# **Bachelor of Science in Information Technology**

Bachelor of Science (Information Technology) program is a three years undergraduate degree course with each year having two semesters. It is designed to meet the current industry needs of information technology and communication. The course is tailor-made to suit the current trends and expectations of industry.

### **Course Outcome:**

#### FY. BSc.IT, SEM I

COURSE CODE	USIT101+USIT1P1
COURSE NAME	Programming Principles with C (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to learn the basic principles of programming.
CO2:	Learners will be able to develop logic using algorithms and flowchart.
CO3:	Learners will be able to acquire the information about data types.
CO4:	Learners will be able to understand input and output functions.
CO5:	Learners will be able to enhance advanced concepts using programs.
CO6:	Learners will be able to understand the structure and union.

COURSE CODE	USIT102+USIT1P2
COURSE NAME	Digital Logic and Applications (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to apply number conversion techniques in real digital systems
CO2:	Learners will be able to solve boolean algebra expressions
CO3:	Learners will be able to derive and design logic circuits by applying minimization in SOP and POS forms
CO4:	Learners will be able to design and develop Combinational and Sequential circuits
CO5:	Learners will be able to understand and develop digital applications
CO6:	Learners will be able to create simple digital systems using counters, registers etc.

COURSE CODE	USIT103+USIT1P3
COURSE NAME	Fundamentals of Database Management Systems (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
C01:	Learners will be able to define and describe the fundamental elements of relational database management systems.
CO2:	Learners will be able to relate the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
CO3:	Learners will be able to design ER-models to represent simple database application scenarios.
CO4:	Learners will be able to transform the ER-model to relational tables, populate relational databases and formulate SQL queries on data.
CO5:	Learners will be able to improve the database design by normalization.
CO6:	Learners will be able to understand basic database storage structures and access techniques: file and page organizations, indexing methods and hashing.

COURSE CODE	USIT104 +USIT1P4
COURSE NAME	Computational Logic and Discrete Structure (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to use logical notation.
CO2:	Learners will be able to perform logical proofs and apply recursive functions and solve recurrence relations.
CO3:	Learners will be able to use graphs and trees.

CO4:	Learners will be able to apply basic and advanced principles of counting.
CO5:	Learners will be able to define sets and relations.
CO6:	Learners will be able to calculate discrete probabilities.

COURSE CODE	USIT105 +USIT1P5
COURSE NAME	Technical Communication Skills (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Ability Enhancement Skill Course
CO SR NO :	
CO1:	Learners will be able to analyze, synthesize and utilize the process and strategies from delivery to solving communication problems.
CO2:	Learners will be able to learn the communication methodologies at the workplace and learn about the importance of team collaboration.
CO3:	Learners will be able to learn about different technical communication such as presentations and interviews.
CO4:	Learners will be able to understand and apply the art of written communication in writing reports, proposals.
CO5:	Learners will be able to ground rules of ethical communication and MIS.
CO6:	Learners will be able to understand the functions of graphs, maps, charts.

COURSE CODE	USIT201 + USIT2P1
COURSE NAME	Object Oriented Programming with C++ (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
C01:	Learners will be able to understand the concept of OOPs, a feature of C++ language.
CO2:	Learners will be able to understand and apply various types of Data Types, Operators, Conversions while designing the program.
CO3:	Learners will be able to understand and apply the concepts of Classes & Objects, friend function, constructors & destructors in program design.
CO4:	Learners will be able to design & implement various forms of inheritance, String class, calling base class constructors.
CO5:	Learners will be able to apply & Analyze operator overloading, runtime polymorphism, Generic Programming.
CO6:	Learners will be able to analyze and explore various Stream classes, I/O operations and exception handling.

COURSE CODE	USIT202 + USIT2P2
COURSE NAME	Fundamentals of Microprocessor and Microcontrollers (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
C01:	Learners will be able to understand the basic concepts of Micro Computer Systems
CO2:	Learners will be able to understand the architecture and hardware aspects of 8085
CO3:	Learners will be able to write assembly language programs in 8085
CO4:	Learners will be able to design elementary aspects of Micro Controller based systems

CO5:	Learners will be able to understand Interfacing peripherals using Microcontroller
CO6:	Learners will be able to design Embedded System with 8051 Microcontroller

COURSE CODE	USIT203 + USIT2P3
COURSE NAME	Web Applications Development (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to analyze the working of Internet.
CO2:	Learners will be able to gain an insight into designing web pages.
CO3:	Learners will be able to use different ways of styling web pages using CSS.
CO4:	Learners will be able to implement basic and complex functionalities of JavaScript in a web page.
CO5:	Learners will be able to employ PHP Scripts to execute dynamic tasks in a web page.
CO6 :	Learners will be able to perform various database tasks using PHP.

COURSE CODE	USIT204 + USIT2P4
COURSE NAME	Numerical Methods (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to understand numerical techniques to find the roots of nonlinear equations and solution of systems of linear equations.
CO2:	Learners will be able to understand the difference operators and the use of interpolation.
CO3:	Learners will be able to understand numerical differentiation and integration and numerical solutions of ordinary and partial differential equations.
CO4:	Learners can analyze solutions to a linear optimization problem.

CO5:	Learners will learn how to apply linear regression models in practice: identify situation where linear regression is appropriate
CO6:	Learners will be able to learn Problem Solving – Approximations, Accuracy, Precision, Round-Off Errors, and Truncation Errors

COURSE CODE	USIT205 + USIT2P5
COURSE NAME	Green IT (Theory and Practical)
LEVEL OF COURSE	BASIC
COURSE CREDIT	2+2
TYPE OF COURSE	Ability Enhancement Skill Course
CO SR NO :	
CO1:	Learners will be able to understand the concept of Green IT and problems related to it.
CO2:	Learners will be able to know different standards for Green IT.
CO3:	Learners will be able to understand how power usage can be minimized in Technology.
CO4:	Learners will be able to learn about how the way of work is changing.
CO5:	Learners will be able to understand the concept of recycling.
	Learners will be able to know how an information system can stay Green Information System.

COURSE CODE	USIT301 + USIT3P1
COURSE NAME	Python Programming (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Skill Enhancement Course
CO SR NO :	
CO1:	Learners will be able to store, manipulate and access data in Python
CO2:	Learners will be able to implement basic Input / Output operations in Python
CO3:	Learners will be able to define the structure and components of a Python program.
CO4:	Learners will be able to learn how to write loops and decision statements in Python.
CO5:	Learners will be able to learn how to write functions and pass arguments in Python.
CO6:	Learners will be able to create and use Compound data types in Python

COURSE CODE	USIT302 + USIT3P2
COURSE NAME	Data Structures (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to understand the array standard data structure.
CO2:	Learners will be able to implement the List standard data structure and will be able to know the standard interface for a List.
CO3:	Learners will be able to implement the Stack standard data structure and will be able to know the standard interface for a Stack.
CO4:	Learners will be able to understand and implement the Queue standard data structure.
CO5:	Learners will be able to understand and implement the Tree standard data structure.
CO6:	Learners will be able to understand and implement the Hash Map standard data structure and will be able to know the difference between open addressing and chained maps

COURSE CODE	USIT303 + USIT3P3
COURSE NAME	Computer Networks (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to understand basics of Data communications and Network Models
CO2:	Learners will be able to understand Physical layer and Digital and Analog transmission
CO3:	Learners will be able to analyze the Bandwidth Utilization, Transmission media, Switching and Data Link Layer
CO4:	Learners will be able to implement and understand Media Access Control and Wireless LANs
CO5:	Learners will be able to understand the Network Layer, Unicast Routing and Next generation IP
CO6:	Learners will be able to understand Transport Layer and Standard Client Server Protocols

COURSE CODE	USIT304 + USIT3P4
COURSE NAME	Database Management System (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
C01:	Learners will be able to apply knowledge of databases for real life applications.
CO2:	Learners will be able to apply query processing techniques to automate the real time problems of databases.
CO3:	Learners will be able to identify and solve the redundancy problem in database tables using normalization.
CO4:	Learners will be able to understand the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL
CO5:	Learners will be able to understand the concepts of transactions, their processing so they will familiar with broad range of database management issues including data integrity, security and recovery

CO6:	Learners will be able to understand the concepts of PL/SQL

COURSE CODE	USIT305 + USIT3P5
COURSE NAME	Applied Mathematics (Theory) and Mobile Programming (Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to apply linear algebra concepts to model, solve, and analyze real-world situations.
CO2:	Learners will be able to interpret the mathematical results in physical or practical terms for complex numbers.
CO3:	Learners will be able to recognize, classify and use different methods in linear first order, linear with constant coefficients differential equations.
CO4:	Learners will be able to use the Method of Laplace transforms and Inverse Laplace transform to solve initial-value problems for ordinary differential equations with constant coefficients.
CO5:	Learners will be able to use a double integral concept to find the area of a region and a triple integral concept to find the volume under a surface.
CO6:	Learners will be able to acquire ideas to solve integration using beta and gamma functions.

COURSE CODE	USIT401 + USIT4P1
COURSE NAME	Core Java (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Skill Enhancement Course
CO SR NO :	
C01:	Learners will be able to understand the basic concept of Java programming language.
CO2:	Learners will be able to understand and use the various data types in the Java programming language.
CO3:	Learners will be able to implement various control flow statements and Iterations.
CO4:	Learners will be able to understand the concept of inheritance and classes.
CO5:	Learners will be able to understand and implement Arrays and Multithreading in Java.
CO6:	Learners will be able to write GUI programs in Java.

COURSE CODE	USIT402 + USIT4P2
COURSE NAME	Introduction to Embedded Systems (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to define embedded systems and identify applications to real word systems.
CO2:	Learners will be able to understand hardware, software, and peripherals involved in an embedded system
CO3:	Learners will be able to understand basic microprocessor and microcontroller functionality utilizing registers and memory and Hardware/Software interfacing concepts.

CO4:	Learners will be able to design and develop a hardware platform encompassing a microcontroller and peripherals.
CO5:	Learners will be able to understand the key concepts of embedded systems such as I/O, timers, interrupts and interaction with peripheral devices.
CO6:	Learners will be able to understand embedded-system programming and apply that knowledge to design and develop embedded solutions.

COURSE CODE	USIT403 + USIT4P3
COURSE NAME	Computer Oriented Statistical Techniques (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
CO1:	Learners will be able to learn techniques to calculate the measures of central tendency and different measures of dispersion
CO2:	Learners will be able to learn gain insight into consequences of plan by probability techniques and processing samples using sampling techniques
CO3:	Learners will be able to draw valid conclusion using estimation theory and proper decision using decision theory
CO4:	Learners will be able to measure experimental result based on hypothesis using chi square techniques
CO5:	Learners will be able to learn techniques to correlate the relationship between various variables
CO6:	Learners will be able to apply the concepts of probability and distributions to some case studies

COURSE CODE	USIT404 + USIT4P4
COURSE NAME	Software Engineering (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	

Learners will be able to plan a software engineering process life cycle,
including the specification, design, implementation, and testing of
software systems that meet specification, performance, maintenance
and quality requirements
Learners will be able to analyze and translate a specification into a
design, and then realize that design practically, using an appropriate
software engineering methodology.
Learners will be able to know how to develop the code from the design
and effectively apply relevant standards and perform testing, and
quality management and practice
Learners will be able to use modern engineering tools necessary for
software project management, time management and software reuse.
Learners will be able to describe and apply validation and verification
processes to software development. They will also be able to classify
and apply various software cost estimation techniques
Learners will be able to apply CMMI practices to improve software
development processes.

COURSE CODE	USIT405 + USIT4P5
COURSE NAME	Computer Graphics and Animation (Theory and Practical)
LEVEL OF COURSE	MIDDLE
COURSE CREDIT	2+2
TYPE OF COURSE	Core Subject
CO SR NO :	
C01:	Learners will be able to list the basic concepts used in computer graphics.
CO2:	Learners will be able to implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
CO3:	Learners will be able to describe the importance of viewing and projections.
CO4:	Learners will be able to define the fundamentals of animation, virtual reality and its related technologies.
CO5:	Learners will be able to understand a typical graphics pipeline
CO6:	Learners will be able to apply image processing basics and its methods like filtering and smoothing as its applications

## TY. BSc.IT, SEM V

COURSE CODE	USIT501 + USIT5P1
COURSE NAME	Software Project Management (Theory) and Project Dissertation (Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Skill Enhancement Course
CO SR NO :	
CO1:	Students will be able to apply project management concepts and techniques to an IT project.
CO2:	Students will be able to explain project management in terms of the software development process.
CO3:	Students will be able to identify different activities of an IT project.
CO4:	Students will be able to identify issues that could lead to IT project success or failure.
CO5:	Students will be able to learn techniques to allocate resources to an IT Project.
CO6:	Students will be able to apply project management concepts through working in a group as team leader or active team member on an IT project.

COURSE CODE	USIT502 + USIT5P2
COURSE NAME	Internet of Things (Theory and Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Skill Enhancement Course
CO SR NO :	
CO1:	Students will be able to gain knowledge in the working of connected devices and will be able to identify which device is applicable for a given purpose.
CO2:	Students will be able to prototype embedded devices in the Raspberry pi environment as well as arbino environment.
CO3:	Students will gain knowledge in the concept of 3D printing as well as CNC milling.

CO4:	Students will be able to analyse the need of open and closed sources and
	details about sensor networks.
CO5:	Students will be able to learn about milling boards and understand
	crowdsourcing and crowdfunding.
CO6:	Students will be able to learn about prototyping the Physical Design and
	prototyping Online Components.

COURSE CODE	USIT503 + USIT5P3
COURSE NAME	Advanced Web Programming (Theory and Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Skill Enhancement Course
CO SR NO :	
CO1:	Learner will be able to understand the Microsoft .NET Framework and develop the C# console application.
CO2:	Learners will be able to understand ASP.NET page structure and design web applications with a variety of controls.
CO3:	Learners will be able to manage cookies and sessions as state management techniques.
CO4:	Learners will be able to create the dynamic web page using ASP.NET Controls which interact with databases.
CO5:	Learners will be able to use Microsoft ADO.NET to access data in web applications.
CO6:	Learners will be able to understand the secured web application.

COURSE CODE	USIT504 + USIT5P4
COURSE NAME	Artificial Intelligence (Theory and Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Discipline Specific Elective
CO SR NO :	
C01:	Learners will be able to understand the concepts of Artificial

	Intelligence.
CO2:	Learners will be able to categorize an Artificial Intelligence problem
	based on its characteristics and its constraints.
CO3:	Learners will be able to understand and implement search and
	adversarial (game) algorithms.
CO4:	Learners will be able to learn different logic formalisms and decision
	taking in planning problems.
CO5:	Learners will be able to learn how to analyze the complexity of a given
	problem and come with suitable optimizations.
CO6:	Learners will be able to demonstrate practical experience by
	implementing and experimenting with the learnt algorithms.

COURSE CODE	USIT506 + USIT5P6
COURSE NAME	Enterprise Java (Theory and Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Discipline Specific Elective
CO SR NO :	
C01:	Learners will be able to learn and understand the Java EE architecture and Understand Java Servlets.
CO2:	Learners will be able to learn and understand Servlet and JDBC Connection.
CO3:	Learners will be able to Learn about Request dispatcher,Cookies,Session concepts.
CO4:	Learners will be able to learn about JSP including Scripting Elements, Operators, Variables and Output.
CO5:	Learners will be able to get hands-on Enterprise JavaBean (EJB3), Session Beans and Message-Driven Beans.
CO6:	Learners will be able to outline the basic functionality that the Hibernate framework provides and how it differs to JPA

## TY. BSc.IT, SEM VI

COURSE CODE	USIT601 + USIT6P1
COURSE NAME	Software Quality Assurance (Theory) and Project Implementation (Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Skill Enhancement Course
CO SR NO :	
CO1:	Students will understand quality or different perspectives of quality and software development process.
CO2:	Students will be able to describe fundamentals of testing.
CO3:	Students will understand various software testing methods and strategies.
CO4:	Students will be familiar with the process of verification and validation.
CO5:	Students will understand the level of testing.
CO6:	Students learn how to use available resources to develop software, reduce cost of software and how to maintain quality of software and Methods and tools of testing and maintenance of software's.

COURSE CODE	USIT602 + USIT6P2
COURSE NAME	Security in Computing (Theory and Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Skill Enhancement Course
CO SR NO :	
C01:	Learners will be able to understand the CIA triad of Confidentiality, Integrity and Availability.
CO2:	Learners will be able to define what information is.
CO3:	Learners will be able to appreciate the value of information to the modern organisation.
CO4:	Learners will be able to identify the five leading-edge resources that
	have up-to-date information on information security.
CO5:	Learners will be able to evaluate network security threats and
	countermeasures.

CO6:	Learners will be able to acquire the knowledge of advanced security
	issues and technologies (such as DDoS attack detection and containment,
	and anonymous communications).

COURSE CODE	USIT603 + USIT6P3
COURSE NAME	Business Intelligence (Theory and Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Skill Enhancement Course
CO SR NO :	
CO1:	Learners will be able to Identify the major frameworks of computerized decision support: decision support systems (DSS), data analytics and business intelligence (BI).
CO2:	Learners will understand the foundations, definitions, and capabilities of DSS, data analytics and BI.
CO3:	Learners will be able to demonstrate the impact of business reporting, information visualization, and dashboards.
CO4:	Learners will be able to Explain data mining, neural networks, support vector machines, text analytics, text mining, sentiment analysis, web mining, web analytics, social analytics, social network analysis.
CO5:	Learners will be able to Outline the definitions, concepts, and enabling technologies of big data analytics.
CO6:	Learners will learn Knowledge Management, Artificial Intelligence.

COURSE CODE	USIT604 + USIT6P4
COURSE NAME	Principles of Geographic Information System (Theory and Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Discipline Specific Elective
CO SR NO :	

CO1:	Learners will be able to understand geographic information systems (gis), providing opportunities to analyze data, explore issues, problem solve, and evaluate situations in a geographic and spatial context.
CO2:	Learners will be able to develop and manage geodatabases.
CO3:	Learners will be able to analyze spatial data, using gis analysis tools.
CO4:	Learners will be able to relate GIS with remote sensing technologies.
CO5:	Learners will be able to understand various types of map.
CO6:	Learners will be able to explore mapped data.

COURSE CODE	USIT607 + USIT6P6
COURSE NAME	Cyber Laws (Theory) and Advanced Mobile Programming (Practical)
LEVEL OF COURSE	ADVANCE
COURSE CREDIT	2+2
TYPE OF COURSE	Discipline Specific Elective + Skill Enhancement Course
CO SR NO :	
CO1:	Learners will be able to understand Penalties, Adjudication and Appeals Under the IT Act,2000.
CO2:	Learners will be able to understand Contracts in the Infotech World.
CO3:	Learners will be able to understand Cyber Squatters and Copyright Protection in the Cyber World.
CO4:	Learners will be able to learn E-Commerce Taxation: Real Problems in the Virtual World.
CO5:	Learners will be able to know about Digital Signature, Certifying Authorities and E-Governance.
CO6:	Learners will be able to learn about Protection of Cyber Consumers in India.