**DEPARTMENT OF COMPUTER TECHNOLOGY(IT & CT- UG)**

**Programme: B.Sc., Information Technology**

| PO No. | Programme Outcomes<br><br>Upon completion of the B.Sc. Degree Programme, the graduate will be able to |
|---|---|
| **PO-1** | emerge with competency in the subject of Computer Technology and apply knowledge to cater to the needs of Society / Employer / Institution / Own Business Enterprise |
| **PO-2** | imbibe analytical/critical/logical/innovative thinking skills in the field of software development, problem solving and hardware designing |
| **PO-3** | acquire distinct traits and ethics with high professionalism to gain a broader insight into the domain concerned for nation building |
| **PO-4** | gain and improve knowledge on programming to build software applications and to solve real time problems. |
| **PO-5** | obtain familiarity on computer hardware concepts, networks and its utility. |

| PSO No. | Programme Specific Outcomes<br><br>Upon completion of these courses the student would |
|---|---|
| **PSO-1** | transform and empower women graduates to meet global challenges through holistic education in terms of recent Teaching-Learning methodologies |
| **PSO-2** | groom the graduates towards excellence through building communication skills, handling leadership challenges and negotiating career path ways |
| **PSO-3** | heighten the conscious of the graduates on socio-economic concern and to inculcate moral and ethical values to chisel them as better human being |
| **PSO-4** | train the student on the state-of-the-art tools and techniques and facilitate them to comprehend, analyze, design and create feasible solutions/innovative products for real life problems |
| **PSO-5** | pursue higher studies with good knowledge in core areas of Information Technology, by aware of modern tools, techniques and good interpersonal skills |

| Course Title | C PROGRAMMING WITH DATA STRUCTURES | |
|---|---|---|
| **CODE** | **18ITUC101/ 18CTUC101** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | State the concept of Problem solving Techniques and the usage of control structures | $K_1$ |
| **CO-2** | Demonstrate the organizational view of arrays, structure and union | $K_3$ |
| **CO-3** | Apply the concept of pointers, various string formats and usage of functions | $K_3$ |
| **CO-4** | Establish the basics of data structure and implement the techniques of stack, list and queue | $K_3$ |
| **CO-5** | Compute sorting and searching techniques using C programming | $K_3$ |

| Course Title | C PROGRAMMING AND DATA STRUCTURES LAB | |
|---|---|---|
| **CODE** | **18ITUCP01/ 18CTUCP01** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Demonstrate the concept of prime numbers, palindrome and binomial coefficients | K3 |
| **CO-2** | Implement the concept of arrays | K3 |
| **CO-3** | Apply the string functions | K3 |
| **CO-4** | Implement the data structure concepts | K3 |
| **CO-5** | Implement the searching and sorting techniques | K3 |

| Course Title | ALLIED PAPER I: MATHEMATICS – I<br>( NUMERICAL METHODS AND BIO STATISTICS)(Derivations not included – Problems only) | |
|---|---|---|
| CODE | 18CSUA101/18CAUA101/ 18ITUA101/18CTUA101 | |
| CO No. | Course Outcomes | Knowledge Level |
| CO-1 | Identify and Apply the matrix operations for solving any matrix related problems | K1 - K3 |
| CO-2 | Determine and apply appropriate numerical methods for solving System of Linear Equations | K2 - K4 |
| CO-3 | Compare and distinguish the use of differentiation / integration methods and plan for solving scientific problems | K3 - K4 |
| CO-4 | Analyze and infer the type of data for using measures of location and measures of dispersion | K2 - K4 |
| CO-5 | Recognize and apply the correlation/regression methods for finding the association between the dependent and independent variables | K2 - K3 |

| Course Title | COMPUTER ORGANIZATION AND ARCHITECTURE | |
|---|---|---|
| CODE | 18ITUC202 | |
| CO No. | Course Outcomes | Knowledge Level |
| CO-1 | Understand input/output mechanisms and its interfaces | K1 |
| CO-2 | Compare various types of memory organization and its hierarchy | K2 |
| CO-3 | Demonstrate different processor architectures and instruction execution by CPU | K2 |
| CO-4 | Perform computer arithmetic operations using different number systems | K3 |
| CO-5 | Apply the knowledge of boolean algebra to simplify the boolean expressions using the standard forms or Karnaugh map method | K3 |

| Course Title | OBJECT ORIENTED PROGRAMMING WITH C++ | |
|---|---|---|
| **CODE** | **18ITUC203** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Understand the features of object oriented programming | $K_1$ |
| **CO-2** | Identify and create classes and objects for the real time problems | $K_2$ |
| **CO-3** | Demonstrate the code reusability, operator overloading and pointers | $K_3$ |
| **CO-4** | Apply the concepts of function overloading and overriding | $K_3$ |
| **CO-5** | Examine the file system and handle the exception in object-oriented programs | $K_3$ |

| Course Title | C++ PROGRAMMING LAB | |
|---|---|---|
| **CODE** | **18ITUCP02** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Apply the concept of member function and constructor | $K_3$ |
| **CO-2** | Illustrate the concept of operator overloading in matrices and string manipulation | $K_3$ |
| **CO-3** | Demonstrate the concept of inheritance and virtual function | $K_3$ |
| **CO-4** | Illustrate the concept of friend function and formatting commands | $K_3$ |
| **CO-5** | Apply programming skills in file operation using command line arguments | $K_3$ |

| Course Title | MATHEMATICS – II ( DISCRETE STRUCTURES) | |
|---|---|---|
| **CODE** | **18CSUA202/18ITUA202** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Understand the logical proof, connectives and laws | K2 |
| **CO-2** | Understand the concepts of equivalence and implication to formulas of the predicate calculus | K2 |
| **CO-3** | Demonstrate Relations and Functions and determine the properties of Relations | K2 |
| **CO-4** | Construct language from a grammar | K3 |
| **CO-5** | Identify shortest path between two nodes. Classify different types of sets and express the logical relationships between various sets | K3 |

| Course Title | JAVA AND NETWORK PROGRAMMING | |
|---|---|---|
| **CODE** | **18ITUC304** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Recall the fundamentals of object-oriented programming, includes defining classes, objects and invoking methods. | K1 |
| **CO-2** | Understand the principles of packages and interfaces, exception handling and multithreading mechanism. | K1 |
| **CO-3** | Describe the use of TCP/IP sockets, URL connections in network programming. | K2 |
| **CO-4** | Discuss the concept of applets and event handling mechanism. | K2 |
| **CO-5** | Apply AWT controls, layout managers and menus to develop GUI based applications. | K3 |

| Course Title | PRINCIPLES OF DATA COMMUNICATION AND NETWORK | |
|---|---|---|
| **CODE** | **18ITUC305** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Understand data communication and the OSI model. | K1 |
| **CO-2** | Compare various types of transmission media and multiplexing | K2 |
| **CO-3** | Demonstrate different error detection and correction, switching concepts. | K2 |
| **CO-4** | Clarify networking and internetworking devices and network security | K3 |
| **CO-5** | Apply the knowledge of TCP/IP protocol and application layer. | K3 |

| Course Title | SOFTWARE ENGINEERING | |
|---|---|---|
| **CODE** | **18CSUC511/18CAUC511/ 19ITUC306 /18CTUC511** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Comprehend various software process models | K1 |
| **CO-2** | Elicit requirements for a software project and develop a Requirement model | K3 |
| **CO-3** | Apply software engineering principles, techniques, tools and practices | K4 |
| **CO-4** | Identify and address design and implementation issues todevelop a quality software product | K3 |
| **CO-5** | Study and Compare various software testing approaches | K3 |

| Course Title | JAVA AND NETWORK PROGRAMMING LAB | |
|---|---|---|
| **CODE** | **18ITUCP03** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Demonstrate a program for Packages in java. | K2 |
| **CO-2** | Construct a program for Multithreading and Exception handling | K3 |
| **CO-3** | Develop a program to establish the network communication. | K3 |
| **CO-4** | Apply the concept of Java Applet programming. | K3 |
| **CO-5** | Utilize AWT controls to develop GUI based programs. | K3 |

| Course Title | MICROPROCESSORS AND ITS ARCHITECTURE | |
|---|---|---|
| **CODE** | **18ITUA303/18CTUA303** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Know different processor concepts and Intel 8086 architecture | K1 |
| **CO-2** | Demonstrate the 8086 instruction sets process and assembly language programs | K2 |
| **CO-3** | Infer the Intel 386 and Intel 486 microprocessor | K2 |
| **CO-4** | Describe IO devices, interfacing chips and 32 and 64 bit processors | K1 |
| **CO-5** | Know the techniques of connecting convertors with microprocessor | K1 |

| Course Title | OPERATING SYSTEM | |
|---|---|---|
| **CODE** | **18ITUC407** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Understand basic OS concepts | K1 |
| **CO-2** | Describe the process of disk performance | K1 |
| **CO-3** | Analyze the concepts of real and virtual storage | K2 |
| **CO-4** | Compare the common algorithm used for both preemptive and non-preemptive scheduling | K3 |
| **CO-5** | Classify the process management and file system | K3 |

| Course Title | PC HARDWARE AND TROUBLESHOOTING | |
|---|---|---|
| **CODE** | **18ITUC408** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Understand the basic concepts of PC hardware &motherboard components. | K1 |
| **CO-2** | Identify various types of chips in the motherboard. | K2 |
| **CO-3** | Describe the various motherboard logic and principles of display adapters. | K2 |
| **CO-4** | Implement the various Installation and assembling techniques in PC. | K3 |
| **CO-5** | Perform the diagnosing, troubleshooting, and repairing operations for computer hardware components. | K3 |

| Course Title | CLIENT/SERVER COMPUTING | |
|---|---|---|
| **CODE** | **18CAUC306/18ITUC409** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Explain client-server computing and types of servers | K2 |
| **CO-2** | Examine the client/server capabilities of current crop of operating system. | K3 |
| **CO-3** | Explore the database server model of client/server. | K2 |
| **CO-4** | Understand the TP monitor and distributed object model of client/server. | K2 |
| **CO-5** | Demonstrate the web based client/server programming | K3 |

| Course Title | PC HARDWARE AND TROUBLESHOOTING LAB | |
|---|---|---|
| **CODE** | **18ITUCP04** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Create hard disk partition | K3 |
| **CO-2** | Implement the new modem, Microsoft office XP and virus scanner software in the given PC | K3 |
| **CO-3** | Apply the trouble shooting in system hangs and keyboard concepts. | K3 |
| **CO-4** | Implement the sound card and web camera software in the given PC | K3 |
| **CO-5** | Illustrate the SMPS types and find the output voltage. | K3 |

| Course Title | SOFTWARE PROJECT MANAGEMENT | |
|---|---|---|
| CODE | 18ITUA404 | |
| CO No. | Course Outcomes | Knowledge Level |
| CO-1 | Identify the step wise planning of activities and understanding the range of effort estimation methods | K1 |
| CO-2 | Prepare an activity plan for a project | K3 |
| CO-3 | Identify and manage the risks, resources and apply techniques for estimating the effort of risk. | K3 |
| CO-4 | Understand the activities, metrics and tools in software configuration management | K3 |
| CO-5 | Apply the project management techniques in real time applications. | K3 |

| Course Title | PYTHON PROGRAMMING | |
|---|---|---|
| CODE | 18CSUC512/18CAUC512/18ITUC510/18CTUC512 | |
| CO No. | Course Outcomes | Knowledge Level |
| CO-1 | Apply decision making and repetition structures in program design. | K2 |
| CO-2 | Develop functions to improve readability of programs | K1 |
| CO-3 | Design the programs using Python data types such as tuples, strings, lists and dictionaries | K4 |
| CO-4 | Adopt file and exception handling mechanisms | K3 |
| CO-5 | Ability to build python program to solve real world problems | K3 |

| Course Title | RELATIONAL DATABASE MANAGEMENT SYSTEMS | |
|---|---|---|
| **CODE** | **18CSUC407/ 18CAUC407/ 18ITUC511/ 18CTUC304** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Understand the basic concepts of Relational Data Model, Entity-Relationship Model and process of Normalization | K1 – K2 |
| **CO-2** | Understand and construct database using Structured Query Language (SQL) in Oracle9ienvironment | K1 – K3 |
| **CO-3** | Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML) | K2 - K4 |
| **CO-4** | Understand and use built-in functions and enhance the knowledge of handling multiple tables | K1 – K3 |
| **CO-5** | Learn basics of PL/SQL and develop programs using Cursors, Exceptions, Procedures and Functions | K1 – K4 |

| Course Title | SOFTWARE TESTING | |
|---|---|---|
| **CODE** | **18ITUC512** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Understand the phases of software project, quality control, verification and validation | K1 |
| **CO-2** | Discuss white-box testing, black-box testing and challenges in white-box testing | K1 |
| **CO-3** | Describe the concepts of integration testing, scenario testing, system testing, functional and non-functional testing | K2 |
| **CO-4** | Identify the methodology, tools, process, challenges and factors governing performance testing | K2 |
| **CO-5** | Compare and study the software testing approaches | K3 |

| Course Title | PYTHON PROGRAMMING LAB | |
|---|---|---|
| **CODE** | **18CSUCP05/18CAUCP05/18ITUCP05/ 18CTUCP05** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Demonstrate branching and looping concepts | K2 |
| **CO-2** | Develop code using Lists and Tuples | K4 |
| **CO-3** | Construct programs using Strings and Functions | K3 |
| **CO-4** | Build Code for Problems using Dictionary and Sets | K3 |
| **CO-5** | Make use of Class in Python Programs | K3 |

| Course Title | ENTERPRISE RESOURCE PLANNING | |
|---|---|---|
| **CODE** | **18ITUE511** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Identify the basic concepts of ERP. Understand the implementation and advantages. | K1 |
| **CO-2** | Understand the manufacturing perspective | K2 |
| **CO-3** | Identify and understand the Quality Management and Materials Management. | K3 |
| **CO-4** | Discuss the benefits and flexibility | K2 |
| **CO-5** | Describe the project planning phase and implementation | K3 |

| Course Title | NETWORK SECURITY AND ADMINISTRATION | |
|---|---|---|
| CODE | 18ITUE521 | |
| CO No. | Course Outcomes | Knowledge Level |
| CO-1 | State the concept of security and types of attack | K1 |
| CO-2 | Establish the basics of cryptographic concepts and techniques | K1 |
| CO-3 | Gain the knowledge of various symmetric key algorithms | K2 |
| CO-4 | Learn the various concepts of asymmetric key algorithms | K2 |
| CO-5 | Understand the concept of digital certificate | K2 |

| Course Title | PREDICTIVE ANALYTICS | |
|---|---|---|
| CODE | 18CSUE531/18CAUE521/ 18ITUE531/ 18CTUE521 | |
| CO No. | Course Outcomes | Knowledge Level |
| CO-1 | Know about the fundamentals concepts of big data | K1 |
| CO-2 | Gain knowledge about data mining and predictive analytics. | K1 |
| CO-3 | Analyze various types of Predictive Models and develop a Predictive Model | K3 |
| CO-4 | Analyze various types of social networks and mapping of social networks | K3 |

| Course Title | OPEN SOURCE TECHNOLOGIES | |
|---|---|---|
| CODE | 18CSUC613/18CAUC613/ 18ITUC613/ 18CTUC613 | |
| CO No. | Course Outcomes | Knowledge Level |
| CO-1 | Acquire knowledge on open source, principles and its methodology. | K2 |
| CO-2 | Develop the knowledge of different software licenses and their usage. | K2 |
| CO-3 | Practice the concepts of control structures and functions in PHP applications | K2-K3 |
| CO-4 | Use string handling and array operations in PHP applications | K2-K3 |
| CO-5 | Apply the connectivity between PHP and MySQL database and develop web pages using PHP, HTML and MySQL | K4 |

| Course Title | COMPUTER GRAPHICS AND MULTIMEDIA | |
|---|---|---|
| CODE | 18ITUC614 | |
| CO No. | Course Outcomes | Knowledge Level |
| CO-1 | Identify the basic concepts of computer graphics and input devices used in it | K2 |
| CO-2 | Understand the two-dimensional graphics and their transformations. | K2 |
| CO-3 | Acquire two Dimensional Viewing and clipping operations. | K2 |
| CO-4 | Describe the creation and implementation of multimedia | K2 |
| CO-5 | Understand the various multimedia tools. | K3 |

| Course Title | COMPUTER GRAPHICS AND MULTIMEDIA LAB | |
|---|---|---|
| **CODE** | **18ITUCP06** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Demonstrate the concept of Bresenhams method and basic transformations | K3 |
| **CO-2** | Implement the midpoint circle algorithm, reflect and shear | K3 |
| **CO-3** | Apply the clipping concepts | K3 |
| **CO-4** | Implement the various shading effects and gradient tool effects using Photoshop | K3 |
| **CO-5** | Illustrate the webpage using images and audio control | K3 |

| Course Title | INTERNET OF THINGS AND ITS APPLICATIONS | |
|---|---|---|
| **CODE** | 18CAUE632/18ITUE612/18CTUE622 | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | To understand the physical, logical design of IoT and to identify various IoT levels | K1 |
| **CO-2** | To describe conceptual framework, architectural views ,technology behind IoT and design principles for connected devices | K2 |
| **CO-3** | To understand the Physical Servers and different types of applications in various domains | K1 |
| **CO-4** | To demonstrate the design methodology and building blocks of IoT devices | K2 |
| **CO-5** | To understand IoT privacy, security, vulnerabilities solutions and business models with applications | K1 |

| Course Title | SOFT COMPUTING | |
|---|---|---|
| **CODE** | **18ITUE622** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Illustrate the basic concepts of AI Systems and Neural Networks | K2 |
| **CO-2** | Describe Back propagation Networks with different parameters and applications | K3 |
| **CO-3** | Understand basic knowledge of fuzzy sets and fuzzy logic. | K2 |
| **CO-4** | Apply basic fuzzy inference and appropriate reasoning. | K3 |
| **CO-5** | Understand the behavior of evolutionary computing algorithms. | K2 |

| Course Title | MOBILE COMPUTING | |
|---|---|---|
| **CODE** | **18ITUE632 / 18CTUE612** | |
| **CO No.** | **Course Outcomes** | **Knowledge Level** |
| **CO-1** | Discuss the basic concepts of networking and mobile computing architecture | K1 |
| **CO-2** | Demonstrate the mobile computing technology through telephone | K2 |
| **CO-3** | Understand the emerging technologies Bluetooth, RFID, mobile IP and GSM card | K2 |
| **CO-4** | Demonstrate the concept of GPRS and WAP | K2 |
| **CO-5** | Illustrate the concept of CDMA and 3G technology | K2 |