

SEMESTER I

CODE	COURSE TITLE
18ITUC101/ 18CTUC101	C PROGRAMMING WITH DATA STRUCTURES

Category	CIA	ESE	L	T	P	Credit
Core	25	75	71	4	-	4

Preamble

This course covers the basics of C programming language and concepts of the Data structure. It demonstrates fundamental programming techniques and the usage of most common library function. The data structure provides efficient storage mechanism of data and it imports the knowledge about stack, queue list, tree, sorting and searching in C language.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	State the concept of Problem solving Techniques and the usage of control structures	K ₁
CO2	Demonstrate the organizational view of arrays, structure and union	K ₃
CO3	Apply the concept of pointers, various string formats and usage of functions	K ₃
CO4	Establish the basics of data structure and implement the techniques of stack, list and queue	K ₃
CO5	Compute sorting and searching techniques using C programming	K ₃

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	M	M
CO2	M	S	M	M	M
CO3	M	S	M	S	M
CO4	M	S	M	S	L
CO5	M	S	M	M	L

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Programming Development Methodologies – Programming Style – **Problem solving Techniques:** Algorithm, Flowchart, Pseudo code - Structure of a C program – C Character Set – Delimiters – Keywords – Identifiers – Constants – Variables – Rules for Defining Variables – Data Types – Declaring and Initializing Variables – Type Conversion. Operators and Expressions – Formatted and Unformatted I/O Functions – Decision Statements – Loop Control Statements.

UNIT-II

15 Hrs.

Arrays – String and its Standard Functions – Functions.

UNIT- III

15 Hrs.

Structure and Union: Features of Structure - Declaration and Initialization of Structure - Structure within Structure - Array of Structure - Pointer to Structure -Union- Pointers.

UNIT-IV

15 Hrs.

Linear Data Structures: Introduction to Data Structures – **List:** Implementations –Traversal - Searching and Retrieving an Element - Predecessor and Successor – Insertion – Deletion - Sorting - Merging Lists – **Stack:** Representation - Terms - Operations on Stack - Implementation. Single Linked List - Linked List with and without Header - Insertion – Deletion. **Queues:** Representation.

UNIT-V

15 Hrs.

Searching and Sorting – **Searching:** Linear - Binary. **Sorting:** Insertion - Selection - Bubble - Quick - Tree - Heap.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ashok N Kamthane	Programming and Data Structures	Pearson Education	2012, 1 st Edition.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Aaron M Tanenbaum , Yedidye Langsam , Moshe J Ahugenstein	Data structure using C	PHI	2005,1 st Edition
2.	Balagurusamy E	Programming in ANSI C	Tata Mcgraw- Hill	2012,6 th Edition
3.	Ellis Horowitz, Sartaj Sahni	Fundamentals of Data Structure in C	Galgotia Book Source,	2011,1 st Edition

Web Resources

1. https://www.tutorialspoint.com/cprogramming/c_data_types.htm
2. <https://www.w3schools.in/c-tutorial/program-structure/>
3. https://www.tutorialspoint.com/data_structures_algorithms/data_structures_algorithms_tutorial.pdf
4. <http://index-of.es/Miscellaneous/Data%20Structures%20Using%20C,%202nd%20edition.pdf>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar.

SEMESTER I

CODE	COURSE TITLE
18ITUCP01/ 18CTUCP01	C PROGRAMMING AND DATA STRUCTURES LAB

Category	CIA	ESE	L	T	P	Credit
Practical	40	60	-	-	75	3

Preamble

This course provides the knowledge for students to code program in C language. The students will be able to enhance their analyzing and problem solving skills and use the same for writing programs in C. This enables to understand and implement the concept of data structure.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the concept of prime numbers, palindrome and binomial coefficients	K3
CO2	Implement the concept of arrays	K3
CO3	Apply the string functions	K3
CO4	Implement the data structure concepts	K3
CO5	Implement the searching and sorting techniques	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	L	M	L	M	S
CO2	M	S	M	S	S
CO3	M	S	M	S	M
CO4	M	S	M	M	L
CO5	M	S	M	M	L

S- Strong; M-Medium; L-Low

Syllabus

1. Write a C program to generate 'n' Prime numbers.
2. Write a C program to create and manipulate array.
3. Write a C program to find the number of Palindromes in a given sentence.
4. Write a C program to calculate binomial co-efficient using NCR function
5. Write a C program to implement the operation of STACK.
6. Write a C program to implement QUEUE using the pointers and perform the following:
 - i. Insertion
 - ii. Deletion
 - iii. Modification
 - iv. Listing of elements
7. Write a C program to insert an element at the end of the LINKED LIST.
8. Write a C program to demonstrate Sequential Search.
9. Write a C program to demonstrate Binary search.
10. Write a C program to arrange a set of numbers in ascending order using QUICK-SORT

Web Resources

1. <http://c.happycodings.com/data-structures/>
2. <http://scanftree.com/programs/operation/data-structure/>
3. <http://www.atri.edu.in/images/pdf/departments/cp-lab-manual.pdf>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar.

SEMESTER I

CODE	COURSE TITLE
18CSUA101/18CAUA101/ 18ITUA101/18CTUA101	ALLIED PAPER I: MATHEMATICS – I (NUMERICAL METHODS AND BIO STATISTICS) (Derivations not included – Problems only)

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	85	5	-	5

Preamble

The objective of the course is to impart mathematical skills in matrix operations, numerical methods and statistics. The students will be trained on the applications of these methods on scientific and biological problems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Identify and Apply the matrix operations for solving any matrix related problems	K1 - K3
CO2	Determine and apply appropriate numerical methods for solving System of Linear Equations	K2 - K4
CO3	Compare and distinguish the use of differentiation / integration methods and plan for solving scientific problems	K3 - K4
CO4	Analyze and infer the type of data for using measures of location and measures of dispersion	K2 - K4
CO5	Recognize and apply the correlation/regression methods for finding the association between the dependent and independent variables	K2 - K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	L	M	S
CO2	S	S	L	M	S
CO3	S	S	L	M	S
CO4	S	S	L	M	S
CO5	S	S	L	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Matrices: Introduction – Determinant – Inverse of a Matrix – Rank of a Matrix – Eigen Values of a Matrix.

UNIT II

20 Hrs.

System of Simultaneous Linear Algebraic Equations: Gauss Jordan and Gauss Seidal Methods.
The Solution of Numerical- Algebraic & Transcendental Equations: Newton – Raphson Method and False Position Method.

UNIT III

20 Hrs.

Numerical Differentiation: Newton's Forward Difference Formula – Backward Difference Formula – Lagrange's Formula for unequal intervals. **Numerical Integration:** Trapezoidal Rule & Simpson's Rule (1/3 only).

UNIT IV

15 Hrs.

Introduction to Biostatistics: Definition- Types of statistics- Applications and uses of Biostatistics- Types of variables- Identification of the type of variable. **Measures of Central Tendency:** Measures of location- Mode- Median- Mean. **Measures of Spread:** Range- Interquartile range- Standard deviation. **Case Study:** Data analysis using Measures of Central Tendency.

UNIT V

20 Hrs.

Correlation: Definition- Types of correlation- Calculation of correlation coefficient by definitional and computational formula. **Regression:** Definition- Meaning of regression and Regression coefficient. **Case Study:** Data analysis using Correlation and Regression.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Balagurusamy. E	Numerical Methods	Tata MCGraw Hill	2008 25 th Edition
2.	Manju Pandey	Biostatistics Basic and Advanced	MV Learning	2015

Ebook

1. S. B. Bhise, R. J. Dias, [K. K. Mali, P.H. Ghanwat](#), “Textbook of Computer Applications and Biostatistics”, Jan 2011 Chapter.

Web Resources

1. <https://statistics.laerd.com/statistical-guides/measures-central-tendency-mean-mode-median.php>
2. <https://www.tutorialspoint.com/statistics/index.htm>
3. <http://www.ece.mcmaster.ca/~xwu/part6.pdf>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18ITUC202	COMPUTER ORGANIZATION AND ARCHITECTURE

Category	CIA	ESE	L	T	P	Credits
Core	25	75	56	4	-	4

Preamble

The course focuses on fundamental concepts of computer organization and architecture. To provide students with the understanding of hardware design of computer including logic design, structure and behavior of the various components of the computer and how they interact to provide the processing needs of the user.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1	Understand input/output mechanisms and its interfaces	K1
CO2	Compare various types of memory organization and its hierarchy	K2
CO3	Demonstrate different processor architectures and instruction execution by CPU	K2
CO4	Perform computer arithmetic operations using different number systems	K3
CO5	Apply the knowledge of boolean algebra to simplify the boolean expressions using the standard forms or Karnaugh map method	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	M	M	M	S
CO3	M	M	S	L	S
CO4	M	S	L	M	L
CO5	M	S	M	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

12 Hrs.

Number System and Binary Codes: Decimal - Binary - Octal - Hexadecimal – Binary addition - Multiplication - Division – Floating Point Representation - Complements - BCD - Excess3 - Gray Code. **Arithmetic Circuits:** Half Adder - Full Adder - Parallel Binary Adder - BCD Adder - Half Subtractor - Full Subtractor - Parallel Binary Subtractor – **Digital Logic:** the Basic Gates – NOR - NAND - XOR Gates.

UNIT II

12 Hrs.

Combinational Logic Circuits: Boolean Algebra – Karnaugh Map – Canonical Form 1 – Construction and Properties – Implicants – Don't Care Combinations – Product of Sum - Sum of Products - Simplifications. **Sequential Circuits:** Flip-Flops: RS – JK – Multiplexers – Demultiplexers – Decoder – Encoder.

UNIT III

12 Hrs.

Central Processing Unit: General Register Organization – Control Word – Examples of Micro Operations – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation Program Control.

UNIT IV

12 Hrs Input–

Output Organization: Input – Output Interface – I/O Bus and Interface – I/O Bus Versus Memory Bus – Isolated Versus Memory – Mapped I/O – Example of I/O Interface. **Asynchronous Data Transfer:** Strobe Control and Handshaking – Priority Interrupt: Daisy-Chaining Priority - Parallel Priority Interrupt.

Direct Memory Access: DMA Controller - DMA Transfer. Input – Output Processor: CPU-IOP Communication.

UNIT V

12 Hrs.

Memory Organization: Memory Hierarchy – Main Memory – Associative Memory: Hardware Organization - Match Logic - Read Operation - Write Operation. Cache Memory: Associative - Direct - Set-Associative Mapping – Writing Into Cache Initialization.

TEXT BOOKS

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Morris Mano	Computer System Architecture	Pearson Education	2009,3 rd Edition
2	Puri V K	Digital Electronics Circuits and Systems	TATA Mcgraw HILL Publications	2013,1 st Edition

REFERENCE BOOKS

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Albert Paul Malvino, Donald P Leach,Goutam S Aha	Digital Principles and applications	TATA Mcgraw HILL Publications	2009,6 th Edition
2	Nicholas Carter	Computer Architecture	TATA Mcgraw HILL Publications	2007,1 st Edition

Web Resources

1. https://www.tutorialspoint.com/digital_circuits/index.htm
2. <https://www.studytonight.com/computer-architecture/>
3. <https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/>
4. <https://www.careerride.com/page/cpu-organization-569.aspx>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18ITUC203	OBJECT ORIENTED PROGRAMMING WITH C++

Category	CIA	ESE	L	T	P	Credit
Core	25	75	56	4	-	4

Preamble

This course provides in-depth coverage of object-oriented programming principles and techniques to enhance the programming skills of the students. The students are provided with the knowledge of pointers, exception handling and file operation.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the features of object oriented programming	K ₁
CO2	Identify and create classes and objects for the real time problems	K ₂
CO3	Demonstrate the code reusability, operator overloading and pointers	K ₃
CO4	Apply the concepts of function overloading and overriding	K ₃
CO5	Examine the file system and handle the exception in object-oriented programs	K ₃

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	L	S	M	M	M
CO2	M	M	S	S	M
CO3	M	S	M	S	M
CO4	M	S	M	S	M
CO5	M	L	M	M	L

S- Strong; M-Medium; L-Low

UNIT I

12 Hrs.

Introduction to C++: Key Concepts of OOP – Advantages – Object Oriented Languages – **Input and Output in C++:** Streams in C++ – Pre-Defined Streams – Unformatted Console I/O Operations – Formatted Console I/O Operations – C++ Declarations – Control Structures – Loops – **Functions** in C++: In Line Functions – Function Overloading.

UNIT II

12 Hrs.

Class and Objects: Declaring Objects – Defining Member Functions – Static Member Variables and Functions – Array of Objects – Friend Functions – Overloading Member Functions – Bit Fields and Class. **Constructor and Destructors:** Characteristics – Calling Constructor and Destructors – Constructor and Destructor with Static Member.

UNIT III

12 Hrs.

Operator Overloading: Overloading Unary - Binary Operators – Overloading Friend Functions – Type Conversion – **Inheritance:** Types of Inheritance – Single - Multilevel - Multiple - Hierarchical - Hybrid and Multi Path Inheritance – Virtual Base Classes – Abstract Classes.

UNIT IV

12 Hrs.

Pointers: Declaration – Pointer to Class - Object – THIS Pointer – Pointer to Derived Classes and Base Classes. **Arrays:** Characteristics – Arrays of Classes . **Memory Models :** New and Delete Operators – Dynamic Objects – Binding - Polymorphisms and Virtual Functions.

UNIT V

12 Hrs.

Files: File Stream Classes – File Modes – Sequential Read/ Write Operations – Binary and ASCII Files – Random Access Operation- Command Line Arguments –**Exception Handling:** Principles of Exception Handling- The Keywords try, throw and catch-Exception Handling Mechanism-Multiple Catch Statements-Catching Multiple Exceptions- Rethrowing Exception – **Strings:** Declaring and Initializing String Objects – String Attributes.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ashok N Kamthane	Object Oriented Programming with ANSI and Turbo C++	Pearson Education	2009,1 st Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Balagurusamy E	Object Oriented Programming With C++	TATA Mcgraw HILL Publications	2006,3 rd Edition
2.	John R Hubbard,Atul Kahate	Programming With C++	TATA Mcgraw HILL Publications	2007, 2 nd Edition
3.	Maria Litvin and Gary Litvin	C++ For You	Vikas Publications	2002,1 st Edition

Web Resources

1. <https://www.tutorialspoint.com/cplusplus/index.htm>
2. <http://www.ddegjust.ac.in/studymaterial/mca-5/mca-302.pdf>
3. https://www.ntu.edu.sg/home/ehchua/programming/cpp/cp3_OOP.html
4. <https://www.studytonight.com/cpp/basics-of-cpp.php>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18ITUCP02	C++ PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Core	40	60	-	-	45	1

Preamble

To familiarize the students with object oriented environment and to implement various concepts related to the language.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Apply the concept of member function and constructor	K ₃
CO2	Illustrate the concept of operator overloading in matrices and string manipulation	K ₃
CO3	Demonstrate the concept of inheritance and virtual function	K ₃
CO4	Illustrate the concept of friend function and formatting commands	K ₃
CO5	Apply programming skills in file operation using command line arguments	K ₃

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	M	M
CO2	S	S	M	S	M
CO3	S	S	M	S	M
CO4	S	M	M	S	L
CO5	M	M	M	S	L

S- Strong; M-Medium; L-Low

Syllabus

1. Create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the stack to 0. Write a member function POP() to delete an element. Check for overflow and underflow conditions.
2. Create a class ARITH which consists of a FLOAT and an integer Variable. Write member ADD() - SUB() - MUL() - DIV() - MOD() to perform addition - subtraction - multiplication - division and modulus Respectively. Write member functions to get and display values.
3. Create a class MAT has a 2-d matrix and R and C represents the rows and columns of the matrix. Overload the operators + - * - to add - subtract and multiply two matrices. Write member functions to get and display MAT object values.
4. Create a class STRING. Write member function to initialize - get and display strings. Overload the operator + to concatenate two strings - == to compare two strings and a member function to find the length of the string.
5. Create a class which consists of EMPLOYEE details like eno - ename - dept - basic-salary - and grade. Write member functions to get and display them. Derive a class PAY from the above class and write a member function to calculate da - hra - pf depending on the grade and Display the Payslip in a neat format using console I/O.
6. Create a class SHAPE which consist of two VIRTUAL FUNCTIONS Cal_Area() and Cal_PERI to calculate AREA and PERIMETER of various figures. Derive three classes SQUARE - RECTANGLE and TRIANGLE from the class SHAPE and calculate AREA and PERIMETER of each class separately and display the result.
7. Create two classes which consist of two private variables - one float and one integer variables in each class. Write member functions to get and display them. Write FRIEND function common to arguments and the integer and float values of both the objects separately and Display the result.

8. Write a user defined function USERFUN() which has the formatting commands like setw() - showpoint - showprecision(). Write a program which prints a multiplication table and uses USERFUN() for formatting.

9. Write a program to perform Insertion - Deletion and Updation using files.

10. Write a program which takes a file as argument and copies in to another file with line numbers using Command Line Arguments.

Web Resources

1. <https://www.w3schools.in/category/cplusplus-program/>
2. <https://www.scribd.com/doc/86187428/c-Practical-File>

Pedagogy

Demonstration, PPT, Group Discussion

SEMESTER II

CODE	COURSE TITLE
18CSUA202/18ITUA202	MATHEMATICS – II (DISCRETE STRUCTURES)

Category	CIA	ESE	L	T	P	Credit
Allied	25	75	70	5	-	5

Preamble

This course comprises the essentials for the students to think logically, mathematically and apply the techniques in solving problems. This is achieved by learning logic and proof, sets, functions, as well as algorithms and mathematical reasoning, relations, graphs and formal languages.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the logical proof, connectives and laws	K2
CO2	Understand the concepts of equivalence and implication to formulas of the predicate calculus	K2
CO3	Demonstrate Relations and Functions and determine the properties of Relations	K2
CO4	Construct language from a grammar	K3
CO5	Identify shortest path between two nodes. Classify different types of sets and express the logical relationships between various sets	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	M	M
CO2	M	M	M	M	M
CO3	M	M	M	S	M
CO4	M	M	M	M	S
CO5	M	M	S	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Mathematical Logic: Connectives (Negation, Conjunction, Disjunction) – Statement Formulas and Truth Tables - Conditional and Bi-Conditional – Well-formed Formulas - Equivalence of Formulas – Duality Law. **Normal Forms:** DNF, CNF, PDNF & PCNF.

UNIT II

15 Hrs.

The Predicate Calculus: Predicates – Variables and Quantifiers - Free and Bound Variables.

The Theory of Inference for the Statement Calculus: Validity Using Truth Tables - Rule of Inference. **Set Theory:** Basic concepts of Set Theory: Notation - Inclusion and Equality of Sets - The Power Set - Some Operations on Sets - Venn Diagrams.

UNIT III

15 Hrs.

Relations: Definition - Properties – Relation Matrix and the Graph of a Relation – Equivalence Relations – Composition of Binary Relations. **Functions:** Definition and Introduction – Composition of Functions – Inverse Functions.

UNIT IV

15 Hrs.

Algebraic Structures: Algebraic Systems- Semigroups and Monoids. **Grammars and Languages:** Discussion of Grammars – Formal Definition of a Language. **Groups:** Definitions - Subgroups and Homomorphisms.

UNIT V

15 Hrs.

Lattices: Definition and Properties of Lattices. **Graph Theory:** Basic Concepts: Definitions – Paths, Reachability, and Connectedness - Matrix Representation of Graphs.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	J.P. Tremblay, R. Manohar	Discrete Mathematical Structures with applications to Computer Science	McGraw Hill	2015, 1 st Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Seymour Lipschutz	Schaums Outline Series: Discrete Mathematics	McGraw Hill	2008, 2 nd Edition

Web Resources

1. https://www.tutorialspoint.com//discrete_mathematics/index.htm
2. <http://nptel.ac.in/courses/106106094/>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18ITUC304	JAVA AND NETWORK PROGRAMMING

Category	CIA	ESE	L	T	P	Credits
Core	25	75	71	4	-	4

Preamble

The main objective of this course is to provide the knowledge of Object Oriented Programming concepts, Packages and Interfaces, Networking Basics, Applet concepts and Awt Classes in solving real world problems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Recall the fundamentals of object-oriented programming, includes defining classes, objects and invoking methods.	K1
CO2	Understand the principles of packages and interfaces, exception handling and multithreading mechanism.	K1
CO3	Describe the use of TCP/IP sockets, URL connections in network programming.	K2
CO4	Discuss the concept of applets and event handling mechanism.	K2
CO5	Apply AWT controls, layout managers and menus to develop GUI based applications.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	M	S	M
CO3	S	S	M	S	M
CO4	S	M	M	S	L
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

An Overview of Java: A First Simple Program – Data Types – The Primitive Types – Type Conversion and Casting – Automatic Type Promotion in Expressions. Introducing Classes – A Closer Look at Methods and Classes. **Inheritance:** Inheritance Basics – Using Super – Creating a Multilevel Hierarchy – When Constructors Are Called – Method Overriding – Dynamic Method Dispatch – Using Abstract Classes – Using Final with Inheritance – The Object Class.

UNIT II

15 Hrs.

Packages and Interfaces: Packages – Access Protection – Importing Packages – Interfaces. Exception Handling: Exception Handling Fundamentals – Exception Types – Uncaught Exceptions – Using Try and Catch – Multiple Catch Clauses – Nested Try Statements – Throw – Throws – Finally – Java's Built-in Exceptions – Creating Your Own Exception Subclasses.

UNIT III

15 Hrs.

Multithreaded Programming: The Java Thread Model – The Main Thread – Creating a Thread – Creating Multiple Threads – Thread Priorities. **Networking:** Networking Basics – The Networking Classes and Interface – Inet Address: Factory Methods – Instance Methods – Inet4

Address and Inet6 Address – TCP/ IP Client Sockets – URL – URL Connection – Http URL Connection – The URL Class – Cookies – TCP/ IP Server Socket – Datagrams: Datagram Socket – Datagram Packet – A Datagram Example.

UNIT IV

15 Hrs.

The Applet Class: Two Types of Applets – Applet Basics - Applet Architecture – An Applet Skeleton - Simple Applet Display Methods – Requesting Repainting – Using the Status Window – The HTML APPLET Tag. **Event Handling:** Two Event Handling Mechanisms – The Delegation Event Model – Event Classes – Sources of Events – Event Listener Interfaces – Using the Delegation Event Model – Adapter Classes – Inner Classes.

UNIT V

15 Hrs.

Introducing the AWT: AWT Classes – Windows Fundamentals – Working with Frame Windows – Creating a Frame Window in an Applet – Creating a Windowed Program – Displaying Information within a Window – Working with Graphics – Working with Color – Setting the Paint Mode. **Using AWT Controls, Layout Managers, and Menus:** Control Fundamentals – Labels – Using Buttons – Applying Check Boxes – Checkbox Group – Choice Controls – Using Lists – Managing Scroll Bars – Using a Text Field – Menu Bars and Menus.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Herbert Schildt	Java: The Complete Reference	Tata McGraw-Hill Publishing Company Limited, New Delhi	2018 10 th Edition.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	John R.Hubbard	Programming with Java	Tata McGraw-Hill Publishing Company Limited, New Delhi	2012 2 nd Edition

2.	C. Xavier	Programming with Java 2	SciTech Publishing Company Limited	2000
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Web Resources

1. www.spoken-tutorial.org
2. www.nptel.ac.in
3. <https://www.w3schools.in/java-tutorial/>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18ITUC305	PRINCIPLES OF DATA COMMUNICATION AND NETWORK

Category	CIA	ESE	L	T	P	Credits
Core	25	75	71	4	-	4

Preamble

The course focus to master the fundamentals of data communications networks by gaining a working knowledge of data transmission concepts and media. Learning the methods used for error detection and correction, understanding the operation of multiplexing and switching. Applying the methods used to provide security for data sent over a network, and understanding the concepts and operation of TCP/IP protocols.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1.	Understand data communication and the OSI model.	K1
CO2.	Compare various types of transmission media and multiplexing	K2
CO3.	Demonstrate different error detection and correction, switching concepts.	K2
CO4.	Clarify networking and internetworking devices and network security	K3
CO5.	Apply the knowledge of TCP/IP protocol and application layer.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1.	S	S	S	S	S
CO2.	M	M	M	M	S
CO3.	S	M	S	L	S
CO4.	M	S	L	M	L
CO5.	M	S	M	M	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Introduction: Data Communication – Networks – Protocols and Standards. **Basic Concepts:** Line Configuration – Topology – Transmission Mode – Categories of Networks – Internetworks. **The OSI Model:** The Model – Functions of the Layers – TCP/ IP Protocol Suite.

UNIT II

15 Hrs.

Signals: Analog and Digital. **Transmission of Digital Data–Interface and Modems:** Digital Data Transmission – DTE-DCE Interface – Other Interface Standards – Modems. **Transmission Media:** Guided Media – Unguided Media. **Multiplexing:** Many to One/One to Many – Frequency-Division Multiplexing (FDM) – Wave-Division Multiplexing (WDM) – Time-Division Multiplexing (TDM).

UNIT III

15 Hrs.

Error Detection and Correction: Types of Errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) – Checksum – Error Correction. **Switching:** Circuit Switching – Packet Switching – Message Switching.

UNIT IV

15 Hrs.

Integrated Services Digital Networks (ISDN): Services – History. **Networking and Internetworking Devices:** Repeaters – Bridges – Routers – Gateways – Other Devices –

Routing Algorithms – Distance Vector Routing – Link State Routing. **Network Security:** Four Aspects of Security – Privacy – Digital Signature – PGP – Access Authorization.

UNIT V

15 Hrs.

TCP/ IP Protocol Suite-Part 1: Overview of TCP/ IP – Network Layer – Addressing – Subnetting – Other Protocols in the Network Layer – Transport Layer. TCP/ IP Protocol Suite-Part 2, Application Layer: Client-Server Model – Bootstrap Protocol (BOOTP) and Dynamic Host Configuration Protocol (DHCP) – Domain Name System (DNS) – Telnet – File Transfer Protocol (FTP) – Trivial File Transfer Protocol (TFTP) – Simple Mail Transfer Protocol (SMTP) – Simple Network Management Protocol (SNMP) – Hypertext Transfer Protocol (HTTP) - World Wide Web (WWW).

TEXT BOOKS

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1	Behrouz A. Forouzan	Data Communications and Networking	Tata McGraw-Hill Publishing Company Limited	2008,2 nd Edition

REFERENCE BOOKS

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Achyut s. Gogbole	Data Communications and Networks	Tata McGraw-Hill	2003 ,1 st Edition
2	MadhulkaJain,Satish Jain,	Data Communications and Networking	BPB Publication	2002,1 st Edition

Web Resources

1. https://www.tutorialspoint.com/data_communication_computer_network/data_communication_computer_network_tutorial.pdf

2. http://elearning.ascollegelive.net/studyMaterial/bca/bca_3rd_year/Networking%20Notes.pdf
3. https://www.tutorialspoint.com/data_communication_computer_network/
4. <https://doc.lagout.org/network/Data%20Communications%20and%20Networking%20By%20Behrouz%20A.Forouzan.pdf>

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18ITUC306	SOFTWARE ENGINEERING

Category	CIA	ESE	L	T	P	Credits
Core	25	75	71	4	-	4

Preamble

This course introduces the concepts and methods required for the construction of large software intensive systems. It aims to develop a broad understanding of the discipline of software engineering models. It seeks to complement with a detailed knowledge of techniques for the analysis and design and testing of complex software intensive systems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand basic software engineering methods , practices and their appropriate application	K1
CO2	Discuss data models, object models, context models and behavioral models	K1
CO3	Describe the concepts of different software architectural styles and Process frame work	K2
CO4	Identify the implementation issues such as modularity and coding standards	K2
CO5	Compare and study the software testing approaches	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	S	M
CO2	S	S	M	S	L
CO3	S	S	L	M	S
CO4	S	M	S	S	S
CO5	S	S	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Introduction – The evolving role of software - software crisis – software myths – software engineering layered technology- software process- software process models – prototyping model- Evolutionary software process models.

UNIT II

15 Hrs.

Analysis concepts & Principles: Requirements analysis and elicitation for software – Analysis principles - software prototyping – specification. Analysis Modeling: data modeling – functional modeling and information flow – behavioral modeling.

UNIT III

15 Hrs.

Design Concepts & Principles: The design process – design principles – design concepts – effective modular design. User Interface Design – The golden rules – UID – Task analyzing and modeling – Interface Design Activities – Implementation Tools – Design Evaluation.

UNIT IV

15 Hrs.

Component level design: Structured Programming – Comparison of Design notations Software testing techniques – Software testing fundamentals – Test case design - White box testing – Basis path testing – control structure testing – Black Box testing.

UNIT V

15 Hrs.

Software testing strategies – A strategic approach to software testing - Unit Testing – Integration testing – validation testing – system testing - Object oriented Design: Design for Object Oriented Systems – System Design process – The object Design Process.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Roger S.Pressman	Software Engineering	TMH Publishers	2005 5 th Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ian Somerville	Software Engineering	Pearson Education Publishers	2001 6 th Edition
2.	Watts S. Humphery	A discipline for Software Engineering	Pearson Education Publishers	2001

Web Resources

1. https://www.tutorialspoint.com/software_engineering/
2. http://www.vssut.ac.in/lecture_notes/lecture1428551142.pdf

3. <https://www.psu.edu/dept/csci/seminars/fallnotes/SWEintro.pdf?q=an-introduction-to-software-engineering>
4. <http://www.bcanotes.com/Download/SoftwareEngineering/SOFTWARE%20ENGINEERING.pdf>
5. <https://www.wiziq.com/tutorials/software-engineering>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18ITUCP03	JAVA AND NETWORK PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credits
Core	40	60	-	-	75	3

Preamble

Objective of this course is to design console based, GUI based and Network based application programs. Students should be able to design, code, test and debug Java language programs.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate a program for Packages in java.	K2
CO2	Construct a program for Multithreading and Exception handling	K3
CO3	Develop a program to establish the network communication.	K3
CO4	Apply the concept of Java Applet programming.	K3
CO5	Utilize AWT controls to develop GUI based programs.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	M	S	M
CO3	S	S	M	S	M

CO4	S	M	M	S	L
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

1. Write a Java program to create and import package.
2. Write a Java program to perform exception handling.
3. Write a Java program to illustrate thread priority.
4. Write a Java program to find the IP address.
5. Write a Java program to perform synchronous transmission with single client.
6. Write a Java program to perform synchronous transmission with multiple clients.
7. Write a Java program to perform asynchronous transmission with single client.
8. Write a Java program to perform asynchronous transmission with multiple clients.
9. Write a Java program to accept and display student information using AWT.
10. Write a Java program to create a frame with response to the mouse click for each event with mouse (Such as Mouse up, Mouse Down etc) the corresponding message must be displayed.
11. Write a Java program to draw circle, ellipse, square, rectangle at the mouse click position.
12. Write a java program to create menu bar and pull-down menu.

Web Resources

1. <https://www.tutorialride.com/core-java/applet-programming-in-java.htm>
2. <https://www.w3schools.in/java-tutorial/>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18ITUA303/ 18CTUA303	MICROPROCESSORS AND ITS ARCHITECTURE

Category	CIA	ESE	L	T	P	Credits
Allied	25	75	71	4	-	5

Preamble

The objective is to gain knowledge in microprocessor, assembly language programming and interfacing of IO devices and supporting chips.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1.	Know different processor concepts and Intel 8086 architecture	K1
CO2.	Demonstrate the 8086 instruction sets process and assembly language programs	K2
CO3.	Infer the Intel 386 and Intel 486 microprocessor	K2
CO4.	Describe IO devices, interfacing chips and 32 and 64 bit processors	K1
CO5.	Know the techniques of connecting convertors with microprocessor	K1

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	L	M	S
CO2.	M	S	M	S	S
CO3.	M	S	M	S	M
CO4.	M	S	M	M	L
CO5.	M	L	M	L	L

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Introduction to microprocessors: Evolution of microprocessors – Single -chip Microcomputer - Embedded Microprocessors – Bit - Slice processors -Microprogramming - RISC and CISC Processors - *Scalar and Superscalar Processors* - Vector Processors - Array Processors - Symbolic Processors – Digital Signal Processors. Intel 8086 - Pin Description of Intel 8086 - Operating modes of 8086 - Register organization of 8086 - BIU and EU - Interrupts - 8086 based computer system - Addressing Modes of 8086.

UNIT II

15 Hrs.

8086 Instruction Set - Instruction Groups - Addressing Mode Byte -Segment Register Selection - Segment Override - 8086 Instructions. **Assembly Language Programs for 8086:** Largest Number, Smallest Number in a Data Array - *Numbers in Ascending and Descending order* - Block Move or Relocation -Block Move using REP instruction - Sum of a series -Multibyte Addition.

UNIT III

15 Hrs.

Intel 386 and 486 Microprocessors: Intel 386 and 486 Microprocessor -486DX Architecture - Register Organization of 486 Microprocessor - Memory Organization - Operating Modes of Intel 486 - *Virtual Memory* - Memory Management UNIT Gates -Interrupts and Exceptions - Addressing Modes of 80486 - Pin Configuration.

UNIT IV**15 Hrs.**

Input devices - Output devices - Memory and VO addressing - 8086 Addressing and Address Decoding - Programmable VO Ports - DMA Data Transfer. Other Microprocessors - PowerPC Microprocessors - Pentium Microprocessors - *Pentium Pro-microprocessor* - Alpha Microprocessor - Cyrix Microprocessor - MIPS Microprocessor – AMD Microprocessor.

UNIT V**15 Hrs.**

MOTOROLA 68000, MOTOROLA 68020, MOTOROLA 68030, **MOTOROLA 68040**
Interfacing of A/D Converter and Applications: Introduction -Interfacing of ADC 0808 or ADC 0809 to Intel 8086 - Bipolar to Unipolar Converter - Sample and Hold Circuit, LF 398 – Microprocessor based Measurement and Control of Physical Quantities.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Badri Ram	Advanced Microprocessors and Interfacing	Tata McGraw Hill Publishing Company Limited	2014, 25 th Reprint

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	A.K. Ray, K.M. Bhurchandi	Advanced Microprocessors and Peripherals	Tata McGraw Hill Publishing Company Limited	2007, 2 nd Edition

Web Resources

1. https://www.tutorialspoint.com/microprocessor/microprocessor_8085_architecture.htm
2. http://service.scs.carleton.ca/sivarama/org_book/org_book_web/slides/chap_1_versions/ch7_1.pdf
3. <https://www.slideshare.net/yashsawarkar1/microprocessor-80386>

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18ITUC407	OPERATING SYSTEM

Category	CIA	ESE	L	T	P	Credits
Core	25	75	70	5	-	4

Preamble

The course aims to explore the importance of the operating system and its function. After learning this subject student will be able to discriminate between various types of scheduling concepts, processor, memory and file management. It helps to handle processes and their communications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand basic OS concepts	K1
CO2	Describe the process of disk performance	K1
CO3	Analyze the concepts of real and virtual storage	K2
CO4	Compare the common algorithm used for both preemptive and non-preemptive scheduling	K3
CO5	Classify the process management and file system	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	M	S	M
CO3	S	S	M	S	M
CO4	S	M	M	S	L
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Introduction: What is an Operating System? – **Process Concepts** – Asynchronous **Concurrent Processes**

UNIT II

15 Hrs.

Deadlock and Indefinite Postponement - Storage Management Real Storage: Introduction- Storage Organization- Storage Management- Storage Hierarchy- Storage Management Strategies-Contiguous Vs Noncontiguous Storage Allocation-Single User Contiguous Storage Allocation-Fixed Partition Multiprogramming-Variable Partition Multiprogramming-Multiprogramming with Storage Swapping.

UNIT III

15 Hrs.

Virtual Storage Organization: Introduction – Evolution of Storage Organizations – Virtual Storage – Multilevel Storage Organization – Block Mapping – Paging – Segmentation – Paging / Segmentation Systems.

UNIT IV

15 Hrs.

Virtual Storage Management: Introduction - Virtual Storage Management Strategies – Page Replacement Strategies – Locality – Working Sets – Page Fault Frequency Page Replacement – Demand Paging. **Job and Processor Scheduling:** Introduction – Scheduling levels – Objectives – Criteria – Preemptive Vs Non-preemptive Scheduling – Interval Timer – Priorities – Deadline Scheduling – FIFO – RR – Quantum Size – SJF – SRT – HRN – Multilevel Feedback Queues.

UNIT V

15 Hrs.

Disk Performance Optimization: Introduction – Operation of Moving-Head Disk Storage – Need for Disk Scheduling – Seek Optimization – Rotational Optimization – System Consideration – Disk Caching – Other Performance – Enhancement Techniques – RAM and Optical Disks. **File and Database Systems :** Introduction – The File System – File System Functions – The Data Hierarchy – Blocking and Buffering – File Organization – Queued and Basic Access Methods – Allocating and Freeing Space – File Descriptor – Access Control Matrix – Access Control by User Classes – Backup and Recovery.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Deitel H.M.	Operating Systems	Pearson Education Publication	2005, 2 nd Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Achyut S Godbole	Operating Systems	Tata McGraw Hill Publications	2009, 2 nd Edition
2.	Silberschatz, Galvin, Gagne	Operating System Concepts	Addison- Wesley	2011, 6 th Edition

Web Resources

1. https://www.tutorialspoint.com/operating_system/index.htm
2. <https://www.geeksforgeeks.org/virtual-memory-operating-systems/>
3. <https://www.studytonight.com/operating-system/deadlocks>
4. https://usmanlive.com/wp-content/uploads/2017/10/09/OS3e_13.ppt

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18ITUC408	PC HARDWARE AND TROUBLESHOOTING

Category	CIA	ESE	L	T	P	Credits
Core	25	75	71	4	-	4

Preamble

This course provides the detailed knowledge of all the hardware components and different interfaces required to connect these hardware devices. It enables the students to identify and rectify the computer hardware, software and network related problems. The main aspect of this course is to install/configure the application programs and troubleshoot the system related problems.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of PC hardware & motherboard components.	K1
CO2	Identify various types of chips in the motherboard.	K2
CO3	Describe the various motherboard logic and principles of display adapters.	K2
CO4	Implement the various Installation and assembling techniques in PC.	K3
CO5	Perform the diagnosing, troubleshooting, and repairing operations for computer hardware components.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	M	S	M
CO3	S	S	M	S	M
CO4	S	M	M	S	L
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus**UNIT I****15 Hrs.**

PC-Hardware Overview: Introduction-Hardware-BIOS-DOS Interaction-The PC family-PC Hardware-Interconnections Between Boxes-Inside the System Box-Motherboard Logic-DMA Channel-Floppy Disk Controller (FDC) - Memory Refresh-Post Sequence-Overview of advanced PCs.

UNIT II**15 Hrs.**

Support Chips in the Motherboard: Introduction-Dumb and Smart Chips- Clock generator-Bus Controller-Interrupt Controller-Programmable Interval Timer-8255A-5 Programmable Peripheral Interface (PPI)-DMA Controller-Support chips for advanced microprocessors. Print Controller: Controller Hardware overview. Hard disk Controller Subsystem: Overview of HDC Organization.

UNIT III**15 Hrs.**

PC Bus and Motherboard: PC Bus and Motherboard Functions-Reset Logic (8088-PC)-DMA Logic (8088-PC)-wait State Logic (8088-PC)-Time of Day (TOD) Logic (8088-PC)-Speaker Logic (8088-PC)-Keyboard Interface (8088-PC)-SMPS.

Display Adapter: Introduction-CRT Display-CRT Controller Principle-CRT Controller-Color/Graphics Adapter-Second Generation Graphics Adapters-New Trends in Display Controllers-Display Adapters Interface.

UNIT IV**15 Hrs.**

Installation and Preventive Maintenance-System Configuration-Pre-Installation Planning-Installation Practice-Routine Checks-PC Assembling and Integration -Engineering Version and Compatibility-Preventive Maintenance-Virus-Data recovery

UNIT V**15 Hrs.**

Keyboard Maintenance and Troubleshooting—correcting problem keyboards-vacuum cleaners and keyboards-replacing the spacebar-preventing problems-dealing with large objects-dealing with spills-disabling a keyboard-Troubleshooting a Pointing Device -mouse/trackball interfaces-serial mice-bus mice-PS/2 mice-USB mice-mouse driver software issues-mouse keys under windows 9x-adjusting mouse properties-common detection issues- Modem Troubleshooting-check the command processor-check the dialer and telephone line-typical communication problems-modem troubleshooting in windows 98-resolving resource conflicts-other issues-checking modem firmware-Troubleshooting a Soundboard-dos drivers and driver order- full duplex drivers-soundboard acceleration-multiple codecs -WAV playback problems-Troubleshooting Video Adapters-Basic problem isolation-multiple display support guide-missing display options.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	B.Govindarajalu	IBM PC and Clones Hardware, Troubleshooting and Maintenance	Tata McGraw-Hill Publishing Company Limited, New Delhi	2008 2 nd Edition. (Unit 1- 4)
2.	Bigelow's	Troubleshooting, Maintaining &Repairing PCs	Tata McGraw-Hill Edition	2008 5 th Edition (Unit 5)

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Craig Zacker and John Rourke	The Complete Reference PC Hardware	Tata McGraw-Hill Publishing Company Limited, New Delhi	2007
2.	Ron Glister	PC Hardware a beginner's Guide	Tata McGraw-Hill Publishing Company Limited, New Delhi	2007
3.	Sanjay K Bose	Hardware and Software of Personal Computers	New Age International (P) Limited, Publishers, New Delhi	2000

Web Resources

1. <https://www.ccri.edu/it/helpdesk/pc-troubleshooting.html>
2. <https://www.techopedia.com/definition/30018/hardware-troubleshooting>
3. <https://www.w3schools.in/java-tutorial/>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18CAUC306/ 18ITUC409	CLIENT/SERVER COMPUTING

Category	CIA	ESE	L	T	P	Credits
Core	25	75	71	4	-	4

Preamble

This course focuses on fundamental concepts of client/server technology and SQL database servers. It also provides a deep understanding of web based client-server programming.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statements	Knowledge Level
CO1.	Explain client-server computing and types of servers	K2
CO2.	Examine the client/server capabilities of current crop of operating system.	K3
CO3.	Explore the database server model of client/server.	K2
CO4.	Understand the TP monitor and distributed object model of client/server.	K2
CO5.	Demonstrate the web based client/server programming	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1.	M	S	M	M	M
CO2.	M	S	L	M	L
CO3.	M	M	S	L	S

CO4.	M	M	M	M	S
CO5.	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Client – Server computing - What is client / server? – File servers, database servers, Transaction servers, Groupware servers, Object servers, Web server – *FAT server* or client / server -Client / Server building blocks

UNIT II

15 Hrs.

Client / Server and operating systems – the Anatomy of a server program – Needs of Client / Server from an OS – server scalability – Client anatomy – *Client and server OS trends* – Client OS and server OS. NOS: Creating the single system image - Remote procedure Calls (RPC) – Messaging and Queuing: The MOM Middleware

UNIT III

15 Hrs.

SQL Database servers: What does SQL do? – The ISO standards – What does a database server do? – Stored procedures, Triggers and Rules. Data warehouses – OLTP (Online Transaction Processing) – *Decision Support System (DSS)* – Executive Information System (EIS) – comparing Decision Support and OLTP system – Production vs. Information Database – The data ware house

UNIT IV

15 Hrs.

Client / Server Transaction Processing – The ACID properties – Transaction Models – TP monitors – Client / Server groupware – *Importance of Groupware* – What is Groupware – The components of Groupware. Distributed Object, CORBA style – CORBA : ORB- The Anatomy of a CORBA ORB.

UNIT V

15 Hrs.

Web client / server – The Evolution of the Web- Client/Server , Web Style-What is URL? – Shortest HTML tutorial – HTTP – 3tier client / server – HTML web based forms – CGI: The server side of the web.

TEXT BOOKS

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Robert Orfali, Dan Harkey and Jeri Edwards	Client /Server Survival guide	Wiley India Edition	2008 3 rd Edition

REFERENCE BOOK

S. No.	Authors	Title of the Book	Publishers	Year and Edition
1.	Nein Jenkins	Client / Server Unleashed	Tech Media	1998 1 st Indian Edition
2.	Partick N.Smith, Steven L.Guengerich	Client /Server Computing	PHI	2002 2 nd Edition

Web Resources

1. https://www.webopedia.com/Computer_Science/Client_Server_Computing
2. <https://www.tutorialspoint.com/Client-Server-Computing>
3. <https://gradestack.com/Gate-Computer-Science-/Web-Technologies/Basic-Concepts-Of-Client/21104-4273-47588-study-wtw>
4. <https://www.w3schools.com/html/>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18ITUCP04	PC HARDWARE AND TROUBLESHOOTING LAB

Category	CIA	ESE	L	T	P	Credits
Core	40	60	-	-	75	3

Preamble

The main objective of this course is to provide the knowledge of computer hardware, the processors, motherboard, different add-on cards, and other peripheral devices. The students will impact the knowledge of troubleshooting and assemble the computer hardware.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Create hard disk partition	K3
CO2	Implement the new modem, Microsoft office XP and virus scanner software in the given PC	K3
CO3	Apply the trouble shooting in system hangs and keyboard concepts.	K3
CO4	Implement the sound card and web camera software in the given PC	K3
CO5	Illustrate the SMPS types and find the output voltage.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	M	S	M

CO3	S	S	M	S	M
CO4	S	M	M	S	L
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

1. Create a Partition in a given Hard Disk.
2. How to install the new modem and connect the internet.
3. Configure the given printers and take the print out successfully.
4. What are the types of SMPS and measure the given SMPS output voltage.
5. Install the given virus scanner software and detect any virus found in your machine.
6. Install the Microsoft office XP for given PC.
7. How to configure the given web camera and activate them.
8. What are the steps involved in Sound Card Driver Installation.
9. Install the Network Interface Card and assign the IP Address for the NIC and Check the connectivity between two machines.
10. Trouble shoots the problem – System hangs during booting.
11. Troubles shoot the problem – Keyboard not working.
12. Trouble shoot the Problem – Wrong character print put.

Web Resources

1. <https://www.maketecheasier.com/pc-troubleshooting-guide-2/>
2. <http://www.linuceum.com/Hardware/hwPrbIntro.php>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER IV

CODE	COURSE TITLE
18ITUA404	SOFTWARE PROJECT MANAGEMENT

Category	CIA	ESE	L	T	P	Credits
Allied	25	75	70	5	-	5

Preamble

This course promotes an ethical approach to the management of software development and maintenance. It enumerates the planning, estimation of cost, scheduling of task and events, resource management in project development.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Identify the step wise planning of activities and understanding the range of effort estimation methods	K1
CO2	Prepare an activity plan for a project	K3
CO3	Identify and manage the risks, resources and apply techniques for estimating the effort of risk.	K3
CO4	Understand the activities, metrics and tools in software configuration management	
CO5	Apply the project management techniques in real time applications.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	L
CO2	S	M	M	S	L
CO3	S	M	M	S	M
CO4	S	M	M	S	M
CO5	S	S	M	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Introduction-Software projects versus other types of project-Problems with projects - Stakeholders-An overview of project planning – Project evaluation- Technical plan content list – Software effort estimation.

UNIT II

15 Hrs.

Activity planning - project schedules- projects and activities-sequencing and scheduling activities-network planning model- shortening the project duration-identifying critical activities.

UNIT III

15 Hrs.

Risk management-resource allocation-Monitoring and control-Managing people and organizing teams-planning for small projects.

UNIT IV

15 Hrs.

Software configuration management-Introduction -The Processes and Activities of Software Configuration Management-Configuration Status Accounting-Configuration Audit-Software Configuration Management in Geographically Distributed Teams-Metrics in Software Configuration Management- Software Configuration Management Tools and Automation.

Introduction to PRINCE2 – The components of PRINCE2 - PRINCE2 Planning Technique - PRINCE2 Project Organization – Project stages – Project Procedure - Directing a Project – Starting up a project- initiating the project – Controlling a Stage – Managing a Project Delivery – Managing Stage Boundaries – closing the Project.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Gopal Ramesh Samy	Managing Global software projects	TMH Publishers	2002
2	Mike Cotrell, Bob Huges	Software Project Management	Inclination/Thomas computer press	1995

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Bob Hughes S.A, Mike Cotterel	Software Project Management	TMH Publishers	4 th Edition, 2006.
2.	Derrel Ince, Sharp H and Woodman M	Introduction to Software Project Management and Quality Assurance,	Tata McGraw Hill	1995.
3	Kelkar	Software Project Management –A concise study	PHI, New Delhi	2003
4	Stephen H. Kan	Metrics and Models in Software Quality Engineering	Pearson Education Asia, New Delhi	2 nd Edition.

Web Resources

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. <https://www.castsoftware.com/research-labs/risk-management-in-software-development-and-software-engineering-projects>
3. <https://www.brighthubpm.com/>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar