergence, interoperability and design of heterogeneous networks with local, access and core networks, as well as with service integration.
- CO2** Ability to model, design, implement, manage, operate, administrate and maintain networks, services and contents
- CO3** Ability to plan networks and decision-making about services.
- CO4** Learn about service transition and service operations.
- CO5** Ability to apply Continual Service Improvement in an organization.

Subject: Cyber Laws

Course Outcomes:

- CO1** Able to demonstrate a critical understanding of the Cyber law with respect to Indian IT/Act and their amendments.
- CO2** Know about Cyber consumer's protection in India.
- CO3** Knowledge about handling Cyber Squatters and using Copyright Protection.
- CO4** Gain insight into Digital signature, Certifying Authorities and Governance.