

**MOTHER TERESA WOMEN'S UNIVERSITY  
KODAIKANAL**

**B.SC INFORMATION TECHNOLOGY**

**UNDER CBCS  
(2021-2022 ONWARDS)**



**DEPARTMENT OF COMPUTER SCIENCE**

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## B.SC. INFORMATION TECHNOLOGY

### 1. About the Programme

**B.Sc. IT (Information Technology)** is a three years undergraduate degree programme. Information technology is all about storing, processing and managing information of an organization. B.Sc. IT course is designed to help students understand the process of managing huge data and information of an organization, analyze the performance of the computer system and servers and ensures secure transfer of data in a network.

Students who have interest in networking, network security system, communication, database management, Information technology systems can join the course. The course is designed keeping in mind the need of the industry and the need to manage bulk data that is produced in an organization on a daily basis.

B.Sc. IT graduates become professionals who have analytical and logical thinking abilities to solve real-world problems in the IT field. They have the knowledge to identify problems in the IT and infrastructure, analyze them and also find solutions for the same.

### 2. Programme Educational Objectives(PEOs)

**PEO1:**Demonstrate core competence in computing and mathematics to design& analyze software engineering problems.

**PEO2:** Develop insights in foundational areas of Information Technology to address real-world problems

**PEO3:** Collaborate with industry, academic and research institutions for product development and research.

**PEO4:** Inculcate a high degree of professionalism, effective communication skills and team spirit to work on multidisciplinary projects

**PEO5:**Practice technical standards in advanced computing and networking

### 3. Eligibility – Hr. Sec. Certification

#### 4. General Guidelines for UG Programme

- i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.
- ii. **Medium of Instruction:** English
- iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	10	25	10	25
External	30	75	30	75

- **Internal (Theory):** Test (15) + Assignment (5) + Seminar/Quiz(5) = 25
- **External Theory:** 75

- **Question Paper Pattern for External examination for all course papers.**

**Max. Marks: 75**

**Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	A	<b>10*1 Marks=10</b> Multiple Choice Questions(MCQs): 2 questions from each Unit	<b>10</b>
2	B	<b>5*4=20</b> Two questions from each Unit with Internal Choice (either / or)	<b>20</b>
3	C	<b>3*15=45</b> Open Choice: Any three questions out of 5 : one question from each unit	<b>45</b>
Total Marks			<b>75</b>

**\* Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

**5. Conversion of Marks to Grade Points and Letter Grade****(Performance in a Course/ Paper)**

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

**6. Attendance**

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

**7. Maternity Leave**

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

**8. Any Other Information**

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

**Program Outcomes (POs)**

Upon completion of the B. Sc. Information Technology programme, students will be able to:

<b>PO1</b>	Apply knowledge of scientific theories and methods in advanced computing techniques
<b>PO2</b>	Proficiency in oral and Written Communication
<b>PO3</b>	Identify, analyze and design the system to solve information technology related problems
<b>PO4</b>	Design the System with environmental consciousness and sustainable development
<b>PO5</b>	Function in a multidisciplinary team by working cooperatively, creatively and responsibly as a member of a team

**Programme Specific Outcomes (PSOs)**

<b>PSO1</b>	Demonstrate logical and analytical thinking abilities in the field of IT
<b>PSO2</b>	Engage in lifelong learning and professional development through Higher Education and research.
<b>PSO3</b>	Ability to identify the resources to build and manage the IT infrastructure in order to solve real world problems
<b>PSO4</b>	Ability to work and communicate effectively in interdisciplinary environment

## B.Sc. (Information Technology)

FIRST SEMESTER							
Course Code	Title of the Course	Credits	Hours		Int	Ext	Total
			L	P			
U21LTA11	TAMIL I- PART-I	3	6	-	25	75	100
U21LEN11	ENGLISH I- PART-II	3	6	-	25	75	100
U21ITT11	CORE I –Programming in C	4	5	-	25	75	100
U21ITP11	CORE II – Programming in C Lab	4	-	6	25	75	100
U21ITA11	ALLIED I – Mathematical Foundation	4	5	-	25	75	100
U21EVS11	Environmental Studies	2	2	-	25	75	100
U21PEPS11	Professional English I	4	6	-	25	75	100
<b>Total</b>		<b>24</b>	<b>36</b>				<b>700</b>
SECOND SEMESTER							
U21LTA22	TAMIL II-PART-I	3	6	-	25	75	100
U21LEN22	ENGLISH II- PART-II	3	6	-	25	75	100
U21ITT21	CORE III - Fundamentals of Data Structures	4	5	-	25	75	100
U21ITP22	CORE IV - Data structures using C++ Lab	4	-	5	25	75	100
U21ITA22	ALLIED II - Digital Principles and Computer Organization	4	5	-	25	75	100
U21VAE21	Value – Education	3	3	-	25	75	100
U21PEPS22	Professional English II	4	6	-	25	75	100
<b>Total</b>		<b>25</b>	<b>36</b>				<b>700</b>



THIRD SEMESTER							
Course Code	Title of the Course	Credits	Hours		Int.	Ext.	Total
			T	P			
U21LTA33	TAMIL III	3	6	-	25	75	100
U21LEN33	ENGLISH I	3	6	-	25	75	100
U21ITT31	CORE V - Relational Database Management System	4	5	-	25	75	100
U21ITA33	ALLIED III –Operations Research	4	5	-	25	75	100
U21ITE311/ U211IT312	ELECTIVE I - Relational Database Management System LAB/ Graphics using C++ Lab	3	-	4	25	75	100
U21MSS31	SBE I- Managerial Skills	2	-	2	25	75	100
	Non-Major Elective – I:	2	2	-	25	75	100
	<b>Total</b>	<b>21</b>	<b>30</b>				<b>800</b>
FOURTH SEMESTER							
Course Code	Title of the Course	Credits	Hours		Int.	Ext.	Total
			T	P			
U21LTA44	TAMIL IV	3	6	-	25	75	100
U21LEN44	ENGLISH IV	3	6	-	25	75	100
U21ITT41	CORE VI – Object Oriented Programming in Java	4	4	-	25	75	100
U21ITP43	CORE VII – Object oriented Programming in JAVA lab	4	-	4	25	75	100
U21ITA44	ALLIED IV – Management Information System	4	4	-	25	75	100
U21ITE421 / U21ITE422	<b>Elective II</b> 1. System Software 2.Mobile Computing	3	3	-	25	75	100
U21ITS42	SBE II- Computer Skills for Office Management	2	-	2	25	75	100
	Non -Major Elective –II	2	2	-	25	75	100
	<b>Total</b>	<b>25</b>	<b>31</b>				<b>900</b>



FIFTH SEMESTER							
Course Code	Title of the Course	Credits	Hours		Int.	Ext.	Total
			T	P			
U21ITT51	CORE VIII- Computer Networks	4	5	-	25	75	100
U21ITT52	CORE IX – Operating System Concepts	4	5	-	25	75	100
U21ITT53	CORE X – Web technology	4	5	-	25	75	100
U21ITT54	CORE XI – Computer Graphics	4	5	-	25	75	100
U21ITP54	CORE XII –Web Technology – Lab	4	-	5	25	75	100
U21ITE531/ U21ITE532	<b>ELECTIVE – III</b> 1. Multimedia Applications 2. E-Commerce	3	3	-	25	75	100
U21ITS53	<b>SBE III-</b> Operating System (OS) Lab	2	2	-	25	75	100
<b>Total</b>		<b>25</b>	<b>30</b>				<b>700</b>
SIXTH SEMESTER							
Course Code	Title of the Course	Credits	Hours		Int.	Ext.	Total
			T	P			
U21ITT61	CORE XIII – Internet of Things	4	5	-	25	75	100
U21ITT62	CORE XIV – Data mining	4	5	-	25	75	100
U21ITT63	CORE XV – Artificial Intelligence	4	-	5	25	75	100
U21ITP65	CORE-XVI-Internet of Things (IoT) Lab	4	-	5	25	75	100
U21ITR61	CORE XVII- Project	4	-	5	25	75	100
U21ITE641 U21ITE642	<b>ELECTIVE –IV</b> 1. Ethical Hacking 2. Information Security	3	3	-	25	75	100
U21ITS611	<b>SBE IV–</b> Image Processing Lab	2	-	2	25	75	100
U21EAS61	Extension Activities	3	-	-	25	75	100
<b>Total</b>		<b>28</b>	<b>30</b>				<b>800</b>
<b>Grand Total</b>		<b>148</b>	<b>193</b>		<b>Grand Total</b>		<b>4400</b>





**ELECTIVE PAPERS**

Course Code	Title of the Course
<b>ELECTIVE – 1</b>	
U21ITE311	Relational Database Management System Lab
U21ITE312	Graphics using C++ Lab
<b>ELECTIVE – 2</b>	
U21ITE421	System Software
U21ITE422	Mobile Computing
<b>ELECTIVE – 3</b>	
U21ITE531	Multimedia Applications
U21ITE532	E Commerce
<b>ELECTIVE – 4</b>	
U21ITE641	Ethical Hacking
U21ITE642	Information Security

**Non-Major Electives**

The Candidates, who have joined the UG Programme, can also undergo Non Major Elective offered by other Departments.

Course Code	Title of the Course
U21PEN31	NME I: Web Designing using HTML
U21ITN42	NME II: Photoshop

**Skill Based Electives**

Course Code	Title of the Course
U21ITJ31	SBE I: Managerial Skills
U21ITJ42	SBE II: Computer Skills for Office Management
U21ITS51	SBE III: Operating System Lab
U21ITS61	SBE IV: Image Processing Lab

**ADDITIONAL CREDIT COURSES**

SEMESTER	COURSE CODE	COURSE	CREDITS
III	U21IT031	SWAYAM - Online Course	2
IV	U21ITI41	Internship	2
V	U21ITV51	Quantitative Aptitude - Value Added Course	2



## Semester – I

COURSE CODE	U21ITT11	PROGRAMMING IN C			
CORE -I		L	T	P	C
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Course Objectives	1. To understand and develop well-structured programs using C language. 2. To learn how to implement basic data structures through C language. 3. To deal with different memory allocation & input/output methods. 4. Problem solving through computer programming using C Language.				

### Unit I : Overview of C

Introduction - character set - C tokens - keyword & identifiers – constants – variables - data types – Declarations of variables – Arithmetic, Relational, Logical, Assignment, conditional, Bit wise, special, increment and decrement operators - Arithmetic expressions - Evaluation of expression - Operator precedence & associativity - Mathematical functions - Reading & writing a character - Formatted input and output

### Unit II:Control Statements

If, if else, switch, break, continue – Operator - The GOTO statement. – Loop Control Statements: Introduction – for, nested for loops – while, do-while statements – Arrays: One-dimensional - Two dimensional - Multidimensional arrays - Recursion - functions with arrays - functions with arrays

### Unit III:String Manipulation and User-Defined Functions

Declaring and initializing string variables – Reading strings from terminal - Writing strings to screen - String handling functions - User-defined functions: Need for user defined functions – Types of functions - calling a function category of functions - no arguments and no return values – Arguments but no return values- Arguments with return values–The scope and lifetime of variables in functions

### Unit IV : Structures and Pointers

Definition- Structure initialization - Comparison of structure variables - Arrays of structures - Arrays within structures - Structures within structures – unions. Pointers: understanding pointers - accessing the address of a variable - declaring and initializing pointers - accessing a variable through its pointers - pointer expressions – pointers and arrays - pointers and character strings - pointers and functions - pointers and structures

### Unit V : File Management in C

Defining and opening a file - closing file - I/O operations on files - error handling during I/O operations - Random access to files - command line arguments. Dynamic memory allocation: Introduction- dynamic memory allocation – MALLOC – CALLOC – REALLOC - The pre-processor.

### Text Book

1. E.Balagurusamy, Programming In ANSI C, Tata McGraw Hill 7th Edition,2017

**Reference Books**

1. Byron Gottfried, Programming with C Tata McGraw Hill, 3rd Edition, 2013
2. Yashwvant Kanetkar, Let us C, BPB Publications 13th Edition, 2014

**Course Outcomes:**

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

CO1: Apply the syntax and semantics of c language

CO2: Apply the concepts of functions and arrays in solving real world problems

CO3: Demonstrate structures, union and pre-processing techniques

CO4: Analyse and develop programs using pointers and file concept

CO5: Able to create programs and applications

**Mapping of COs with POs and PSOs :**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	M	M
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	M	S
CO5	S	S	M	S	S	M	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT12	PROGRAMMING IN C LAB			
CORE -II		L	T	P	C
Cognitive Level	K1: Recall	K2: Understand	K3: Apply	K4: Analyze	
Course Objectives	1. To imbibe the in-depth practical experience in „C“ programming. 2. To impart knowledge on basic concepts in C 3. To make them familiar for structure and files in C 4. To create c program for real world examples				

### List of Programs

1. Finding the largest and smallest of three numbers using if, if-else.
2. Checking for an Armstrong number using if, if-else
3. Solving Quadratic equations using switch statement
4. Finding the area of different shapes using switch statement.
5. Ascending and descending order of numbers using arrays.(Largest and smallest numbers)
6. Sorting of names in alphabetical order.
7. Program to search the given element by using linear search.
8. Matrix operations i) Addition ii) Subtraction iii) Multiplication iv) Transpose
9. Finding factorial of a number Using Recursive function
10. Generating Fibonacci series Using Recursive function
11. String manipulations using string functions
  - i) String length ii) String comparison iii) String copy
12. String manipulations without using string functions
  - i) String length ii) String comparison iii) String copy
13. Palindrome checking Using function
14. Counting characters, words and lines Using function
15. Generate salary slip of employees using structures.
16. Program to generate student mark list using array of structures
17. Programs for file handling (Sequential, Random)

### Course Outcomes

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

CO1: Develop and execute programs using Operators and control Structures

CO2: Develop programs in C to solve any kind of real world problem

CO3: Apply the programming concepts of C in the standalone applications.

CO4: Have a depth understanding in C program features

CO5: Develop applications in a different scenario

**Mapping of COs with POs and PSOs :**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M	M	M	M	S	S
CO2	S	S	S	S	S	S	S	S	S
CO3	S	M	M	S	S	S	S	S	M
CO4	S	S	S	M	M	M	S	M	M
CO5	S	M	M	S	M	S	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITA11	MATHEMATICAL FOUNDATION	L	T	P	C
ALLIED –I				5	-	-
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To introduce the concepts of mathematical logic 2. To introduce the concepts of sets, relations, and functions. 3. To perform the operations associated with sets, functions, and relations. 4. To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.					

### Unit 1 : Basic concepts of set theory

Basic concepts of set theory – Mathematical logic-introduction-statements-connectives-negation, conjunction, disjunction- statement formulas and truth tables- conditional and bi-conditional statements- tautology-contradiction-equivalence of formulas-duality law-Predicates and Quantifiers, Arguments.

### Unit II : Operations on sets

Operations on sets – power set- Venn diagram Cartesian product-relations –functions- types of functions –composition of functions. Relations: Properties of binary Relation, equivalence, compatibility and partial ordering relations, Hasse diagram. Function: Inverse function Comport of functions, recursive Functions, Lattices and its Properties

### Unit III : Matrix algebra

Matrix algebra-Introduction-Types of matrices-matrix operations- transpose of a matrix – determinant of matrix – inverse of a matrix- Cramer’s rule: Matrix: finding rank of a matrix – normal form-echelon form –Cayley Hamilton theorem – Eigen values

### Unit IV: Elementary Combinatorics

Elementary Combinatorics: Basics of counting, Combinations and Permutations , with repetition, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion, Exclusion. Pigeon hole principle and its application. Differential Calculus – Functions and limits – Simple Differentiation of Algebraic Functions — Evaluation of First and Second Order Derivatives – Maxima and Minima

### Unit V: Vector Spaces

Vector Spaces: Vector spaces; subspaces; Linearly independent and dependent vectors ; Bases and dimension;coordinate vectors- Illustrative examples. Linear transformations; Representation of transformations by matrices; linear functional; Non singular Linear transformations; inverse of a linear transformation- Problems.

### Text Books

1. P.R.Vittal, Business Mathematics and Statistics, Margham Publications, Chennai, 2020.

### Reference Books

1. S.Vatsa, Discrete Mathematics, New Age International Limited Publishers, New Delhi, 2009

**Course Outcomes**

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

CO1: The course will help students to develop conceptual understanding

CO2: It acquire multiple strategies for solving problems.

CO3: The course will prepare students for success in future courses

CO4: It will help them develop skills for the workplace and as productive citizens.

CO5: Learn and apply multi variant analysis necessary.

**Mapping of Cos with Pos and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	M	M
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	M
CO5	M	S	M	M	S	M	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

## Semester-II

COURSE CODE	U21ITT21	FUNDAMENTALS OF DATA STRUCTURES	L	T	P	C
<b>CORE - III</b>			<b>5</b>	<b>-</b>	<b>-</b>	<b>4</b>
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. To Understand about Stack &amp; Queue.</li> <li>2. To understand about tree &amp; its traversal techniques.</li> <li>3. To Understand about Graphs and its components.</li> <li>4. The Student can get In-depth Knowledge inefficient utilization of memory by using appropriate data structures.</li> </ol>					

### Unit I: Array

Array: Axiomatization – Ordered Lists – Sparse Matrices – Representation of Arrays: Sequential Representation of Arrays – 3D Arrays.Stacks And Queues: Fundamentals – Amazing Problem – Evaluation of expressions – Multiple Stack and Queues.Data types – primitive and non-primitive, Types of Data Structures- Linear & Non Linear Data Structures.

### Unit II: Linked List

Linked List: Singly Linked List - Doubly Linked list - Circular linked list - Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.– The Storage Pool - Polynomial Addition – Linked list and Dynamic Storage Management – Data Management concepts ,Garbage Collection and Compaction.

### Unit III: Sorting

Sorting : Need of sorting, Types of Sorting , Insertion Sort, Quick Sort, Merge Sort, Heap Sort, Sorting On Several Keys, List and Table Sort, Performance of sorting – Best case and Worst case of sorting. Searching - Purpose of searching – types of searching - Linear Search, Binary Search. Application of sorting and searching

### Unit IV: Tree

Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees- Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance , Graph-Matrix Representation Of Graphs, Elementary Graph operations,(Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree ).

### Unit V:Graphs

Graphs: Terminology and Representations: Introduction – Definitions and Terminology – Graph representations – Traversal, Connected components and Spanning Trees.Hashing: The symbol table,



Hashing Functions, Collision-Resolution Techniques, File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods

### Text Books

1. Ellis Horowitz, SartajSahni, Fundamentals of Data Structure Galgotia Publications, 1998.
2. Seymour Lipschutz ,Data Structures with C, Schaum's Outline Series, 2017

### Reference Books

1. SartajSahni, Data Structure, Algorithms and Applications in C++ McGraw Hill, 1998.
2. A.Chitra, P.T.Rajan, Data Structures, Vijay Nicol Imprints Pvt. Ltd, McGraw HillEducationofIndiaPvt. Ltd., 2006.

### Course Outcome:

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

CO1: Describe the basics of Ordered Lists and Representation of Arrays

CO2: Apply the knowledge of Linked list for solving problem in the real world.

CO3: Demonstrate the usage of Binary trees and Representation of Trees

CO4: Illustrate the performance of representation of Graphs and spanning Trees

CO5: Can analyze and apply various structures in different applications.

### Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	S	S	S	S	S	M	M
CO3	S	S	S	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	M
CO5	M	M	M	S	S	S	S	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITP22	DATA STRUCTURE USING C++ LAB	L	T	P	C
CORE - IV				-	-	5
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To impart knowledge on Data Structures 2. To implement and differentiate single and double linked list 3. To illustrate stack to convert infix to postfix. 4. To develop programs for De queue and Dictionary					

### Lab Exercises

1. Program using array based stack push (), pop (), stackFull() and stackEmpty() functions.
2. Program to evaluate the given postfix expression using the stack
3. Program that uses stack operations to convert a given infix expression into its postfix equivalent
4. Program to add two polynomials using linked list.
5. Program to find Union of two single Linked Lists.
6. Program to Create a singly linked list of integers.
7. Program to Delete a given integer from the above linked list.
8. Program to Display the contents of the above list after deletion.
9. Program to eliminate duplicates from Linked List
10. Program to implement all the functions of a dictionary (ADT) using hashing
11. Program to implement a double ended queue ADT an array, using a doubly linked list.
12. Program that uses functions to perform the following:
13. Program to Create a doubly linked list of elements.
14. Program to Delete a given element from the above doubly linked list.
15. Program to Display the contents of the above list after deletion.

### Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: apply the concepts to solve problems using C++ programming language

CO2: implement the basic data structures using C++

CO3: solve real world problems using C ++Programming language

CO4: recognise the importance of Data Structure features

CO5: Can develop real time applications with features of data struture.

### Mapping of COs with POs and PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	S	M	M
CO2	S	M	M	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M
CO4	S	M	M	S	M	M	S	M	M
CO5	S	S	M	S	S	S	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITA22	DIGITAL PRINCIPLES & COMPUTER ORGANIZATION	L	T	P	C
ALLIED -II			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. To understand computer fundamental and its role in problem solving.</li> <li>2. Students will acquire the concept of flow of control and program structures.</li> <li>3. To learn the operation of latches, flip-flops, counters, registers, and register transfers in the Computer organization.</li> <li>4. To design two-level logic functions with AND, OR, NAND, NOR and XOR gates with minimum number of gate delays or literals</li> </ol>					

### Unit I: Number Representation

Number Representation-Number System: Binary, Hexadecimal-Octal Codes-BCD-Excess-3-Gray Code - ASCII - EBCDIC - Binary Arithmetic - 1's Complement - 2's Complement Representation- Error Detecting Codes-Hamming Codes. Introduction-Boolean Algebra- Demorgan's Theorem-Sum Of Product method-Product of Sum method-Karnaugh Map.

### Unit II: Logic Gates

Introduction - Logic Gates – Universal Gates – Decoder – Encoder – Multiplexer – De multiplexer - Half Adder - Full Adder - Half Subtractor - Full Subtractor. Flip-Flops - S-R Flip-flop - J-K Flip Flops. Sequential Circuits – Storage Elements: Latches, State Reduction and Assignment – Design Procedure – Registers and Counters – HDL Models of Sequential Circuits.

### Unit III: Machine Language

Introduction: Machine Language - Assembly language – Assembler - Programming Arithmetic & Logic Operations – Input - Output Programming. Basic Computer Organization and Design Instruction Codes - Computer Registers -Computer Instruction - Timing & Control Instruction Cycles-Memory Reference Instruction.

### Unit IV: I/O Organization

I/O Organization - Peripheral Devices - I/O Interface - Mode of Transfers - DMA.Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards.RAM – Memory Decoding – Error Detection and Correction – ROM – Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices

### Unit V: Memory Organization

Memory Organization - Memory Hierarchy - Main Memory - Auxiliary Memory -Associative Memory - Cache Memory - Virtual Memory. Dynamic Storage Management – Data Management concepts ,Garbage Collection and Compaction.Programmable Logic devices - Programmable Logic Array - Programmable Array Logic - Sequential Programmable device - Application Specific Integrated circuits

**Text Books:**

1. Albert Paul Malvino & Donald P. Leach - Digital Principles and Applications - IV Edition - Tata McGraw Hill Company Limited, 1982.
2. Morris Mano, Computer System Architecture, Pearson Publication, Third Edition, 1981.

**Reference Books:**

1. P.K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. Alexis Leon, Fundamentals of Information Technology, Vikas Publication, 2009.
4. P.S. Manoharan, Digital Principles & System Design, Revised Edition - Charulatha Publication, 2013.

**Course Outcomes:**

Upon successful completion of the course the students will be able to

CO1: Understands the hardware and software, types and components of the computer

CO2: Recognizes the problem solving fundamental key points.

CO3: Sketch out the representation of numbers and codes in the computer.

CO4: Knows the digital computers internal components and the execution of the instructions

CO5: Learn and work on new operating system and different platforms

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	M	S	S	M	M	S	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT31	RELATIONAL DATABASE MANAGEMENT SYSTEM	L	T	P	C
CORE -V			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>To understand the overview of Data Base systems &amp; Data Models.</li> <li>To modify and maintain the database structure.</li> <li>To Understand about the PL/SQL / SQL.</li> <li>The Students can able to handle the Database</li> </ol>					

### Unit I: Data base systems

Introduction: Purpose of data base systems – View of data – Data models – Database languages – Transaction management – Storage management – Database Administrator – Database users – Overall system structure.Storage Strategies: Indices, B-Trees, Hashing, Transaction processing: Recovery and Concurrency Control, Locking and Timestamp based Schedulers, Multiversion and Optimistic Concurrency Control Schemes.

### Unit II: Entity – Relationship Model

Entity – Relationship Model-Basic concepts – Design issues – Mapping cardinalities – Keys – E-R Diagrams – Weak entity sets – Extended E-R features – Design of an E-R Database scheme – Reduction of an E-R scheme to table.Database System Architecture – Data Abstraction, Data Independence, Data Definitions and Data Manipulation Languages.

### Unit III: Relational Model

Relational Model: Structure of relational databases – Relational algebra – The Tuple Relational Calculus – The domain relational calculus – Extended relational – Algebra operations – Modification of the database – Views.Query Processing and Optimization: Evaluation of Relational Algebra Expressions, Query Equivalence, Join strategies, Query Optimization Algorithms.

### Unit IV : Other Relational Languages & Integrity Constraints

Other Relational Languages & Integrity Constraints: Query by Example – Quel – Datalog – Domain constraints – Referential Integrity – Assertions – Triggers – Functional dependencies. Relation Query Languages, Relational Algebra, Tuple and Domain Relational Calculus, SQL and QBE.

### UNIT V: PL/SQL

PL/SQL – Relationships between SQL & PL/SQL –Advantages of PL/SQL – arithmetic & expressions in PL/SQL – Loops and conditional statements in PL/SQL – Exceptions Handling – Cursor management – Triggers – Functions & Procedures.Relational Database Design: Domain and Data dependency, Armstrong’s Axioms, Normal Forms, Dependency Preservation, Lossless design, Comparison of Oracle & DB2.

### Text Book

Abraham Silberschatz, Henry F.Korth, S.Sudarshan,Database System Concepts (third edition)-McGraw - Hill international editions, 1997.

**Reference Books**

1. Atre, Shaku, Database Structured Techniques for Design, Performance & Management - John Wiley & Sons, 1988.
2. James W Martin, Principles of Database Management - Prentice Hall, 1979.

**Course Outcomes**

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

CO1: Understand the fundamentals of database system.

CO2: Design and create tables in database and execute queries.

CO3: Have knowledge in network and hierarchical data base system.

CO4: Design a database based on a data models using normalization.

CO5: Can develop own database in own application

**Mapping of COs with POs and PSOS:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	M
CO5	S	S	M	S	M	M	S	M	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITA33	OPERATIONS RESEARCH			
ALLIED III		L	T	P	C
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Objectives	<ol style="list-style-type: none"> <li>To understand the Mathematical Formation of L.P.P.</li> <li>To Understand the Simplex Method &amp; Artificial Variables.</li> <li>To understand the transportation Problem and Assignment Problem.</li> <li>The Student can Formulate and solve problems as networks and graphs using special solution algorithms.</li> </ol>				

### Unit I: Introduction to Operations Research

Development of OR – Definition OR – General methods for solving OR models – main characteristics and Phases of OR study – tools, techniques and methods – scientific methods in OR – Scope of OR. Introduction to Operations Research (OR) Operations Research definition and origin. Essential features of the OR approach. Quantification of factors. Stages in OR study.

### Unit II: Linear Programming Problem

Linear Programming Problem: Introduction to Foundation mathematics and statistics Linear Programming (LP), LP and allocation of resources, LP definition, Linearity requirement - Formulation of L.P.P. - Maximizing and Minimizing Problem – Mathematical– Slack and Surplus variables – Graphical Solution of L.P.P.

### Unit III: Simplex Method

Simplex Method – Computational Procedure – Artificial Variables Technique - Two Phase Method – Duality in Linear Programming. Example containing mixed constraints, Minimization example for similar limitations. Example containing mixed limitations, Duality Theory, The Primal Vs- Dual Solutions

### Unit IV: Transportation problem

Mathematical formulation of transportation problem – optimal solution of Transportation Problems – Methods for obtaining an Initial Feasible Solution – Optimal Solution – Degeneracy in Transportation Unbalance Transportation Problems. SolutionMethods: Feasible Solution: The Northwest Method, The Lowest Cost Method

### Unit V: Assignment Problem

Mathematical Formulation of Assignment Problem - Assignment Algorithm – Optimal Solution of Assignment Problem - Unbalance Assignment Solution – Balanced Assignment Solution. .Optimal Solution: The Stepping Stone Method, Modified Distribution (MODI) Method. MSPT:- The Dijkstra algorithm, and Floyd’s Algorithm {Shortest Route Algorithm}

### Text Books:

- KantiSwarup, P.K Gupta &Manmohan, Operations Research - Sultan Chand & Sons Publications, Sixteenth Revised Edition, 2009.
- S.D.Sharma - Operations Research, McGraw Hill, 2013.

**Reference Books:**

1. Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, Resource Management Techniques – AR Publications Revised Edition, 2010.

**Course Outcome**

1. Solve Linear Programming Problems
2. Solve Transportation and Assignment Problems
3. Understand the usage of game theory and Simulation for Solving Business Problems
4. Solve the Problem by using special solution Algorithm
5. Solve and manipulate different complex problems in an optimized way.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	M	S	M	S	M	S	M	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**



COURSE CODE	U21ITE311	CHOICE –I	L	T	P	C
<b>ELECTIVE-I</b>		<b>RELATIONAL DATABASE MANAGEMENT SYSTEM LAB</b>	-	-	6	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>To become familiar with SQL fundamental Concepts.</li> <li>To Apply Normalization techniques to normalize a database</li> <li>To know the connectivity of databases with controls (DAO,ADO &amp; RDO)</li> <li>The Student can Gain a good understanding of the architecture and functioning of Database Management Systems as well as associated tools and techniques.</li> </ol>					

### List Of Programs

- Queries using DDL commands
- Queries using DML commands
- Program using conditional control, interactive controls & sequential controls.
- Program using excepting handling
- Programs using explicit cursors & implicit cursors
- Program using PL/SQL tables & records
- Programs using database triggers
- Program to design procedures using In, Out, Parameter
- Program to design procedures using functions
- Program to design procedures using packages
- Program using ADO connectivity.
- Program using DAO connectivity.
- Program using RDO connectivity.

### Course Outcomes:

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

CO1: Describe the concepts of database technologies

CO2 Discuss PL/SQL including stored procedures, stored functions, cursors, packages

CO3 Apply constraints on a database using RDBMS

CO4 Demonstrate the concept of Triggers and Subroutines

CO5 Learn database connectivity and apply real time applications

**Mapping of Cos with Pos and PSOs:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	S	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	S	S	M	S	S	M	M
CO4	S	S	S	S	S	S	S	M	S
CO5	M	S	S	S	M	M	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

### Program List

COURSE CODE	U21ITE312	CHOICE II	L	T	P	C
<b>ELECTIVE - I</b>		<b>GRAPHICS USING C++ LAB</b>	-	-	6	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>To apply the fundamentals of Graphics primitives using C++</li> <li>To create a program using 2D &amp; 3D Transformations</li> <li>To understand the features of line, circle and ellipse algorithms</li> <li>To emphasize the properties of composite transformations in Graphics</li> </ol>					

- Draw a Line using DDA Algorithm
- Draw a Line using Bresenham's Line Drawing Algorithm
- Draw a Circle using Mid Point Circle Algorithm
- Draw an Ellipse using Mid Point Ellipse Algorithm
- Implement various attributes of Output primitives
- Implement 2D Transformation
- Implement 2D Composite Transformation
- Clip a Line using Cohen Sutherland Clipping Algorithm
- Implement 3D Transformation
- Implement 3D Composite Transformation

#### Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: apply the concepts to solve problems using C++ programming language

CO2: implement the basic data structures using C++

CO3: solve real world problems using C ++Programming language

CO4: recognise the importance of Data Structure features

CO5: Enable user interface environment.

#### Mapping of COs with POs and PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	S	M	S
CO2	S	M	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S
CO4	S	M	M	S	M	M	S	M	M
CO5	M	S	S	S	M	M	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT41	OBJECT ORIENTED PROGRAMMING IN JAVA	L	T	P	C
CORE -VI			4	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>To understand the object-oriented paradigm in the Java programming language.</li> <li>To know about the Package and Interfaces.</li> <li>To Understand about Applets.</li> <li>The use of Java in a variety of technologies and on different platforms.</li> <li>To write Java application programs using proper program structuring</li> </ol>					

**Unit I: Java Basics**

Java Basics: Review of Object oriented concepts, History of Java, Java buzzwords, JVM architecture, Data types, Variables, Scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, methods, Static block, Static Data, Static Method String and String Buffer Classes, Using Java API Document.

**Unit - II : Inheritance And Polymorphism**

Inheritance And Polymorphism: Basic concepts, Types of inheritance, Member access rules, Usage of this and Super key word, Method Overloading, Method overriding, Abstract classes, Dynamic method dispatch, Usage of final keyword. PACKAGES AND INTERFACES: Defining package, Access protection, importing packages, Defining and Implementing interfaces, and Extending interfaces. I / O

**Unit – III: Exception Handling**

Exception Handling: Exception types, Usage of Try, Catch, Throw, Throws and Finally keywords, Built-in Exceptions, Creating own Exception classes. MULTI THREADING: Concepts of Thread, Thread life cycle, creating threads using Thread class and Runnable interface, Synchronization, Thread priorities, Inter Thread communication.

**Unit - IV : AWT Controls**

AWT Controls: The AWT class hierarchy, user interface components- Labels, Button, Text Components, Check Box, Check Box Group, Choice, List Box, Panels – Scroll Pane, Menu, Scroll Bar. Working with Frame class, Colour, Fonts and layout managers. EVENT HANDLING: Events, Event sources, Event Listeners, Event Delegation Model (EDM), Handling Mouse and Keyboard Events, Adapter classes, Inner classes.

**Unit V:Swings**

Swings: Introduction to Swings, Hierarchy of swing components. Containers, Top level containers - JFrame, JWindow, JDialog, JPanel, JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JPasswordField, JTextArea, JList, JComboBox, JScrollPane. APPLETS: Life cycle of an Applet, Differences between Applets and Applications, Developing applets, simple applet.

**Text Book**

E.Balagurusamy Programming with Java – Sixth Edition – McGraw Hill Education Private Limited. 2019

**Reference Books**

1. Patrick Naughton, Herbert Schildt, *The Complete Reference Java 2*, India:McGraw Hill, 5th Edition, 2006.
2. Dr.K.Somasundaram, *Introduction to Java Programming*, India: Jaico Publishing, House, 2013.

**Course Outcomes:**

At the end of the course the student will be able to:

CO1: Describe the basics of OOP and the syntax of Java language

CO2: Discuss Input/Output functions with file manipulations using I/O Streams.

CO3: Analyze GUI programming applications using AWT packages.

CO4: Plan to Develop Java based Applications using GUI and user interface and database Connectivity

CO5: Can build their own application using OOPS concept.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	M	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	S	M	M	S	M	S	M	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITP43	OBJECT ORIENTED PROGRAMMING IN JAVA	L	T	P	C
CORE VII		LAB	-	-	4	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.</li> <li>2. To understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.</li> <li>3. To Understand the principles of inheritance, packages and interfaces</li> <li>4. The Student can develop software in the Java programming language.</li> </ol>					

**Exercise:**

1. Arrays and flow control statements.
2. Run time exception And I/O exception.
3. Multi- Threading.
4. Layout Management.
5. GUI Components (Labels, Check box, Menus, Text, etc.)
6. Event Handling (Focus Events, Key Events, Paint Events, Text Events, Mouse Events, Window Events, Etc.)
7. Animation and Images.
8. Java Applet.
9. Java files management methods.
10. Java Streams.
11. JDBC (Java Database Connectivity).
12. Arithmetic Operation Using Java Script
13. Prime Number Using Java Script
14. Find Largest Number in Array Using Java Script
15. Palindrome Using Java Script

**Course Outcomes:**

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

CO1: Solve problems using OOPs concept in Java

CO2: Implement simple software using JAVA

CO3: Implement the Input/Output functions with file manipulations using I/O Streams.

CO4: Implement the GUI programming applications using AWT packages.

CO5: Apply database connectivity using JDBC

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	M	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	M
CO5	S	S	M	M	S	S	S	S	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITA44	MANAGEMENT INFORMATION SYSTEM	L	T	P	C
ALLIED IV			4	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. To Understand about the Decision Making Concepts.</li> <li>2. To Understand about the Decision Support System.</li> <li>3. To Design Data Base Requirements</li> <li>4. The Student can develop the leadership role of Management Information Systems in achieving the business competitive advantage through informed decision-making.</li> </ol>					

### Unit I: Management Information System

Management Information System: Introduction to Management Information System – Management Information Systems – Role and Importance of Management. Structure of MIS – Operating Elements of Information system – Organization structure and theory. data and information- measuring data, information as a resource, information in organisational functions, types of information technology, types of information systems- transaction processing systems-management information systems

### Unit II: Organisations and Computing

Organisations and Computing: Introduction, Modern Organisation-IT enabled- Networked- Dispersed- Knowledge Organisation, Information Systems in Organisations- what are information systems?, Brief history of computing- ENIAC: Way to commercial computers- Advent of artificial intelligence- advent of personal computing-Free Software Movement- Advent of Internet, The role of internet- Internet and Web: they are different-the internet changes everything

### Unit III: Basic of Information systems

Basic of Information systems – Information and its role in Business – Components of Information Systems - Management System and decision making concepts: Decision Making Process – Process and Modeling in Decision Making.

### Unit IV: MIS and Decision Making Concepts

MIS and Decision Making Concepts: Decision Making – Decision support system: Programmed and Non-programmed Decisions –DSS: Attributes, Benefits, Components, Classification and Types. The competitive environment of business- partnering for mutual benefit- bargaining power of suppliers-bargaining power of buyers and customers-barriers to entry-threat of substitutes-industry regulations, Using IT for competing-competing on low cost-competing on differentiation

### Unit V: Information System Requirements

Information System Requirements: Strategies for the determination of Information Requirements – Database Requirements – User Interface Requirements. The Need for Data Management- History of data use, Challenges of Data Management- data independence- reduced data redundancy- data consistency- data access- data administration- managing concurrency-managing security- recovery from crashes-application development, Database Concepts- fields, records and files- basic architecture, Data Warehouses- data mining uses



**Text Books:**

1. Gorgon Davis & Margret He H.D.Dlaon, Management Information System, McGraw Hill International Editions, 1994.

**Reference Books:**

1. RoberG.Murdick, Joel E.Ross and R.Clasggett,-Information System for Modern Management –PHI, 1990.
2. Jawadekar, Management Information System — TMH – 1997.
3. R.Schultheis, Management Information System, The Manager View –TMH, 1994.

**Course Outcomes:**

Upon completion of this course, students will be able to:

CO1: Relate the basic concepts and technologies used in the field of management information systems.

CO2: Compare the processes of developing and implementing information systems.

CO3: Outline the role of the ethical, social, and security issues of information systems.

CO4: Translate the role of information systems in organizations, the strategic management processes with the implication of management

CO5: Develop and handle large amount of data in a strategic manner.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	M	M	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	S	M
CO5	S	S	M	S	M	M	S	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITE421	CHOICE -I	L	T	P	C
ELECTIVE II		SYSTEM SOFTWARE	3	-	-	3
Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyze					
Objectives	1. To understand the relationship between system software and machine architecture. 2. To know the design and implementation of assemblers, macro processors, loaders, linkers and compilers. 3. To understand the process of scanning and parsing of a program. 4. To have clear knowledge about system software like assemblers, loaders, linkers, macro processors and compilers.					

### Unit I: System Software Vs. Application Software

System Software Vs. Application Software, Different System Software – Assembler, Linker, Loader, Macro Processor, Text Editor, Debugger, Device Driver, Compiler, Interpreter, Operating System (Basic Concepts only) SIC & SIC/XE Architecture, Addressing modes, SIC & SIC/XE Instruction set, Assembler Directives and Programming.

### Unit II: Assemblers

Assemblers: Basic Functions of Assembler. Assembler output format – Header, Text and End Records- Assembler data structures, Two pass assembler algorithm, Hand assembly of SIC/XE program, Machine dependent assembler features. Machine-Dependent Assembler Features – Machine-Independent Assembler Features – Assembler Design Options

### Unit III: Loaders and Linkers

Loaders and Linkers: Basic Loader functions - Design of absolute loader, Simple bootstrap Loader, Machine dependent loader features- Relocation, Program Linking, Algorithm and data structures of two pass Linking Loader, Machine dependent loader features, Loader Design Options. Basic Loader Functions

### Unit IV: Macro Processors

Macro Processors: Basic Macro Processor Functions – Machine-Independent Macro Processor Features – Macro Processor Design Options Anatomy of a device driver, Character and block device drivers, General design of device drivers Compilers: Basic Compiler Functions – Machine-Dependent Compiler Features - Machine-Independent Compiler Features

### Unit V: Debugging

Debugging Functions and Capabilities, Relationship with other parts of the system, Debugging Methods- By Induction, Deduction and Backtracking. Overview of Editing, User Interface, Editor Structure.

### Text Book

1. Leland L. Beck & Manjula. D - System Software - An Introduction to Systems Programming - 3rd Edition. India: Pearson Education (2009).

<b>COURSE CODE</b>	<b>U21ITE422</b>	<b>CHOICE -II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**Reference Books**

1. Dhamdhere.D.M - System Programming and Operating Systems - India: Tata McGraw Hill Education Private Limited. (2006)
2. Donovan.J.J - Systems Programming - India: Tata McGraw Hill Education Private Limited. (2001).

**Course Outcomes:**

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

CO1: understand the relationship between system software and machine architecture.

CO2: know the design and implementation of assemblers, macro processors, loaders, linkers and compilers.

CO3: interpret various concepts of scanning and parsing of a program

CO4: discuss the processing of a HLL program for execution on a computer system

CO5: learn internal operations of the compiler.

**Mapping of COs with POs and PSOs:**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	S	M	M	S	S	M	S	M	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

ELECTIVE II		MOBILE COMPUTING	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. To clearly understanding the mobile communications environment</li> <li>2. To get clear idea about Satellite Systems.</li> <li>3. To Interface a mobile computing system to hardware and networks.</li> <li>4. The Student can develop their knowledge in mobile computing system and how to interact with servers and database systems.</li> </ol>					

**Unit I: Introduction**

Introduction: Applications - A Simplified Reference Model. Wireless Transmission: Frequencies for radio transmission – Signals – Antennas - Signal Propagation – Multiplexing – Modulation – Spread Spectrum - Cellular System. Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio

**Unit II: Medium Access Control**

Medium Access Control: Motivation for a Specialized MAC- Hidden and exposed terminals – Near and far terminals – SDMA – FDMA – TDMA - Fixed TDM – Classical Aloha – Slotted Aloha – Carrier Sense Multiple Access – Demand assigned Multiple Access – PRMA Packet Reservation Multiple Access – Reservation TDMA – Multiple Access with Collision Avoidance – Polling – Inhibit Sense Multiple Access. CDMA - Spread Aloha multiple access. Comparison of S/T/F/CDMA.

**Unit III: Telecommunication Systems**

Telecommunication Systems: GSM - Mobile Services – System Architecture – Radio Interface – Protocols - Localization and Calling – Handover – Security. UMTS and IMT 2000: UMTS releases and standardization - UMTS System Architecture - UMTS Radio Interface –UTRAN - UMTS Handover.

**Unit IV: Satellite System**

Satellite System: History – Applications – Basics - Routing– Localization – Handover. Wireless LAN: IEEE 802.11- System Architecture – Protocol Architecture - Physical Layer – Medium Access Control Layer. Bluetooth: User scenarios – Architecture – Radio Layer – Baseband Layer – Link Manager Protocol.

**Unit V: Mobile Network Layer**

Mobile Network Layer: Mobile IP - Goals, Assumption, and Requirements – Entities and Terminology – IP Packet delivery – Agent discovery – Registration. Dynamic Host Configuration Protocol - Mobile Transport Layer: Traditional TCP - Congestion Control – Slow Start – Fast Retransmit.

**Text Book(s):**

1. Jochen Schiller, “Mobile Communications”,2nd Edition, eighth impression, Pearson Education, 2011.

**Reference Book(s):**

1. William Stallings, “Wireless Communication and Networks”, 2nd Edition, Pearson Education, 2005.
2. Theodore Rappaport, “Wireless Communications: Principles and Practice”, Prentice Hall Communications, 1996.

### Course Outcome

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

CO1 : Understand fundamentals of wireless communications.

CO2 :Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.

CO3: Demonstrate basic skills for cellular networks design.

CO4: Apply knowledge of TCP/IP extensions for **mobile** and wireless networking.

CO5: Learn and apply wired and wireless devices.

### Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	M	M	S
CO3	S	S	M	M	S	S	S	S	S
CO4	S	S	M	S	S	M	S	M	M
CO5	M	S	M	M	S	M	S	S	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT51	COMPUTER NETWORKS				L	T	P	C
CORE- VIII						5	-	-	4
Cognitive Level	K1: Recall	K2: Understand	K3: Apply	K4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>To build an understanding of the fundamental concepts of computer networking and</li> <li>To prompt the student to learn advanced networking.</li> <li>To understand the working principles of various application protocols</li> <li>To know about the Working with routing algorithms.</li> </ol>								

### Unit I: Basics of Computer Networks

Introduction: Uses of Computer Networks–Types of Computer Networks–Network Technology – Examples of Networks – Network protocols–Reference Models – Network Standardization.Introduction – Uses – Network Hardware – LAN –MAN – WAN, Internetworks – Network Software – Protocol hierarchies – Designissues for the layers – Interface & Service – Service Primitives.Reference models – OSI – TCP/IP.

### Unit II: Network topologies

Introduction: Network topologies; Linear Bus Topology, Ring Topology, Star Topology, Hierarchical or Tree Topology, Topology Comparison, Considerations when choosing a Topology: Switching; Circuit switching, Message switching, Packet switching, Implementation of packet switching, Relationship between Packet Size and Transmission time, Comparison of switching techniques: Multiplexing; FDM – Frequency division multiplexing, WDM – Wavelength division multiplexing, TDM – Time division multiplexing:.

### Unit III: Data Link

Data Link layer Design Issues – Flow Control and ARQtechniques. Data link Protocols – HDLC. DLL in Internet.MACSub layer – IEEE 802 FOR LANs & MANs, IEEE 802.3, 802.4,802.5.Bridges - Switches – High Speed LANs - Gigabit Ethernet.Wireless LANs - 802.11 a/b/g/n, 802.15.PPPData Link Layer & Medium Access Layer – Data Link Layer - Design Issues – Elementary Data link protocols – Multiple Access Protocols – Ethernet, Wireless LAN, Bluetooth

### Unit IV: Network Layer & Transport Layer

Network Layer & Transport Layer: Network Layer Design Issues – Routing Algorithms – Transport Layer- The Transport Service – Elements of Transport Protocol. Congestion control algorithms – QoS. Internetworking – Network layer in internet. IPv4 - IP Addressing – Classless and Classfull Addressing.Sub- netting.

### Unit V: Application Layer &Security

Application Layer &Security: DNS- E-Mail - Security – Cryptography – Digital Signature – Social Issues.Internet Control Protocols – ICMP, ARP, RARP, BOOTP. Internet Multicasting – IGMP, Exterior Routing Protocols – BGP.IPv6 –Addressing – Issues, ICMPv6.Transport Layer – TCP & UDP. Application layer –FTP, DNS, Electronic mail, MIME, SNMP.Introduction to World Wide Web.

**Text Book**

1. Andrew S.Tanenbaum, Amsterdam, Nick Feamster, David J. Wetherall, Computer Networks, 6<sup>th</sup> Edition, Pearson, 2021

**Reference Book**

- 1) Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition, TMH, 2013.
- 2) Andrew S. Tanenbaum, David J. Wetherall, Computer Network, Fifth Edition, Pearson Education, 2011.

**Course Outcomes:**

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

CO1: explain the concepts of various reference models, Internet and protocols

CO2: identify different transmission media and topologies

CO3: distinguish error detection and error correction of data

CO4: implement routing algorithms to determine the optimal path

CO5: Able to send data communication through wired and wireless mode.

**Mapping of COs with POs and PSOs**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	M
CO2	S	S	M	S	S	S	M	S	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	M	S
CO5	S	S	S	M	M	S	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U2IIT52	OPERATING SYSTEM CONCEPTS	L	T	P	C
CORE - IX			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To introduce various components of computer hardware and operating systems. 2. To discuss the structure of operating system, its functions and algorithms. 3. To understand the working of operating system, its structures and functioning 4. To Learn various algorithms used in operating systems.					

### Unit 1: Process Management

Introduction - What is operating system do-operating System structure-operating system services-user operating system interface -system calls-Operating system design and implementation--operating –system structure. Process Management- Process scheduling-operations on processes Inter-process communication –Threads and concurrency-overview- multithreading models.

### Unit II: Process Scheduling & Threads

Processes – Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; CPU Scheduling – Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling; Threads- Overview, Multithreading models, Threading issues; Process Synchronization – The critical-section problem, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Critical regions, Monitors;

### Unit III: Deadlocks

Deadlocks: Deadlock Characterization- Methods for Handling Deadlocks-Deadlock Prevention-Avoidance – Detection-Recovery. Main Memory: Background-Contiguous Memory Allocation – paging- Structure of the page table- Swapping

### Unit IV: Virtual Memory

Virtual Memory: Demand Paging-Copy on Write-Page Replacement-Allocation of Frames – Thrashing- Mass Storage Structure- RAID structure Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, 32 and 64 bit architecture Examples; Virtual Memory – Background, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

### Unit V: Storage system

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, swap space management; File-System Interface – File concept, Access methods, Directory Structure, Directory organization, File system mounting, File Sharing and Protection; File System Implementation- File System Structure, Directory implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

### Text Book

Abraham Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts, Wiley, 10th Edition, 2018



**Reference books**

1. Andrew S Tanenbaum, Herbert Bos, Modern Operating Systems, 4e Fourth Edition, Pearson Education, 2016
2. Abraham Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts, Wiley, 8th Edition

**Course Outcomes:**

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

CO1: Understand the types, design, implementation of operating system and I/O programming concepts.

CO2: Recognize the management of main and virtual memory schemes.

CO3: Analyze different scheduling algorithms and the management of devices.

CO4: Understand and manage the information system using OS

CO5: Learn to work on different platforms.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	M	M	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	S	M
CO5	M	S	M	S	M	S	M	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT53	WEB TECHNOLOGY			
CORE -X		L	T	P	C
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Objectives	<ol style="list-style-type: none"> <li>1. To understand the concept of Tables, Forms, Files, Basic Web server Controls.</li> <li>2. Able to know Internet Basics and HTML.</li> <li>3. To understand the concept of OLEDB connection class &amp; Cookies.</li> <li>4. Knowledge of solving web client/server problems.</li> </ol>				
		5	-	-	4

### Unit I: Web Essentials

Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers. Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-HTML 5.0.

### Unit-II: Style Sheets

Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML- Style Rule Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout-Beyond the Normal Flow-CSS3.0. Client-Side Programming: The JavaScript Language-History and Versions Introduction JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

### Unit-III: Host Objects

Host Objects: Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window. Server-Side Programming: Java Servlets- Architecture -Overview-A Servlet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency- Databases and Java Servlets.

### Unit-IV: Separating Programming and Presentation

Separating Programming and Presentation: JSP Technology Introduction-JSP and Servlets-Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm- Databases and JSP. Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration-Namespaces- DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data: XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browser

**Unit-V: AJAX**

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods. Web Services: JAX-RPC-Concepts-Writing a Java Web Service-Writing a Java Web Service Client-Describing Web Services: WSDL- Representing Data Types: XML Schema-Communicating Object Data: SOAP Related Technologies-Software Installation-Storing Java Objects as Files

**Text Book**

1. Deitel&Deitel, internet & World Wide Web How to program, Pearson Education, 2018.

**Reference Books**

1. I.Bayross, Web Enabled Commercial Application Development Using HTML, DHTML, Javascript, Pen CGI, BPB Publications, 2000
2. J.Jaworski, Mastering Javascript, BPB Publications, 1999
3. T.A.Powell, Complete Reference HTML (Third Edition),TMH, 2002
4. G.Buczek, ASP.NET Developers Guide, TMH, 2002

**Course Outcomes:**

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

CO1: learn to design web pages using HTML.

CO2: to gain knowledge on creating interactive web pages using ASP.Net

CO3: to understand how to use Cookies and DOM.

CO4: to develop server side scripting using OLEDB

CO5: create own BLOG own webpage.

**Mapping of COs with POs and PSOs**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M	M	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S
CO3	S	M	M	M	M	M	M	M	S
CO4	S	S	S	S	S	S	S	S	M
CO5	M	M	M	S	S	M	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT54	COMPUTER GRAPHICS			
CORE- XI		L	T	P	C
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Objectives	<ol style="list-style-type: none"> <li>To Understand computational development of graphics</li> <li>To Analyze the Line attribute &amp; curve attribute</li> <li>To Design animation with rotation, translation and scaling</li> <li>The Student can gain in-depth knowledge about the current 3D graphics.</li> </ol>				

### Unit I: Overview of graphics systems

Overview of graphics systems: Video display devices – Raster-scan systems – Random-scan systems – Graphics monitors and workstation – Input devices – Hard-copy devices – Graphics software. Introduction, What is computer Graphics?, Area of Computer Graphics, Design and Drawing, Animation Multimedia applications, Simulation, How are pictures actually stored and displayed, Difficulties for displaying pictures.

### Unit II: Output primitives

Output primitives: Points and lines – Line-drawing algorithms – DDA algorithm – Bresenham's line algorithm – Attributes of output primitives: Line attributes – Area-fill attributes – Character attributes – Bundled attributes. Cathode Ray Tube, Quality of Phosphors, CRTs for Color Display, Beam Penetration CRT, The Shadow – Mask CRT, Direct View Storage Tube, Tablets, The light Pen, Three Dimensional Devices

### Unit III: Geometric transformations

Two-dimensional Geometric transformations: Basic transformations – Matrix representations – Composite transformations – Other transformations. What is transformation?, Matrix representation of points, Basic transformation, Need for Clipping and Windowing, Line Clipping Algorithms, The midpoint subdivision Method, Other Clipping Methods, Sutherland – Hodgeman Algorithm, Viewing Transformations

### Unit IV: Windowing and Clipping

Windowing and Clipping – Windowing concepts – Clipping Algorithms – Window to view port Transformations – segments – Interactive input methods – Physical input devices – logical classification of input devices – interactive picture construction techniques – input functions. Graphical Input Techniques, Positioning Techniques, Positional Constraints, Rubber band Techniques

### Unit V: Three dimensional concepts

Three dimensional concepts – 3D Display Methods – 3D Object representations – polygon surfaces- curved line and surfaces – 3D transformations- Translation-Rotation-Scaling- Other Transformations-Composite Transformations, Solid Area Scan Conversion, Scan Conversion of Polygons, Algorithm Singularity,

### Text Book

Donald Hearn and M.Pauline Baker, Computer Graphics C Version Second Edition, Pearson Education, 2006.

**Reference Books:**

1. William M. Neuman and Robert F. Sproul "Principles of Interactive computer Graphics", McGraw Hill International Edition, 2nd Edition, 1996.
2. Foley, van Dam, Feiner, and Hughes. Computer Graphics: Principles and Practice, 3<sup>rd</sup> edition, 2014.

**Course Outcomes:**

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

CO1: Have a broad knowledge about the overview of Graphics System

CO2: Analyse and design algorithms using attributes in graphics

CO3: Recognize the properties of Two- and three-dimensional geometric transformations

CO4: Understand the importance of Windowing and Clipping

CO5: Develop user interface environment using graphics tools.

**Mapping of Cos with Pos and PSOs**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S
CO3	S	M	M	S	S	M	M	M	S
CO4	S	S	S	M	M	S	S	S	S
CO5	S	S	M	S	M	M	S	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITP54	WEB TECHNOLOGY LAB	L	T	P	C
CORE - XII				-	-	5
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. Apply the knowledge of the internet and related internet concepts that are vital in understanding web application development and analyze the insights of internet programming to implement complete application over the web.</li> <li>2. To understand, analyze and apply the role of markup languages in the workings of the web and web applications.</li> <li>3. To automate the real time problems by developing &amp; analyzing a web project and identify its elements and attributes in comparison to traditional projects.</li> <li>4. The Students can choose best technologies for solving web client/server problems.</li> </ol>					

Programs using the following concepts

#### **VB.NET**

1. Enumeration
2. Exception handling
3. Constructor
4. Destructor
5. Inheritance
6. Polymorphism
7. Interface

#### **ASP.NET**

1. Designing simple Form
2. data grid
3. request and response object
4. Cookies
5. Ad rotator Control
6. Validator Control
7. String Functions
8. OLEDB
9. Generate the Hotspots in the image

**VB SCRIPT**

1. Branching statements
2. Sorting
3. Looping through Arrays
4. Functions
5. Forms

**Course Outcomes:**

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

CO1: To perform the basic functions of VB.NET.

CO2: Perform tests, resolve defects and revise existing code

CO3: Develop dynamic web applications, create and consume web services

CO4: Use appropriate data sources and data bindings in VB.NET / ASP.Net.

CO5: Develop their own applications with database connectivity.

**Mapping of COs with POs and PSOs**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	M	M	S
CO2	S	S	S	M	S	S	S	M	M
CO3	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	M	M	M	S
CO5	S	S	M	M	S	S	S	M	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITE531	CHOICE -I	L	T	P	C
<b>ELECTIVE -III</b>		<b>MULTIMEDIA AND ITS APPLICATION</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. To understand Multimedia Architecture.</li> <li>2. To Design Authoring Tools.</li> <li>3. To Gain the importance of Internet in multimedia.</li> <li>4. The Student can able to work with the current multimedia applications.</li> </ol>					

### Unit I: Basics of Multimedia

Introduction- Brief history of Multimedia – Resources for multimedia developers – Types of products – Multimedia Computer Architecture. Analog Signal, Waves, General properties of Analog Signals, Digital Representation, Need for digital representation, Analog to digital conversion, Nyquist's Sampling Theorem, Encoder Design, Digital to Analog conversion, Decoder design and its principles, Encoder – Decoder, Relation between sampling rate and bit depth.

### Unit II: Digital Audio

Digital Audio – Characteristics of sound and Digital Audio – Digital Audio Systems – MIDI – Audio File Formats - Using Audio in Multimedia Applications – Digital Video – Background on Video – Characteristics of Digital Video – Digital Video Data Sizing – Video Capture and Playback Systems – Computer Animation – Using Digital Video in Multimedia Applications.

### Unit – III: Product Design

Product Design – Building Blocks – Classes of products – Content Organizational Strategies – Story Boarding – Authoring Tool – Categories of Authoring Tools – Selecting the right Authoring paradigm. Types Of Media, Time Independent Media, Time Dependent Media, Text, Unformatted Text, Formatted Text, Hyper Text, Essential Features Of HTML, Graphics And Images,

### Unit IV: Multimedia and the Internet

Multimedia and the Internet – The Internet – HTM Land Web Authoring – Multimedia Considerations for the Internet – Design Considerations For Web Pages – Multimedia Development Team – Team Approach – Assembling a Multimedia Production Team. Creation Of Computer Graphics, Digitised Documents, Digitized Pictures, Digitised Cameras, Raster Scan Principles, Image Analysis, and Image Transmission.

### Unit V: Text

Text – Elements of Text – Text Data Files – Using Text in Multimedia Applications – Hypertext – Graphics – Element of Graphics – Images and Color – Graphics file and Application Formats – Obtaining Images for Multimedia Use – Using Graphics in Multimedia Applications. Compression Principles, Source Encoders and destination decoders, Lossless and Lossy Compression, Entropy Encoding, Source Encoding, Text Compression, Static Huffman coding.



**Text books:**

1. David Hillman, Multimedia Technology and Applications — Galgotia Publications Pvt. Ltd., 1998.

**Reference books:**

1. Tay Vaughan -Multimedia making it work –TMH 1996.

**Course outcomes**

1. After completing the course the students can
2. Define multimedia to potential clients.
3. Identify and describe the function of the general skill sets in the multimedia industry.
4. Identify the basic components of a multimedia project.
5. Learn to send lossy and lossless data.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	M	S	M	M	M	S	M	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITE532	CHOICE -II				L	T	P	C
<b>ELECTIVE -III</b>		<b>E-COMMERCE</b>				<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>
Cognitive Level	K1: Recall	K2: Understand	K3: Apply	K4: Analyze					
<b>Objectives</b>									
1	To establish knowledge about computers and to acquaint the basic concepts of e-commerce.								
2	To instill idea of convergence of business relationship through recent technologies.								
3	To impart the business knowledge into Computer Application students.								
4	To identify, define and differentiate the various modes of electronic commerce.								
<b>Unit I: Introduction to computers</b>									
Introduction to computers- Importance of Computers- Computer Applications in various Areas of Business- General Application of Computers in Various Fields. Fundamentals of Computers: Classification of Computers- Basic Principles of operation of Digital Computer- Computer system-computer virus- Development of computers and Computer Generation- Computer Number System.									
<b>Unit II: Electronic commerce</b>									
Electronic commerce – Introduction – Business Models of e-Commerce – Business to Business e-commerce customer to customer ecommerce and EDI – Business Applications of e-commerce. Infrastructure for e-commerce – Communication networks for e-commerce. General applications of electronic commerce									
<b>Unit III: Network services</b>									
Network services: secure messaging – payment systems in e-commerce – Structured electronic documents. Cryptocurrency: Understanding Cryptocurrency - Types of Cryptocurrency - Advantages and Disadvantages.Android Applications– Introduction-Concept-Applications. V-Commerce: Introduction and Features.									
<b>Unit IV: E-online Banking</b>									
E-online Banking: Introduction Concepts and Meaning-Need for computerization-Electronic delivery channels-Automated Teller Machine(ATM)-Electronic Fund Transfer(EFT)-uses computerization in clearing houses-Telebanking-Electronic Money Transfer(EMT) - e-Cheque Financial Transactions Terminals - MICR Cheques-e-Banking in India.									
<b>Unit V: E-Commerce Technology</b>									
E-Commerce Technology – Security Issues in e-Commerce – Legal and Ethical Issues - Role of social media in e-Commerce Industry-M-Commerce and WAP - Mobile Commerce Risk, Security and Payment Methods - Mobile money-infrastructure and fraud prevention for M-payment - Current Trends in electronic world – e-Waste – e-Surveillance – e-Governance - e-Care.									
<b>Text Book:</b>									
1. , R.Saravana Kumar R.ParameswaranT.Jayalakshmi, S.Chand, “Information Technology (Unit I)” , 2015.									
2. V. Rajaraman , “Essentials of E-Commerce Technology(Unit II,III)”, PHI Learning Private Limited, 2015.									
3. Dr.C.S.Rayudu, “e-Commerce e-Business (Unit IV)” , Himalaya publishing house, 2015.									
4. Dr. U.S. PandeyEr. SaurabhShukla S. Chand, “e-Commerce and Mobile Commerce									

Technologies (Unit II,V)”, 2015.

**Reference Books:**

1. S. Jaiswal, “Doing Business on the Internet e-Commerce (Electronic Commerce for Business)”, Galgotia Publications, 2015.
2. CSV Murthy, “e-Commerce– Concepts, Models, Strategies”, Himalaya Publishing House, 2015.
3. Ravi Kalakota Andrew B. Whinston, “Frontiers of e-Commerce”, Pearson Education, 2015.

**Course Outcomes**

CO1: Enumerate the technological changes in trade

CO2: Explain E-commerce on business models and strategy

CO3: Interpret various terminologies of electronic commerce.

CO4: Understand the e-commerce technology and security issues.

CO5: Create own E-Commerce blog.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	M	M
CO5	M	M	M	S	M	M	S	S	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

<b>COURSE CODE</b>	<b>U21ITS51</b>	<b>OPERATING SYSTEM (OS) LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>SBE -III</b>			<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>

**Objectives:**

1. To Write Shell Script Programs To Solve Problems.
2. To Implement Some Standard Linux Utilities Such As Ls.CpEtc Using System Calls.
3. To Develop Network Based Applications.
4. To Run Various Unix Commands On A Standard Unix/Linux Operating System.

**List Of Exercises:**

1. Creation Of A Child, Orphan And Zombie Process.
2. Execution Of Various File/Directory Handling Commands.
3. Shell Scripts To Check Various Attributes Of Files And Directories.
4. Shell Scripts To Perform Various Operations On Given Strings.
5. Write A Shell Script To Find The Factorial Of Given Integer
6. Shell Scripts To Explore System Variables Such As Path, Home Etc.
7. Shell Scripts To Check And List Attributes Of Processes.
8. Execution Of Various System Administrative Commands.
9. Write A Shell Script To Display List Of Users Currently Logged In.
10. Write A Shell Script To Delete All The Temporary Files.
11. Simulation OfFcfs Process Scheduling.
12. Simulation Of Round Robin Process Scheduling.
13. Simulation OfSjf Process Scheduling.
14. Demonstration Of Process Synchronization Using Signals.
15. Demonstration Of Process Synchronization Using Semaphores.
16. Deadlock Avoidance Using Banker's Algorithm.

**Course Outcomes:**

On Successful Completion Of The Course, Students Will Be Able To

CO1: Learn Basic Linux Commands.

CO2: Understand The Basic Behaviour Of Operating System

CO3: Demonstrate Different Process Scheduling And Executing Algorithm

CO4: Do Shell Programming On Linux Os

CO5: Able to develop own applications in a linux environment.

**Mapping of COs with POs and PSOs**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	S	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	S	S	M	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S
CO5	M	S	M	M	S	S	S	S	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT61	INTERNET OF THINGS			
CORE - XIII		L	T	P	C
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Objectives	<ol style="list-style-type: none"> <li>1. To explore various components of Internet of things such as Sensors, internetworking and cyber space.</li> <li>2. To design and implement IoT circuits and solutions.</li> <li>3. To understand the concepts of Internet of Things</li> <li>4. Can able to build IoT applications.</li> </ol>				

### Unit I:Introduction to IoT

Introduction to IoT: Sensing, Actuation, Networking basics, Communication Protocols, Sensor Networks, Machine-to-Machine Communications, IoT Definition, Characteristics. IoT Functional Blocks, Physical design of IoT, Logical design of IoT, Communication models & APIs Domain specific applications of IoT: Home automation, Industry applications, Surveillance applications, Other IoT application.

### Unit II:M2M to IoT

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, 8 3 M2M vsIoT An Architectural Overview–Building architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. Reference Architecture and Reference Model of IoT.

### Unit III:MAC protocol

Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.IoT Reference Architecture- Getting Familiar with IoT Architecture, Various architectural views of IoT such as Functional, Information, Operational and Deployment. Constraints affecting design in IoT world- Introduction, Technical design Constraints.

### Unit IV:IoT Design challenges

Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges - Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications.

### Unit V: Developing IoT solutions

Developing IoT solutions: Introduction to Python, Introduction to different IoT tools, Introduction to Arduino and Raspberry Pi Implementation of IoT with Arduino and Raspberry, Cloud Computing, Fog Computing, Connected Vehicles, Data Aggregation for the IoT in Smart Cities, Privacy and Security Issues in IoT.

### Text Book

1. Vijay Madiseti, ArshdeepBahga, “Internet of Things: A Hands-On Approach”, 2014.

**Reference Book**

1. WalteneusDargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice", 2009.

**Course Outcomes:**

CO1: Understand the concepts of Internet of Things

CO2: Analyze basic protocols in wireless sensor network

CO3: Design IoT applications in different domain and be able to analyze their performance

CO4: Implement basic IoT applications on embedded platform.

CO5: Simulation of tools in an IOT environment.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	M	S
CO5	S	S	M	S	M	S	M	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT62	DATA MINING			
CORE -XIV		L	T	P	C
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Objectives	<ol style="list-style-type: none"> <li>To Aware about the Functionalities, patterns, of operating system.</li> <li>To Design and deploy appropriate classification techniques.</li> <li>To Use association rule mining for handling large data set.</li> <li>To discover interesting patterns from large amounts of data toanalyze and extract patterns to solve problems.</li> </ol>				

### Unit I: Introduction to Data mining

Introduction - What is Data mining, Data mining – On kind of data - Data mining Functionalities – Classification of Data mining Systems - Data mining Task Primitives - Integration of Data Mining System - Major issues in Data Mining. Introduction to Information Retrieval and Data Mining include Correlation, association rules, Knowledge Discovery from Databases, Classification, and Clustering.

### Unit II: Data Preprocessing

Data Preprocessing : Need for pre-processing the Data - Descriptive Data Summarization – Data Cleaning - Data Integration and Transformation - Data Reduction-Data Discretization and Concept Hierarchy Generation.

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

### Unit III: Data Warehouse and OLAP Technology

Data Warehouse and OLAP Technology An overview: Data Warehouse –A Multidimensional Data Model - Data Warehouse Architecture - Data Warehouse Implementation – From Data warehousing to Data Mining. What is OLAP, Dimensional Modelling (facts, dimensions), cube, Schema, defining schema’s star schema, snow-flakes schema and fact constellation, ETL process

### Unit IV: Mining

Mining – Frequent Patterns, Associations Correlations: Basic Concepts - Efficient Scalable - Frequent Item set Mining methods - Mining Various Kinds of Association rules. Decision tree (ID3, C4.5, CART), Bayesian Classification, Rule based, Neural Network, Lazy and Eager Learners, Parameters for measuring Accuracy

### Unit V: Applications and Trends in Data mining

Applications and Trends in Data mining: Data mining Applications –Data Mining System Products and Research Prototypes - Additional Themes on Data Mining - Social impact of Data mining - Trends in Data mining .Linear and nonlinear regression, Logistic Regression Use of open source data mining tool – WEKA, XLMiner, MOA.

### Text Book:

- Jiawei Han and Micheline Kamber, Data Mining (Concepts and Techniques) Second Ed Morgan Kaufmann Publishers ( An imprint of Elsevier), 2006.



**Reference Books:**

- 1 Karguta, Joshi, Sivakumar - Data Mining (Next Generation Challenges and Future Directions) & Yesha Publishers : Prentice Hall of India ( 2007 )
2. Ian H. Witten & Data Mining (Practical Machine Learning Tools and Techniques (II Edition) Eibe Frank Publishers : Morgan Kaufmann Publishers (An imprint of Elsevier], 2011.
3. Alex Benson, Stephen V. Smith- Data Warehousing, Data Mining & OLAP, Publishers: Tata McGraw – Hill, 2004.

**Course Outcomes**

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

CO1: explain the concepts of data and trends of data mining

CO2: distinguish various data mining techniques such as Association rule mining, Classification and Clustering

CO3: assess the application of data mining.

CO4: apply the data mining techniques for various applications.

CO5: Learn about text and web mining.

**Mapping of COs with POs and PSOs**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	S	S
CO5	M	M	M	S	S	M	S	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITP65	IOT LAB	L	T	P	C
CORE -XV			-	-	5	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. To understand what is IoT, its importance and Application</li> <li>2. To interface the Arduino with LED</li> <li>3. To interface Bluetooth with Arduino/</li> <li>4. To interface Bluetooth with Rasperry pi</li> </ol>					

### Experiments:

1. Familiarization with Arduino/Rasperry Pi and perform necessary software installation.
2. To interface LED/Buzzer with Arduino/Rasperry Pi and write a program to turn ON LED for 1 sec after every 2 seconds.
3. To interface Push button/Digital sensor (IR/LDR) with Arduino/Rasperry Pi and write a program to turn ON LED when push button is pressed or at sensor detection.
4. To interface motor using relay with Arduino/Rasperry Pi and write a program to turn ON motor when push button is pressed.
5. To interface Bluetooth with Arduino/Rasperry Pi and write a program to send sensor data to smartphone using Bluetooth.
6. To interface Bluetooth with Arduino/Rasperry Pi and write a program to turn LED ON/OFF when „1“/“0“ is received from smartphone using Bluetooth.
7. Write a program on Arduino/Rasperry Pi to upload temperature and humidity data to thingspeak cloud.
8. Write a program on Arduino/Rasperry Pi to retrieve temperature and humidity data from thingspeak cloud.
9. To install MySQL database on Rasperry Pi and perform basic SQL queries.
10. Write a program on Arduino/Rasperry Pi to publish temperature data to MQTT broker.
10. Write a program on Arduino/Rasperry Pi to subscribe to MQTT broker for temperature data and print it.
11. Write a program to create TCP server on Arduino/Rasperry Pi and respond with humidity data to TCP client when requested.

### Course Outcomes

- CO1: Investigate a variety of emerging devices and technologies such as smart sensing, pervasive connectivity, virtual interfaces & ubiquitous computing and their potential applications in consumer, retail, healthcare and industrial contexts
- CO2: Collaborate on research with industry partners to address significant and complex challenges surrounding IoT technologies and applications
- CO3: This may be used as a platform for conducting consultancy work required by government/Private organizations in around Coimbatore
- CO4: Enable faculty learning, research and hands-on experimentation to discover and demonstrate the promise of the Internet of Things
- CO5: Learn and simulate real time applications in an IOT environment.

**Mapping of COs with POs and PSOs**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	S	M
CO5	M	S	S	S	M	M	S	S	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITT63	ARTIFICIAL INTELLIGENCE			
CORE - XVII		L	T	P	C
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Objectives	<ol style="list-style-type: none"> <li>1. To learn to summarize the basics of AI and Machine learning.</li> <li>2. To understand different search methods</li> <li>3. To analyze the various logics and applications</li> <li>4. To interpret the different learning methods</li> </ol>				

### Unit I: Artificial intelligence

Artificial intelligence meaning- The AI problems – The underlying assumption – What is an AI Techniques? – The level of the model. Problems, problem spaces, and search: Defining the system – problem characteristics – production system characteristics. Statistical analysis concepts Descriptive statistics Introduction to probability and Bayes theorem Probability distributions Hypothesis testing & scores

### Unit II: Heuristic search techniques

Heuristic search techniques: Generate and Test – Hill climbing – Best –first search – Problem reduction – Constraint satisfaction – Means –ends analysis. Knowledge representation issues: Representations and mappings – Approaches to knowledge representation.

### Unit III: Predicate logic

Using predicate logic: Representing simple facts in logic – Representing instance and ISA relationships – computable functions and predicates resolution – natural deduction. Representing Knowledge using rules: Procedural versus declarative knowledge – Logic programming – Forward versus Backward reasoning – Matching – Control Knowledge.

### Unit IV: Game playing

Game playing: Overview – The minimax search procedure – Adding alpha – beta cutoffs – Additional refinements – Iterative Deepening – References on specific games. Understanding: What understands? What makes understanding hard? Planning- The blocks world- components of a planning system –Good stack planning-Coral Stack planning-Non linear planning using constraint posting.

### Unit V: Expert systems

Expert systems: Representing & using domain knowledge – Expert system shells – Knowledge acquisition. Perception and Action: Real-time search – perception- Action – Robot Architectures. Introduction to Machine learning Paradigms: Supervised Learning Introduction to Supervised learning Supervised Learning concepts Linear Regression

### Text book:

Elaine rich, Kevin Knight, Shivashankar B Nair - Artificial Intelligence - Tata McGraw Hill 3rd Edition, 2011

**Reference Books:**

1. Stuart Russell - Artificial Intelligence: A Modern Approach - Pearson 3rd Edition, 2013
2. Deepak Khemani - A First Course in Artificial Intelligence - McGraw Hill 2013
3. Mishra R. B. - Artificial Intelligence - Prentice Hall of India 2010

**Course Outcomes:**

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

CO1: Learn about the artificial intelligence problem and its characteristics

CO2: Demonstrate the fundamentals of heuristic search techniques and reasoning for problem solving.

CO3: Understand the problem-solving using predicates.

CO4: Describe the concepts of expert systems with case studies for various applications

CO5: Understand different terminologies in various expert system concept.

**Mapping of COs with POs and PSOs**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	S	M	M
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	M	M
CO4	S	S	S	S	S	S	S	M	M
CO5	S	S	M	S	S	S	S	M	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITR61	CORE XVII- Project	L	T	P	C
			-	-	5	4

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

COURSE CODE	U21ITE641	CHOICE -I	L	T	P	C
ELECTIVE -IV		ETHICAL HACKING	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>To Identify the vulnerabilities in a given network infrastructure Understand</li> <li>Implement real-world hacking techniques to test system security apply</li> <li>Employ complex tools to identify and analyze your company's risks and weaknesses apply.</li> <li>Apply countermeasures to secure your system against threats apply</li> </ol>					

### Unit I:Introduction to ethical Hacking

An Introduction to ethical Hacking : Security Fundamental, Security testing, Hacker and racker, Descriptions, Test Plans-keeping It legal, Ethical and Legality . What is Hacking? Introduction &Types,Potential Security Threats To Your Computer SystemsSkills Required to Become a Ethical Hacker

### Unit II:Technical Foundations of Hacking

The Technical Foundations of Hacking: The Attacker's Process, The Ethical Hacker's Process, Security and the Stack. What is Social Engineering? Attacks, Techniques & PreventionCryptography Tutorial: Cryptanalysis, RC4, CrypToolHow to Crack a PasswordWorm, Virus & Trojan Horse: Ethical Hacking TutorialLearn ARP Poisoning with Examples

### Unit III:Footprinting and scanning

Footprinting and scanning:Information Gathering, Determining the Network Range, Identifying Active Machines, Finding Open Ports and Access Points, OS Fingerprinting Services, Mapping the Network Attack SurfaceWireshark Tutorial: Network & Passwords Sniffer How to Hack WiFi (Wireless) Network

### Unit IV:Enumeration and System Hacking

Enumeration and System Hacking: Enumeration, System Hacking. Malware Threats : Viruses and Worms, Trojans, Covert Communication, Keystroke Logging and Spyware, Malware Counter measures. DoS (Denial of Service) Attack Tutorial: Ping of Death, DDOSHow to Hack a Web ServerHow to Hack a Website: Online ExampleSQL Injection Tutorial: Learn with Example

### Unit V: Sniffers, Session Hijacking and Denial of Service

Sniffers, Session Hijacking and Denial of Service : Sniffers, Session Hijacking, Denial of Service and Distributed Denial of Service .Firewalls and Honeypots: Intrusion Detection Systems, Firewalls, Honeypots Hacking Linux OS: Complete Tutorial with Ubuntu ExampleCISSP Certification Guide: What is, Prerequisites, Cost, CISSP Salary

**Text Book**

Michael Gregg, Certified Ethical Hacker, Version 9, Second Edition, Pearson IT Certification, 2021.

**Reference Books:**

1. Roger Grimes - Hacking the Hacker – Wiley, 2017.
2. AnkitFadia - The Unofficial Guide to Ethical Hacking - Premier Press, 2002.

**Course Outcomes:**

CO1: Introduce about the basic concepts of ethical hacking

CO2: Know about the technical foundation of hacking

CO3: Acquire about the techniques used in hacking

CO4: Know about the enumeration and threats

CO5: Learn to provide security for data.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	M	S
CO4	M	S	M	S	S	M	S	M	M
CO5	M	M	M	S	S	M	S	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**



COURSE CODE	U21ITE642	CHOICE - II	L	T	P	C
<b>ELECTIVE -IV</b>		<b>INFORMATION SECURITY</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>3</b>
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	<ol style="list-style-type: none"> <li>1. To able to know the IT security concepts.</li> <li>2. To able to know about the database security concepts etc.</li> <li>3. Describes about Information Security.</li> <li>4. Describe about Cryptography Ciphers.</li> </ol>					

### Unit I :Security

Introduction: Security, Attacks, Computer Criminals. Overview of computer networks, seven-layer architecture, TCP/IP suite of protocols, MAC protocols for high-speed LANS, MANs, and wireless LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet, etc.), CSMA/CD, CSMA/CA, Simple performance models; WAN access methods - PPP.

### Unit II : Cryptography

Cryptography: Substitution ciphers, Transposition ciphers, Confusion, Diffusion, Symmetric, Asymmetric, Encryption, DES, Uses of Encryption, Hash Function, Key exchange, Digital Signatures, Digital Certificates. Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

### Unit III: Program Security

Program Security: Secure Programs, Non malicious program errors, malicious codes virus, Trap doors, Salami attacks, covert channels, Control against program. Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

### Unit IV: Database Security

Database Security: Requirements, Reliability, Integrity, Sensitive data, Inference, Multilevel Security. Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.

### Unit V:Security in Networks

Security in Networks: Threats in Networks vs. Networks security controls, Firewalls, Intrusion detection systems, Secure e-mails. Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.

**Text Books:**

1. W.Stallings – Network Security Essentials Applications and Standards, 4/E, 2010.

**Reference Books:**

1. Forouzan -Cryptography and Network Security, 2002.

**Course Outcomes**

After the completion of Information security The students can gain the

CO1: Knowledge of cryptography and network security

CO2: Knowledge of security management and incident response

CO3: Knowledge of security in software and operating systems

CO4: Knowledge of data security and secure system development

CO5: Analyze different threats and remove the threats.

**Mapping of COs with POs and PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S
CO4	S	S	M	S	S	M	S	S	S
CO5	M	S	M	S	M	S	M	M	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE	U21ITS611	IMAGE PROCESSING LAB			
SBE -IV		L	T	P	C
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Objectives	1. To introduce the concepts of image processing and basic analytical methods to be used in image processing. 2. To familiarize students with image enhancement and restoration techniques. 3. To explain different image compression techniques. 4. To introduce segmentation and morphological processing techniques..				

### List of Programs:

1. Implement the spatial image enhancement functions on a bitmap image – mirroring(Inversion)
2. Implement the spatial image enhancement functions on a bitmap image – notation(Clockwise)
3. Implement the spatial image enhancement functions on a bitmap image – Enlargement (Double Size)
4. Implement (a) Low Pass Filter (b) High Pass Filter
5. Implement (a) Arithmetic Mean Filter (b) Geometric Mean Filter
6. Implement Smoothing and Sharpening of an eight bit color image
7. Implement (a) Boundary Extraction Algorithm (b) Graham & #39; Scan Algorithm
8. Implement (a) Edge Detection (b) Line Detection
9. Display an image and its histogram
10. Write a Program to Perform Shrinking, Zooming and Cropping of an image
11. Write a Program to perform the experiment for histogram equalization.
12. Write a Program to Perform blurring and de-blurring on an image.
13. Write a Program to Remove salt and pepper noise in an image.
14. Write a Program to Perform Edge detection using Operators.
15. Write a Program to Perform 2-D DFT and DCT.
16. Write a Program to Perform DWT of images.
17. Implement a function for image segmentation.
18. Implement a function for image morphology that analyze the form and shape detail of image structures.

19. Implement a function for Image Restoration.
20. Models for representing the color and methods of processing the color plane

### Course Outcomes

After the completion of Information security. The students can gain the

CO1: Knowledge of image processing and basic analytical methods to be used in image processing.

CO2: Knowledge of Image Enhancement and Restoration technique.

CO3: Knowledge of Image Compression Technique

CO4: Knowledge of segmentation and morphological processing techniques

CO5: Knowledge about to develop new real time application.

### Mapping of COs with POs and PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	S	S	M	S	S	M	S	S	M
CO5	S	S	M	S	M	S	M	S	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

## NON-MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)

COURSE CODE	WEB DESIGNING USING HTML	L	T	P	C
NME - I		2	-	-	2

### OBJECTIVES:

1. To Use formatting tags in HTML
2. To recognize How to Insert the Image file in web pages.
3. To understand How to navigate through web pages.
4. To become Master in creating Web pages using basic HTML tags.

### LAB Exercises

1. Web page creation using head, title, body, h1 – h6.
2. Web page creation using formatting tags (bold, italic, underline etc)
3. Ordered list
4. Unordered list
5. Definition list
6. Marquee creation
7. Web page with images
8. Web page creation with various font styles and body colors.
9. Hyper link
10. Tables
11. Frames
12. Forms

### COURSE OUTCOMES:

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

**CO1:** understand the concepts of webpage

**CO2:** analyze various tags in HTML

**CO3:** gain knowledge in creating webpage

**CO4:** design new webpages

### MAPPING OF COs WITH POs AND PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	S	M	S	S	M	M	S	S	S
<b>CO2</b>	S	S	M	S	M	S	S	S	S
<b>CO3</b>	S	S	M	S	S	S	S	M	S
<b>CO4</b>	S	S	S	M	S	S	S	M	M
<b>CO5</b>	M	S	M	S	M	M	S	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

COURSE CODE		PHOTOSHOP	L	T	P	C
NME – II			2	-	-	2

**OBJECTIVES:**

1. To navigate Photoshop's Workspace, Create & setup documents
2. To Understand about the Layers and Masking.
3. To work with effects, filters and adjustments
4. To create a broad range of design skills pertaining to publication & web design.

**Exercises**

1. Album preparation
2. Invitation Preparation
3. Wall Papers
4. Visiting Card
5. Background Changing and Removing
6. Birthday Card
7. Friendship Card
8. Wedding invitation Card
9. Cloning an Image
10. Flex Designing
11. Photo Editing
12. Book Cover

**COURSE OUTCOMES**

On completion of the course, the student will be able to

**CO1:** design Visiting card, advertisement

**CO2:** analyze new features

**CO3:** develop new drawings using Photoshop

**CO4:** learn to work with Photoshop

**CO5:** Design and deploy new drawing application.

**MAPPING OF Cos WITH Pos AND PSOs**

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	S	S	M
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	M	S	S	S	S	S	M
CO4	S	S	S	M	S	S	S	S	M
CO5	M	M	M	S	S	M	S	S	M

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

## Value Added Course

<b>COURSE CODE</b>	<b>U21ITV51</b>	<b>QUANTITATIVE APTITUDE</b>	<b>Hours</b>	<b>C</b>
<b>SEMESTER V</b>			<b>30</b>	<b>2</b>

### OBJECTIVES:

1. To equip with the relevant skills to appear for various competitive examinations.
2. To acquire right skills to tackle aptitude problems.
3. To improve mental calculations.
4. To improve the speed of solving problems

**UNIT I:** Numbers - HCF & LCM of numbers – Decimal fraction

**UNIT II:** Average - Problems on numbers – Problems on Ages

**UNIT III:** Percentage – Profit & loss - Ratio & Proportion

**UNIT IV:** Time & work – Time & Distance – Problems on Trains

**UNIT V:** Simple Interest – Compound Interest - Permutation & Combination. (13 Hours)

### TEXT BOOK

1. Aggarwal, R.S. - Quantitative Aptitude for Competitive Examinations, New Delhi: S.Chand Publications, Seventh Revised Edition, Reprint 2008.

### COURSE OUTCOMES

After Completion of this Course, Students will be able to

**CO1:** Acquire right skills to tackle aptitude problems

**CO2:** Improve mental calculations.

**CO3:** Solve problems with ease and confidence

**CO4:** Improve the speed of solving problems and equip them employable

**CO5:** Ability to solve complex problems.

### MAPPING OF COs WITH POs AND PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	S	M	S	S	M	S	S	S	S
<b>CO2</b>	S	S	M	S	S	M	S	S	S
<b>CO3</b>	S	S	M	S	S	S	S	M	S
<b>CO4</b>	S	M	S	M	S	S	S	M	M
<b>CO5</b>	M	S	M	S	M	M	S	S	S

**S – Strongly Correlating - 3 Marks**

**M – Moderately Correlating - 2 Marks**

**W-Weakly Correlating - 1 Mark**

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