B.Sc. (Information Technology)

PROGRAM OUTCOMES (PO)

PO1: Will have the ability to communicate computer science concepts, designs, and solutions effectively and professionally. Apply knowledge of computing to produce effective designs and solutions for specific problems. Identify, analyze, and synthesize scholarly literature relating to the field of computer science; and use software development tools, software systems, and modern computing platforms.

PO2: Work in a collaborative manner with others on a team, contributing to the management, planning and implementation of a computer system.

PO3: Independently propose a small scale research project, plan its execution, undertake its development, evaluate its outcome and report on its results in a professional manner.

PO4: Advance knowledge through innovation and knowledge creation. Pursue life-long learning in practice. Interpret and present theoretical issues and empirical findings.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO1: Gains understanding about techniques, technologies and methods used in managing and implementing information technology systems.

PSO2: Widens and deepens understanding of computing technologies and covers high level concept that enable the effective management and planning of IT project and services.

PSO3: High level strategy and design in-depth technical specializations, management and planning of IT project and services.

COURSE OUTCOMES

COURSE NAME: Paper – 1 Fundamentals of Computers
CLASS – B.Sc(IT) **SEMESTER – I**

Objectives of Course:

- Give students an in-depth understanding of why computers are essential components in business, education and society.
- Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software, the Internet, networking and mobile computing.

- Provide hands-on use of Microsoft Office applications Word, Excel and PowerPoint. Completion of the assignments will result in MS Office applications knowledge and skills.

COURSE OUTCOMES

At the end of this course the student shall be able to:

- Understand the basic terminology of computers
- Understand the fundamental hardware components that make up a computer's hardware and the role of each of these components
- Understand the difference between an operating system and an application program, and what each is used for in a computer
- Describe some examples of computers and state the effect that the use of computer technology has had on some common products
- Identify the applications of computer in daily life
- Understand the practical concepts of MS Word , MS Excel and MS PowerPoint

COURSE NAME: Paper – 2 Introduction to Programming – C
CLASS – B.Sc.(IT) **SEMESTER – I**

Objectives:

- The primary goal is to develop the programming skills in C.
- To get good knowledge of procedural language approach so that students can make software in the later stage of their course.
- This will help the students to frame the real world modeling of data and its associated functions
- This course also aims to an understanding of various concepts of C with the help of which one can create its own data types that can be used globally in different program files.

Outcomes:

a) Knowledge and Understanding: On successful completion of this subject the students have the programming ability in C Language.
b) Intellectual Cognitive/ Analytical Skills: Enhancing Logical Thinking and Reasoning Skills through Collaborative Learning in C Programming.
c) Practical Skills: Students would be capable of developing various applications to solve deluge of real world problems. They can also learn to make system software as well as application software. These existing languages could become base for developing new languages which can inherent its features. On the backend of various embedded systems, these languages are deployed.

d) Transferable Skills: In many multinational companies they can work effectively in a group or team to achieve goals and can show initiative and leadership abilities.

COURSE NAME: Paper – 3 Applied & Discrete Mathematics
CLASS – B.Sc.(IT) **SEMESTER – I**

- Simplify and evaluate basic logic statements including compound statements, implications, inverses, converses, and contrapositives using truth tables and the properties of logic.
- Express a logic sentence in terms of predicates, quantifiers, and logical connectives
- Apply the operations of sets and use Venn diagrams to solve applied problems; solve problems using the principle of inclusion-exclusion.
- Determine the domain and range of a discrete or non-discrete function, graph functions, identify one-to-one functions, perform the composition of functions, find and/or graph the inverse of a function, and apply the properties of functions to application problems.
- List the terms in a sequence, write a sequence in closed form, compute the sum of a finite sequence, compute the product of a finite sequence, and express sequences in terms of recursive or non-recursive forms.
- Perform basic matrix operations including sums, products, and transpose and perform 0-1 matrix operations.
- Apply rules of inference, tests for validity, and methods of proof including direct and indirect proof forms, proof by contradiction, proof by cases, and mathematical induction and write proofs using symbolic logic and Boolean Algebra.
- Solve counting problems by applying elementary counting techniques using the product and sum rules, permutations, combinations.
- Solve discrete probability problems and use sets to solve problems in combinatory and probability theory.
- Solve problems using recurrence relations and recursion to analyze algorithms and programs such as finding Fibonacci numbers and Tower of Hanoi problems.
- Solve problems using divide-and-conquer recurrence relations such as the fast multiplication algorithm and binary search.
- Describe binary relations between two sets; determine if a binary relation is reflexive, symmetric, or transitive or is an equivalence relation; combine relations using set operations and composition.
- Evaluate Boolean functions and simplify expression using the properties of Boolean algebra; apply Boolean algebra to circuits and gating networks.

Program Learning Outcomes:
Knowledge and Understanding:

- Students develop knowledge about basic matrix operations including sums, products, and transpose .
- Students develop knowledge about how to Simplify and evaluate basic logic statements including compound statements, implications, inverses, converses, and contrapositives

using truth tables and the properties of logic. , Express a logic sentence in terms of predicates, quantifiers, and logical connectives
- Students learn to apply the operations of sets and use Venn diagrams to solve applied problems; solve problems using the principle of inclusion-exclusion.
- Determine the domain and range of a discrete or non-discrete function, graph functions.

COURSE NAME: Paper – 1 Principles of Digital Electronics
CLASS – B.Sc.(IT) SEMESTER – II
Objectives of the Course :

This course is aimed at acquainting students with the principles of digital electronics. The course aims to equip students with the basic building blocks of all digital circuits laying more emphasis on logic gates, combinational circuits and sequential circuits. The course also aims to impart fundamental knowledge about construction of computer memory.

Program Learning Outcomes:

Students will learn how to :
- Convert numbers from one number system to another.
- Represent information using Binary Codes.
- Draw Logic circuit Diagrams and write Truth Tables for the functions.
- Solve and minimize expressions of Boolean Algebra.
- Draw Combinational Circuits and Sequential Circuits.

COURSE NAME: Paper – 2 Introduction to Programming C++
CLASS – B.Sc.(IT) SEMESTER – II
Objectives of the Course:

- To take review or tour of Programming in C and make aware of limitation of C, thereby need of the origin of C++.
- To impart knowledge in such a way that students should be able to use of concept of Object Oriented Programming Approach in their programming skills.
- To imbibe with the knowledge of implementation of various features of C++ i.e. concept of Object, Object communication, Encapsulation, Data hiding, overloading, inheritance, polymorphism etc.
- To raise programming level of students in C++ to be able to apply in the real life.

Program Learning Outcomes:

(Knowledge and Understanding, Intellectual Skills, practical Skills, Transferable skills).

Learning Outcomes:

A. Knowledge and Understanding:

Students will be
- Able to know how to do programming in C++ environment.
- Able to understand and implement the concepts of object oriented approach using C++.
- Able to acquire in depth knowledge and develop software in C++

B. Intellectual(Cognitive/ Analytical) Skills:

Students will be able to

- identify different class attributes, member functions, base class and derived class and their relationships among them
- learn how to reuse the code using polymorphism

C. Practical Skills

Students will be able to learn:

- to solve a real life existing problems using the features of C++
- to develop software/ big and complex programs for a complex problems
- implement advance features of object oriented approach in other various language(s).

D. Transferable Skills :

Students will be able to

- use C++ more effectively,
- learn to think more analogously, creatively as well as comparatively
- Develop better software development skills in other language too.

COURSE NAME: Paper – 3 Numerical Methods & Statistical Techniques
CLASS – B.Sc.(IT) SEMESTER – II

Objectives of the Course:

The objectives of the course are to develop numerical methods aided by technology to solve algebraic, transcendental, and differential equations, and to calculate derivatives and integrals. The course will also develop an understanding of the elements of error analysis for numerical methods and certain proofs.

Program Learning Outcomes:

- Develop appropriate numerical methods to approximate a function
- Perform an error analysis for various numerical methods
- Develop appropriate numerical methods to solve a differential equation
- Derive appropriate numerical methods to solve a linear system of equations
- Derive appropriate numerical methods to evaluate a derivative at a value
- Prove results for various numerical root finding methods
- Derive appropriate numerical methods to calculate a definite integral
- Code various numerical methods in a modern computer language

COURSE NAME: Paper – I Introduction to Python
CLASS – B.Sc.(IT) SEMESTER – III
Objective of the course:

It aims at acquainting students better with the process of Computational Problem Solving, Python Programming Language fundamentals. Students will enrich their programming skills using Data types,List Structures, Control Structures,Functions, Objects and their Use, Modular Design and Text files handling using Python Language. Python is a very powerful language and is used in various domains so there is better career prospectus for the students after grasping thorough knowledge about Python programming. Career prospectus after completion of course of study are as Programmer, Web developer, Data Scientist, Information Officer, Application

analyst, IT consultant, IT technical support officerand allied jobs. Further Knowledge of usage of Python libraries and other allied technical skills are essential for achieving heights in this field.

The key goal is to prepare students for a professional career in the field of Programing,Web development, Data Science etc.

- To get acquaint students with good knowledge ofProgrammingskills.
- To get acquaint students with various case studies using Python.

Course Outcomes:

- Knowledge & Understanding : Python programming.
- Intellectual Cognitive/ analytical skills: Application development.
- Practical Skills :Programming for application development and data science.
- Transferable skills: Ability to define a practical problem, Data structure and Modular approach.

COURSE NAME: Paper – II Data Structure
CLASS – B.Sc.(IT) SEMESTER – III
Objective of the course:

- To impart the basic concepts of data structures and algorithms
- To teach efficient storage mechanisms of data for an easy access.
- To design and implementation of various basic and advanced data structures.
- To introduce various techniques for representation of the data in the real world.
- To improve the logical ability

Learning Outcomes:

A. Knowledge and Understanding:

- Define basic static and dynamic data structures and relevant standard algorithms for them: stack, queue, dynamically linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms.
- Demonstrate advantages and disadvantages of specific algorithms and data structures,
- Select basic data structures and algorithms for autonomous realization of simple programs or program parts
- Determine and demonstrate bugs in program, recognize needed basic operations with data structures
- Formulate new solutions for programming problems or improve existing code using learned algorithms and data structures,
- Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

COURSE NAME: Paper – III System Analysis & Design

CLASS – B.Sc.(IT) **SEMESTER – III**
Objective of the course:

- Learn how to identify an organization's information processing requirements.
- Learn how to develop a detailed specification for an information system that can fulfill these requirements.
- Understand that the successful systems analyst needs to have a broad understanding of organizations, organizational culture, organizational change, organizational operations, and business processes.
- Understand that IT strategy must be conceived in an interaction with overall organizational strategy.

Learning Outcomes
After successfully completing this course, students will have gained comprehensive theoretical knowledge as well as practical skills related to the system development process of information systems. Students who successfully complete the course should be able to

- gather data to analyse and specify the requirements of a system.
- design system components and environments.
- build general and detailed models that assist programmers in implementing a system.
- design a database for storing data and a user interface for data input and output, as well as controls to protect the system and its data.

COURSE NAME: Paper – I Database Management System
CLASS – B.Sc.(IT) **SEMESTER – IV**
Objective of the course:

It aims at acquainting students better with the basics of DBMS, different Architectural Models for DBMS, Normalization of data, Concurrency control problems and its management, Protection, Security and recovery aspects of databases along with practical knowledges of databases using SQL and PL/SQL. Career prospectus after completion of course of study are as Data manager, Data administrator, Database analyst, Database designer and allied jobs. Further Knowledge of database management systems software and strong programming skills are essential for achieving heights in this field.

- The key goal is to prepare students for a professional career in the field of data administration and database design.
- To get acquaint students with good knowledge of DBMS. During the course, students will learn about database design and database handling activities.
- To get acquaint students with basics of database security and administration.

Course Outcomes:

- Knowledge & Understanding : Databases and their design & development
- Intellectual Cognitive/ analytical skills: Normalization of Databases.
- Practical Skills :Using SQL and PL/SQL.
- Transferable skills: Usage of DBMS design and administration.

COURSE NAME: Paper – II Internet Applications
CLASS – B.Sc.(IT) SEMESTER – IV
Objectives:

- The primary goal is to prepare students for full knowelege of internet its application and working of Internet
- To get good knowledge of internet protocol,working of all protocols
- Also you can learn how to design web pages in HTML practically.

Program Learning Outcomes:

(Knowledge and Understanding, Intellectual Skills, practical Skills, Transferable skills).

A. Knowledge and Understanding):

Students will

- know how to define internet, www, various protocols
- understand the working of internet
- are able to create email id and use it for sending online mails and attachments
- Students will understand and be able to describe the differences between internet and intranet.

B. Intellectual(Cognitive/ Analytical) Skills:

Students will be able to

- identify which medium and topology should be used for networking
- They will be able to judge which connection should they use for getting an internet at home or work.
- Browsing at high sped using keywords

C. Practical Skills

Students will learn to:

- Able to create HTML based web pages
- Dynamicity to web page using javascript.
- Create email ids
- Surf net using shortcuts.

D. Transferable Skills :

Students will be able to

- Create projects and earn money by selling them

COURSE NAME: Paper – III JAVA & Web Designing

CLASS – B.Sc.(IT) SEMESTER – IV

Objectives of the Course:

Students will get familiar with

- Object-oriented programming: data abstraction, encapsulation, classes, objects, templates, operator overloading, function overloading, inheritance, polymorphism, exception handling, and streams.
- The principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
- To understand importance of Multi-threading & different exception handling mechanisms.

Program Learning Outcomes:

(Knowledge and Understanding, Intellectual Skills, practical Skills, Transferable skills).

B. Knowledge and Understanding):

Students will

- Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
- Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem

B. Intellectual(Cognitive/ Analytical) Skills:

Students will be able to

- Evaluate how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
- understand and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.

C. Practical Skills

Students will be able to

- Design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.

- Understand the importance of Classes & objects and will be able to implement it along with constructors, Arrays and Vectors.
- Develop computer-based systems.
- Deploy the tools for software projects documentation.

D. <u>Transferable Skills</u> :

Students will be able to

- Practice Designing skills in software projects.
- Practice Engineering skills for software development

COURSE NAME: Paper – IV Web Technologies
CLASS – B.Sc.(IT) SEMESTER – IV
<u>Objectives of the Course:</u>

- Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.
- Become familiar with graphic design principles that relate to web design and learn how to implement these theories into practice.
- Develop skills in analyzing the usability of a web site.
- Understand how to plan and conduct user research related to web usability.
- Learn the language of the web: HTML and CSS.
- Learn techniques of responsive web design, including media queries.
- Be able to embed social media content into web pages

<u>Program Learning Outcomes:</u>
<u>(Knowledge and Understanding, Intellectual Skills, practical Skills, Transferable skills).</u>

<u>Learning Outcomes:</u>

Upon completion, graduates with a IT degree in Web Design & Development will be able to:

- Employ fundamental computer theory to basic programming techniques.
- Use fundamental skills to maintain web server services required to host a website.
- Select and apply markup languages for processing, identifying, and presenting of information in web pages.
- Use scripting languages and web services to transfer data and add interactive components to web pages.
- Create and manipulate web media objects using editing software.
- Incorporate aesthetics and formal concepts of layout and organization to design websites that effectively communicate using visual elements.
- Conceptualize and plan an internet-based business that applies appropriate business models and web technologies.
- Combine multiple web technologies to create advanced web components.
- Design websites using appropriate security principles, focusing specifically on the vulnerabilities inherent in common web implementations.

- Incorporate best practices in navigation, usability and written content to design websites that give users easy access to the information they seek.

COURSE NAME: Paper – I Computer Networks
CLASS – B.Sc.(IT) SEMESTER – V

Objectives of the Course:

This course aims to an understanding of communication of data, transmission of data signals, network security and privacy, various multiplexing and switching elements. This course also aims to an understanding of various models used in networking and how to secure data using cryptography.

Program Learning Outcomes:

Knowledge and Understanding:

- Students will know what is network, its types.
- Students will learn about the different topologies used in network.
- Students will understand different protocols used in internet.
- Students will understand and be able to describe the differences between intranet, extranet and internet.
- Students will understand about various multiplexing and switching techniques used in networks.
- Students will learn about various services provided by network.

COURSE NAME: Paper – II Operating System
CLASS – B.Sc.(IT) SEMESTER – V

Objectives of the Course:

- To introduce students with basic concepts of Operating System, its functions and services.
- To familiarize the students with various views and management policies adopted by O.S. as pertaining with processes , Deadlock , memory , File and I/O operations.
- To brief the students about functionality of various OS like Unix , Linux and Windows XP as pertaining to resource management..

Learning Outcomes:

After studying this course, students should be able to:

- Appreciate the role of operating system as System software.
- Compare the various algorithms and comment about performance of various algorithms used for management of memory, CPU scheduling, File handling and I/O operations.

- Apply various concept related with Deadlock to solve problems related with Resources allocation, after checking system in Safe state or not.

- To appreciate role of Process synchronization towards increasing throughput of system.
- Able to describe process management and concepts of threading, multitasking.
- Able to differentiation of various scheduling algorithms and identify the reasons of Deadlock and their remedial measures in an operating system.

COURSE NAME: Paper – III E-Business
CLASS – B.Sc.(IT) SEMESTER – V

Objectives of the Course:

- The primary goal is to prepare students for practical use of internet for online transactions like use of e-banking
- To get good knowledge of various modes of online payment using various apps.
- Also you can learn various security mechanisms

Learning Outcomes:

- Demonstrate an understanding of the foundations and importance of E-commerce
- Demonstrate an understanding of retailing in E-commerce by: analyzing branding and pricing strategies, using and determining the effectiveness of market research assessing the effects of disintermediation.
- Analyze the impact of E-commerce on business models and strategy
- Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.
- Describe the infrastructure for E-commerce
- Describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.
- Discuss legal issues and privacy in E-Commerce
- Assess electronic payment systems
- Recognize and discuss global E-commerce issues

COURSE NAME: Paper –I: Network Operating System/Client Server Application
CLASS – B.Sc.(IT) SEMESTER – VI

Objectives of the Course:

- Understand different types of networks, various topologies and application of networks.
- Understand types of addresses, data communication.
- Understand the concept of networking models, protocols, functionality of each layer.
- Learn basic networking hardware and tools

(Knowledge and Understanding, Intellectual Skills, practical Skills, Transferable skills).

Learning Outcomes:

A. Practical Skills

Students will learn to:

- Designing of homogenous and heterogenous lab.
- Creating Windows 95/NT/Novell Netware Server.
- How to share information One PC or clients to other clients or PC
- Creating of Proxy Server.
- Creating of Database Server