

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI
UG COURSES – AFFILIATED COLLEGES

B.Sc . COMPUTER SCIENCE

Learning Outcome Based Curriculum

(With effect from the academic year 2021-2022 onwards)

Sem	Part I/II/ III/IV	No.	Subject Status	Subject Title	Contact Hrs/week		Credits
					T	P	
I	III	1.	Core-1	Python Programming	5		5
	III	2.	CC2 Practical	i) Python Programming Lab		3	3
				ii) Office Automation Lab		2	2
	III	5.	Elective Course - I (Generic / Discipline Specific)	Discrete Mathematics	4		3
	IV	6.	Skill Enhancement Course SEC-1	Office Automation	2		2
	IV	7.	Foundation Course-FC	Problem Solving Techniques	2		2

Sem	Part I/II/ III/IV	No.	Subject Status	Subject Title	Contact Hrs/week		Credits
					T	P	
II	III	1.	CC - 3	Data Structure and Algorithms	5		5
	III	2.	CC4 Practical	i) Data Structure and Algorithms		3	3
				ii) Web Design		2	2
	III	5.	Elective Course - II (Generic / Discipline Specific)	Digital Logic Fundamentals	4		3
	IV	6.	Skill Enhancement Course SEC-2	Introduction To HTML	2		2
	IV	7.	Skill Enhancement Course – SEC-3 (Discipline Specific / Generic)	Understanding Internet	2		2

Sem	Part I/II/ III/IV	No.	Subject Status	Subject Title	Contact Hrs/week		Credits
					T	P	
III	III	1.	Core-3	Java Programming	4		4
	III	2.	Major Practical -3	Java Programming Lab		3	2
	III	3.	Allied II	Scripting Languages	3		3
	III	4.	Allied Practical II	Scripting Languages Lab		2	2
	III	5.	Skill Based Core-I	Digital Design	4		4
	IV	6.	NME	1. Fundamentals of Internet and Emerging Technologies 2. Basic Programming Design	2		2
	IV	7.	Common	Yoga*	2		2

Sem	Part I/II/ III/IV	No.	Subject Status	Subject Title	Contact Hrs/week		Credits
					T	P	
	III	1	Core - 4	Data Structures	4		4
IV	III	2	Major Practical IV	Data Structures lab		3	2
	III	3	Allied II	Machine Learning Techniques	3		3
	IV	4	Allied II Practical	PYTHON		2	2
	III	5	Skill Based - Core II	Computer Architecture	4		4
	IV	6	NME	1. HTML 2. Programming in C	2		2
	IV	7	Common	Computers for Digital Era *	2		2
	V	8	Extension Activity	NCC, NSS, YRC,YWF			1

V	III	1.	Core -4				
	III	2	Major Practical IV				
	III	3	Allied II				
	IV	4	Allied II Practical	PYTHON			
	III	5	Skill Based - Core II	Computer Architecture			
	IV	6	NME	1. HTML 2. Programming in C			
	IV	7	Common	Computers for Digital Era *			
	V	8	Extension Activity	NCC, NSS, YRC,YWF			

Sem	Part I/II/ III/IV	No.	Subject Status	Subject Title	Contact Hrs/week		Credits

VI	III	1.	Core -4	Data Structures			
	III	2	Major Practical IV	Data Structures lab			
	III	3	Allied II	Machine Learning Techniques			
	IV	4	Allied II Practical	PYTHON			
	III	5	Skill Based - Core II	Computer Architecture			
	IV	6	NME	1. HTML 2. Programming in C			
	IV	7	Common	Computers for Digital Era *			
	V	8	Extension Activity	NCC, NSS, YRC,YWF			

FIRST SEMESTER

CORE PAPER

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
CC1	Python programming	Core	5	-	-	-	5	25	75	100
Learning Objectives										
LO1	To make students understand the concepts of Python programming.									
LO2	To apply the OOPs concept in PYTHON programming.									
LO3	To impart knowledge on demand and supply concepts									
LO4	To make the students learn best practices in PYTHON programming									
LO5	To know the costs and profit maximization									
UNIT	Contents									No. of Hours
I	Basics of Python Programming: History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. Python Arrays: Defining and Processing Arrays – Array methods.									15
II	Control Statements: Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. Jump Statements: break, continue and pass statements.									15
III	Functions: Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.									15
IV	Lists: Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples–Difference between lists and tuples. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions									15

LO2	Be able to create loops and decision statements in Python.	
LO3	Be able to work with functions and pass arguments in Python.	
LO4	Be able to build and package Python modules for reusability.	
LO5	Be able to read and write files in Python.	
LAB EXERCISES		Required Hours
1. Write a Python program to read and print values of variables of different data types. 2. Write a Python program to perform addition, subtraction, multiplication, division, integer division and modulo division on two integer numbers. 3. Write a Python program to determine whether the character entered is a vowel or not using conditional statement. 4. Write a Python program to calculate the factorial of a number using loop. 5. Write a Python program to calculate the square root of a number. Use break, continue and pass statements. 6. Write a Python program using function and return statement to check whether a number is even or odd. 7. Write a Python program to print the Fibonacci series using recursion. 8. Write a Python program to reverse the order of the items in the array. 9. Write a Python program that accepts a string from the user and redisplay the same string after removing vowels from it. 10. Write a Python program to remove all duplicates from a list. 11. Write a Python program that has a list of numbers. (both positive and negative). Make new tuple that has only positive values from this list. 12. Write a Python program that creates a dictionary of radius of a circle and its circumference.		60

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	M a r k s		
									CIA	External	Total
CC4	Office Automation LAB	Core	-	-	2	-	2	2	25	75	100
Learning Objectives											
LO1	To understand the concepts of MS word										
LO2	To learn the features of Word										
LO3	To do calculations in excel										
LO4	To Design invitations etc using Word										
LO5	To understand and design presentations										
Sl. No	Contents										No. of Hours

	<ol style="list-style-type: none"> Usage of Numbering, Bullets, Indents and Headers in a Word Document Prepare a Calendar in a Word Document Design a wedding invitation in Word Document Usage of Spell Check, Find and Replace Picture Insertion and Alignment Prepare a semester wise mark statement for a computer class of 20 students using any spreadsheet" worksheet. Total, average and rank the student marks. Give proper headings. Make the column headings bold and italic. Consider the sample employee worksheet and calculate their salary. Use any spreadsheet to use mathematical, statistical and logical functions Use any spreadsheet to plot a chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50). Create a database for a Telephone Directory. Create a table named phone book with relevant 	60
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	<p>fields. Enter a minimum of 10 records.</p> <ol style="list-style-type: none"> 11. Create a student database and create validation rules for fields like age, date of birth, pincode etc. 12. Enter data to the student database using a form. 13. Create a query and add criteria to the query. 14. Create a tabular auto report. 15. Customize a report in report design 	
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Reference Books:

1. Microsoft Office 2016 Step By Step, Lambert, Joan , Frye, Curtis D., Phi Learning
2. *Microsoft Access 2016* Step By Step, By Lambert, Joan Phi Learning
3. *Microsoft Excel 2016* Step By Step, Curtis Frye, Phi Learning
4. Browse the Internet for Open Source Office Software

CourseCode-Elective Course		Discrete Mathematics		Credits 3
LectureHours:(L) perweek - 4	TutorialHours:75 (T)perweek	Hours: (P)perweek		Total:(L+T+P) perweek: 4
CourseCategory: Elective		Year&Semester:I Year I Semester		AdmissionYear:
Pre-requisite		Basic Knowledge of Programming concept		
Units	Contents			RequiredHours
I	Set theory-Sets and elements-Specifications of sets-Identity and Cardinality-Set inclusion-Equality of sets-proper sets-Power sets-Universal set-Operations on sets-ordered pairs-Cartesian product of sets			15
II	Relations and functions-Definition-example- Relations on sets- Equivalence relations-Equivalence Class - Functions			15
III	MATHEMATICAL LOGIC Introduction – Statement (Propositions) – Laws of Formal Logic Basic Set of Logical operators/operations - Propositions and Truth Tables – Algebra Propositions - Tautologies and Contradictions Logical Equivalence – Logical Implication – Normal Forms			15
IV	MATRIX ALGEBRA Introduction – Definition of a Matrix Types of Matrices – Operations on Matrices – Related Matrices – Transpose of a Matrix – Symmetric and Skew-symmetric Matrices Complex Matrix – Conjugate of a Matrix – Determinant of a Matrix – Typical Square Matrices			15
V	Adjoint and Inverse of a Matrix –Singular and Non-singular Matrices – Adjoint of a Square Matrix – Properties of Adjoint of Matrix – Properties of Inverse of a Matrix.			15

Text Book:

DISCRETE MATHEMATICS, Swapan Kumar Chakraborty and Bikash Kanti Sarkar, OXFORD University Press.

Reference Books:

1. DISCRETE MATHEMATICS, Third Edition, Seymour Lipschutz and Marc Lars Lipson, Tata McGraw Hill Education Private Limited.
2. Discrete Mathematical Structures with Applications to Computer Science by J.P.Tremblay, R.Manohar TMH edition

CourseCode: SEC-1	Office Automation		Credits: 2
LectureHours:(L) perweek: 2	TutorialHours: (T)perweek	Hours: (P)perweek	Total:(L+T+P) perweek: 2
CourseCategory: SEC-1	Year&Semester: I Year I Semester	AdmissionYear:	
Pre-requisite	Basic skills in Computer operations		
LearningObjectives: (forteachers:whattheyhavetodointheclass/lab/field) <ul style="list-style-type: none">• The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Powerpoint.• The course is highly practice oriented rather than regular classroom teaching.• To acquire knowledge on editor, spreadsheet and presentation software.			
Recap: (not for examination)Motivation/previous lecture/relevant portions required fort he course)[Thisisdoneduring2Tutorialhours)			
Units	Contents		RequiredHours
I	Introductory concepts: Memory unit– CPU-Input Devices: Key board, Mouse and Scanner.Output devices:Monitor,Printer.Introduction to Operating systems &its features: DOS– UNIX– Windows. Introduction to Programming Languages.		17

II	Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spellchecker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing–Preview, options, merge.	17
III	Spreadsheets: Excel– opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts– creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.	17
IV	Database Concepts: The concept of data base management system; Data field, records, and	17

	files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of datafiles; Understanding Programming environment in DBMS; Developing menu drive applications in query language (MS–Access).	
V	Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition– Animation effects , audio inclusion, timers.	17
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC– CSIR/GATE/TNPSC/other to be solved (To be discussed during the Tutorial hour)	

Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferable Skill	
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Learning Resources:

- **Recommended Texts**

1. Peter Norton, "Introduction to Computers" – Tata McGraw-Hill.

- **Reference Books**

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGraw-Hill.
2. **Web resources** : Web content from NDL / SWAYAM or open source web resources

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
FC	Problem Solving Techniques	FC	2	-	-	-	2	2	25	75	100
Learning Objectives											
LO1	Familiarize with writing of algorithms, fundamentals of C and philosophy of problem solving.										
LO2	Implement different programming constructs and decomposition of problems into functions.										
LO3	Use data flow diagram, Pseudo code to implement solutions.										
LO4	Define and use of arrays with simple applications										
LO5	Understand about operating system and their uses										
UNIT	Contents								No. Of. Hours		
I	Introduction: History, characteristics and limitations of Computer. Hardware/Anatomy of Computer: CPU, Memory, Secondary storage devices, Input Devices and Output devices. Types of Computers: PC, Workstation, Minicomputer, Main frame and Supercomputer. Software: System software and Application software. Programming Languages: Machine language, Assembly language, High-level language, 4GL and 5GL-Features of good programming language. Translators: Interpreters and Compilers.								6		
II	Data: Data types, Input, Processing of data, Arithmetic Operators, Hierarchy of operations and Output. Different phases in Program Development Cycle (PDC). Structured Programming: Algorithm: Features of good algorithm, Benefits and drawbacks of algorithm. Flowcharts: Advantages and limitations of flowcharts, when to use flowcharts, flowchart symbols and types of flowcharts. Pseudocode: Writing a pseudocode. Coding, documenting and testing a program: Comment lines and types of errors. Program design: Modular Programming.								6		
III	Selection Structures: Relational and Logical Operators - Selecting from Several Alternatives – Applications of Selection Structures. Repetition Structures: Counter Controlled Loops –Nested Loops– Applications of Repetition Structures.								6		
IV	Data: Numeric Data and Character Based Data. Arrays: One Dimensional Array - Two Dimensional Arrays – Strings as Arrays of Characters.								6		
V	Data Flow Diagrams: Definition, DFD symbols and types of DFDs. Program Modules: Subprograms-Value and Reference parameters- Scope of a variable - Functions –								6		

	Recursion. Files: File Basics-Creating and reading a sequential file- Modifying Sequential Files.	
TOTAL HOURS		30
Textbooks		
1	Stewart Venit, “Introduction to Programming: Concepts and Design”, Fourth Edition, 2010, Dream Tech Publishers.	
Web Resources		
1.	https://www.codesansar.com/computer-basics/problem-solving-using-computer.htm	
2.	http://www.nptel.iitm.ac.in/video.php?subjectId=106102067	
3.	http://utubersity.com/?page_id=876	

Semester II

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC3	DATA STRUCTURE AND ALGORITHMS	Core	5	-	-	-	5	5	25	75	100
Learning Objectives											
LO1	To understand the concepts of ADTs										
LO2	To learn linear data structures-lists, stacks, queues										
LO3	To learn Tree structures and application of trees										
LO4	To learn graph structures and application of graphs										
LO5	To understand various sorting and searching										
UNIT	Contents									No. of Hours	
I	Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal									15	
II	Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations- Circular Queue- Priority Queue- deQueue applications of queues.									15	
III	Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.									15	
IV	Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.									15	
V	Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-Rehashing Extendible Hashing									15	
	Total									75	
Text Book											

1	1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education 2014, 4th Edition.
2	Reema Thareja, “Data Structures Using C”, Oxford Universities Press 2014, 2nd Edition
Reference Books	
1.	Thomas H.Cormen, ChalesE.Leiserson,RonaldL.Rivest, Clifford Stein, “Introduction to Algorithms”, McGraw Hill 2009, 3rd Edition.
2.	Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education 2003
Web Resources	
1.	https://www.programiz.com/dsa
2.	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	M a r k s		
									CIA	External	Total
CC4	DATA STRUCTURE AND ALGORITHMS [Note: Practicals may be offered through C / C++ / Python]	Core	-	-	3	-	3	-	25	75	100
Learning Objectives											
LO1	To understand the concepts of ADTs										
LO2	To learn linear data structures-lists, stacks, queues										
LO3	To learn Tree structures and application of trees										
LO4	To learn graph structures and application of graphs										
LO5	To understand various sorting and searching										
Sl. No	Contents									No. of Hours	

	<ol style="list-style-type: none"> 1. Search an element in a list using Binary Search. 2. Implementation of Stack- Push and Pop. 3. Implementation of Queue – Enqueue and Dequeue 4. Implementation of Binary Tree Traversals using recursion. <ol style="list-style-type: none"> a) Pre-order b) In-order c) Post-Order 5. Implementation of Breadth First Search algorithm. 6. Implementation of Depth First Search algorithm. 7. Implementation of Merge Sort 8. Implementation of Quick Sort 	60
		60
Text Book		
1	Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education 2014, 4th Edition.	
2	Reema Thareja, “Data Structures Using C”, Oxford Universities Press 2014, 2nd Edition	
Reference Books		
1	Thomas H.Cormen,ChalesE.Leiserson,RonaldL.Rivest, Clifford Stein, “Introduction to Algorithms”, McGraw Hill 2009, 3rd Edition	
2.	Aho, Hopcroft and Ullman, “Data Structures and Algorithms”, Pearson Education 2003	
Web Resources		
1.	https://www.programiz.com/dsa	

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC4	Web Design	Core	2	-	-	-	2	2	25	75	100
LO1	To understand the concepts of links										
LO2	To learn tags, lists										
LO3	To learn frames and its applications										
LO4	To apply forms and to create pages										
LO5	To apply sound effect										
Sl. No	Contents									No. of Hours	
	1. Create a website using internal links and images. 2. Design a calendar using table tag. 3. Create a HTML document to display a list of five flowers and link each one to another document displaying brief description of the flower, Add pictures wherever possible. 4. Write an HTML code to display a list of 5 cars in a frame, Link each one to a brief description in second frame. The left frame										
	should display the list and the right frame should display the paragraph about the frame. 5. Create a simple HTML Form covering major form elements. 6. Embed Audio and Video in an HTML page. 7. Rotate an element using CSS. 8. Build a simple quiz.										
										60	
										60	

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	M a r k s		
									CIA	External	Total
	Digital Logic Fundamentals	Elective course-2	4	-	-	-	3	4	25	75	100
Learning Objectives											
LO1	To understand the concepts of number systems										
LO2	To learn conversions										
LO3	To construct truth tables										
LO4	To learn SOP and POS										
LO5	To understand various simplifications										
UNIT	Contents									No. of Hours	
I	Number Systems :Codes and Digital Logic Binary Number System –Binary to Decimal Conversion – Decimal to Binary Conversion –Octal Numbers –Hexadecimal Numbers –The ASCII Code –The Excess- 3 Code –The Gray Code. Digital Logic:The Basic gates NOT, OR , AND –Universal Logic Gates NOR,NAND – AND-OR Invert Gates.									15	
II	Combinational Logic: Circuits Boolean Laws and Theorems – Sum of Products Method–Truth Table to Karnaugh Map –Pairs, Quads and Octets –Karnaugh Simplifications –Don't Care Conditions –Product of Sums Method –Product of Sums Simplification.									15	
III	Data Processing and Arithmetic circuits :Multiplexers –De-multiplexers –1-of-16-Decoders –BCD- to-Decimal Decoders – Seven-Segment decoders –Encoders –Exclusive-OR gates. Arithmetic Circuits:Binary Addition –Binary Subtraction –Unsigned Binary Numbers –Sign-Magnitude Numbers – 2's Complement Representation –2's Complement Arithmetic.									15	

IV	Flip-Flops: RS Flip Flops –Edge Triggered RS Flip Flops -Edge Triggered D Flip Flops -Edge Triggered JK Flip Flops –JK Master Slave Flip Flops	15
V	Registers :Types of Registers –Serial in serial out –serial in parallel out –parallel in serial out –parallel in parallel out–Universal Shift Register.	15
	Total	75

Course Outcomes		Programmeme Outcome
CO	On completion of this course, students will	
CO1	Understand the concept of various number systems	PO1,PO6
CO2	Understand basic concepts of digital systems	PO2
CO3	Describe the storage structures	PO2,PO4
CO4	Solve problems using SOP and PoS	PO4,PO6
CO5	Apply concepts for simplifications	PO5,PO6

Text Book

Text Book:

Digital Principles and Applications, by Albert Paul Malvino & DonaldP.Leach, Seventh Edition,
McGraw Hill Education Private Limited

Reference Books:

1. Fundamentals of Digital Circuits, A.Anand Kumar, Second Edition,PHI Learning Private Limited
2. Digital design, M.Morris Mano, Third Edition, Pearson Education

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	M a r k s		
									CIA	External	Total
	Introduction to HTML	Skill Enhancement Course - 2	2	-	-	-	2	2	25	75	100
Learning Objectives											

LO1	To understand the concepts Tags	
LO2	To learn linear data structures-lists and links	
LO3	To learn formatted images	
LO4	To learn frames and its structures	
LO5	To create various style sheets	
UNIT	Contents	No. of Hours
I	Introduction to HTML: Designing a Home page – History of HTML – HTML generations- HTML Documents-Anchor tag –Hyper links –Sample HTML documents.	15
II	Head and Body section: Header Section –Title-Prologue-Links-Colorful web page –Comments lines Designing the body: Heading printing –Aligning the headings-Horizontal rule- paragraph-Tab settings-Image and pictures- Embedding PNG format Images	15
III	Ordered and unordered lists: List-Unordered lists- headings in a list – ordered lists- Nested lists. Table handling: Tables- table creation in HTML- Width of the Tables and cells-Cells spanning multiple rows/Columns- Coloring cells – Column specification	15
IV	Frames: Frame set - Definition – Frame definition –Nested Frames Web Page Design Project : Frameset Definition – Animals – Birds – Fish Forms: Action attributes –Method attributes –Enctype attribute – Drop down list- sample forms	15
V	DHTML and Style sheets: Defining styles –Elements of styles- Linking a style sheet to an HTML document –Inline styles –Internal & External style sheets – Multiple styles	15
	Total	75
Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
CO1	Understand the concept of various tags	PO1,PO6
CO2	Understand basic designing	PO2
CO3	Describe the hash function and concepts of tables,designing etc	PO2,PO4
CO4	Solve problem involving style sheets	PO4,PO6
CO5	Apply the attributes in designing web pages	PO5,PO6

Text Book:

World Wide Web Design with HTML, C. Xavier, TMH, 2001

Reference Book:

1. Internet & World Wide Web, H.M.Deital, P.J.Deital & A.B.Goldberg, Pearson Education
2. Fundamentals of information technology, Mathew's lenon and Alxis
leon, Vijay Nicole privatelimited, Chennai.

Title of the Course/ Paper	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Understanding Internet	Skill enhancement	2	-	-	-	2	2	25	75	100
Learning Objectives											
LO1	To understand the concepts network										
LO2	To learn various links in internet										
LO3	To learn formatted images										
LO4	To learn frames and its structures										
LO5	To create various style sheets										
UNIT	Contents										No. of Hours
I	Man and Machines - Human Capability of five senses to see, hear, smell, speak and act - Basic Structure of a Computer - Data - Characteristics of a Computer-History of Computers - - Classification of Computers										15
II	Application Software and Programming Languages - Application Software - Packaged Software Products (Off-the-Shelf Products) - Office Automation - Core Banking System - Enterprise Software Products – SAP - Sales Force – Oracle - CRM and ERP - Early High Level Programming Languages - Translators (Compilers and Interpreters) – FORTRAN – BASIC – COBOL – PASCAL - C Language - Web Programming Languages – HTML - Java Script - Objected Oriented Programming with C++ - C++ Language - C# Language - Java Programming - Modern Programming Language – Python - GO Language - Swift Language - Kotlin Language - R Language - Artificial Intelligence Languages - Database Management Software										15
III	Digital Transformation - Data (High Value Commodity) - Digital Transformation in Business - Features of Digital Transformation -										15

	Banking and Financial Services Industry (BFSI) - Human Resource Management – Healthcare - Big Data Analytics in Healthcare - Virtual Reality Wearable medical devices	
IV	<p>Cyber Security - IT Assets - Risk and Vulnerabilities - Computer Security Types - Fundamental Principles of Security - Physical Safety and Security - Access Control - Biometric Access Control - Network Security - AAA Server – Firewall – Malware – Spyware – Adware – Spamware – Virus – Ransomware – Worms Trojan Horse</p>	15
V	<p>– Computer Virus Types of Computer Viruses Antivirus Protection Digital Signature Cyber Crime - Hacking - Phishing Spam emails</p> <p>Attack using Malware - ATM Skimming – Ransomware - Fake News - Deep fake – Cyberbullying –</p> <p>Textbook</p> <p>Fundamentals of Internet and Emerging Technologies (2021) , C. Xavier, New Age International Publishers Ltd., New Delhi., Chapters 1, 2, 3 and 9 to 16 only.</p> <p>Reference Book</p> <ol style="list-style-type: none"> 1. Introduction to Computer Science, Second Edition, ITL Education Solutions Ltd, Pearson Education 2. Introduction to Computers, Peter Norton, 7th Edition, McGraw Hill Education 3. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI <p>–</p>	15
	Total	75

JAVA PROGRAMMING

L T P
C 4 0 0
4

Objective: To understand the basic programming constructs of Java Language and to explore the features of Java by applying to solve problems

UNIT I

Data Types, Variables and Arrays: Primary types – Integers – Floating point types – Characters – Booleans – A Closer Look at Literals – Variables – Type Conversion and Casting – Automatic type Promotion in Expressions - One Dimensional Arrays– Multi Dimensional Arrays. **Introducing Classes:** Class Fundamentals – Declaring objects- Assigning object Reference variables- Introducing Methods- Constructors-Garbage collection – Finalize() Method. (12L)

UNIT II

A Closer Look at Methods and classes: Overloading Methods-Using objects as parameters- Argument passing –Returning objects- Recursion-Introducing Access control – understanding static – Introducing final – Nested and Inner classes- String class- Using command line arguments. **Inheritance:** Inheritance Basics –Using super- creating Multilevel Hierarchy - Method overriding. (12L)

UNIT III

Packages and interfaces: Packages –Access Protection – Importing packages-Interfaces. **Exception Handling:** Introduction- Exception Types – Uncaught Exceptions- Using try and catch – Multiple catch clauses –Nested try statements- throw – throws-finally. **Multithreaded programming :** Java Thread Model –Main Thread –Creating a Thread –Creating Multiple Threads

(12L)

UNIT IV

The Applet class: Applet Basics – Applet Architecture –Applet Skeleton- Applet Display method –Requesting Repainting – HTML APPLET tag- Passing Parameters to Applet.
Event Handling: Event Handling Mechanisms –Delegation Event Model –Event classes(The Action Event ,Item Event , Key Event, Mouse Event) – Sources of Events - Event Listener Interfaces(Action Listener, Item Listener, Key Listener, Mouse Listener). (12L)

UNIT V

Introducing the AWT: AWT Classes – Window fundamentals – working with Frame Windows –working with Graphics– Working with color – Working with Fonts. **Using AWT Controls:** Controls Fundamentals – Labels – Using Buttons –Applying check Boxes – Check Box group – Choice Controls – Using a Text field – Using a Text Area – Understanding Layout Managers [Flow Layout Only] – Menu Bars and Menus. (12L)

Text Book:

Java, The Complete Reference 8/e , Herbert Schildt, TMH

Reference Book:

1. Programming with Java –C.Muthu
2. Java Programming A Practical Approach, C.Xavier, TMH
3. Programming in Java, Sachin Malhotra, Saurabh Choudhary, OXFORD University Press
4. Programming with Java a primer 3/E E.BALAGURUSWAMY
5. Core Java, Mahesh P. Matha, PHI Learning Private Limited

COMPUTER ARCHITECTURE

L T P C

4 1 0 4

Objective: To gain knowledge about the architecture of computer and to understand the concepts of CPU, ALU Design, I/O Instruction format and different processors.

UNIT I

Basic Computer Organisation And Design : Instruction codes - Computer

Registers - Computer Instructions - Timing and Control - Instruction Cycle - Control Memory-Address Sequencing

(12L)

UNIT II

Central Processing Unit : General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data transfer and manipulation – Program Control.

(12L)

UNIT III

Computer Arithmetic : Hardware Implementation and Algorithm for Addition, Subtraction, Multiplication, Division-Booth Multiplication Algorithm-Floating Point Arithmetic.

UNIT IV

Input Output Organization : Input — Output Interface — Asynchronous data transfer – Modes of transfer – Priority Interrupt – Direct Memory Access (DMA).

(12L)

Unit V

Memory Organisation: Memory Hierarchy - Main memory - Auxillary memory - Associative memory - Cache memory - Virtual memory.

Text Book:

(12L

Computer system Architecture - by Morris Mano, Third Edition. P.H.I Private Limited.

Reference Books:

1. Computer System Architecture P.V.S. Rao PHI
2. Nirmala Sharma, "Computer Architecture", First Edition, 2009, University Science Press
3. Nicholas Carter, "Computer Architecture", 2006, TMH Publication.

DATA STRUCTURES

L T P C

4 0 0 4

Objective:

- To understand the concepts of basic data structures such as stack, Queues and Linked list.
- To have general understanding of the network structures through trees and graph.
- To make the students to understand the basic algorithms for sorting.

Unit I

Basic Concepts:- Algorithm specification – Data Abstraction – Performance Analysis.

Arrays and Structures:- Arrays: Abstract data type – Polynomials – Sparse Matrices – Representation of Multidimensional Arrays.

(12L)

Unit II

Stacks and Queues:- Stacks – Queues – Evaluation of Expressions. **Linked Lists:-**

Singly Linked Lists and Chains – Linked Stacks and Queues – Polynomials: Polynomial Representation – Adding Polynomials. Sparse Matrices: Sparse Matrix Representation. – Doubly Linked Lists.

(12L)

Unit III

Trees:- Introduction – Binary Trees – Binary Tree Traversals: Inorder Traversal – Preorder Traversal – Postorder Traversal. Heaps – Binary Search Trees Forests: Transforming a Forest into a Binary Tree.

(12L)

Unit IV

Graphs:- - The Graph Abstract Data Type-Elementary Graph Operations – Minimum Cost Spanning Trees: Kruskal's Algorithm – Prim's Algorithm. – Shortest Paths and Transitive Closure: Single Source/ All Destination: Nonnegative Edge Costs - All Pairs Shortest Paths.

(12L)

Unit V

Sorting:- Motivation – Insertion Sort – Quick Sort – Merge Sort: Recursive Merge Sort.

– Heap Sort – External Sorting: Introduction – k-way Merging..**Hashing**:- Static Hashing: Hash Tables.

(12L)

Text Book:

Fundamentals of Data Structures in C by Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed – Second Edition – Universities Press (India) Private Limited.

Reference Books:

1. Data Structures Using C, Second Edition by Reema Thareja – Oxford University Press
2. Data Structures by Dr N Jeya Prakash – Anuradha Publications

JAVA PRACTICAL LIST

L T P

C 0 0 4

2

Objective: To develop skills in implementing algorithms through the programming Language JAVA and to explore the features of JAVA by applying sample problems.

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Define a class called Student with the attributes name, reg_number and marks obtained in four subjects(m1,m2,m3,m4). Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by
 - (i) Overloading Constructor
 - (ii) Overloading Method.
3. Write a java program to add two complex numbers.
[Use passing object as argument and return object].
4. Define a class called Student_super with data members name, roll number and age. Write a suitable constructor and a method output () to display the details. Derive another class Student from Student_super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output().[Apply method Overriding concept].
5. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
6. Write a java program to create a thread using Thread class.
7. Write a java program to Design a calculator to perform only addition and division.
It must contains three Buttons with labels +, / and =, and a TextField to get input and display the result.
8. Create an applet with four Checkboxes with labels MARUTI-800, ZEN, ALTO and

ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.

9. Write a Java program, which creates a window with a check box group with boxes for the colors, Violet, Indigo, Yellow, Orange, Red, Blue, and Green. When the button is selected the background color must change accordingly.
10. Write a Java program to throw the following exception,
 - 1) Negative Array Size
 - 2) Array Index out of Bounds

Allied - Web Technology

L T P C

3 0 0 3

Objective: To impart knowledge about the web technologies and their applications and to understand the basics of web designing.

Unit I

Introduction: Internet Services and Accessibility-Uses of the Internet-Protocols-Web

concepts-The client/server model at the web-Retrieving data from the web. **Internet Protocols:** Introduction – Internet protocols-transmission control protocols-User Datagram protocols - Host Names. (9L)

Unit II

HTML: Introduction-SGML-DTD-DTD Elements- attributes-outline of an HTML document-Head section-Body section: Headers – Paragraphs – Text formatting – Linking – Internal linking – Embedding images – Lists – Tables – Frames – Other Special tags - HTML forms. (9L)

Unit III

JavaScript: Introduction- need of a scripting language - language elements : Identifiers – Expressions – JavaScript keywords – Operators – Statements – functions. (9L)

Unit IV

Objects of JavaScript: Window object – Document object – Forms object – Text boxes and text areas – Buttons , Radio buttons and Check boxes – Select object - other objects: Date object – Math Object – String Object – Arrays – worked examples. (9L)

Unit V

Dynamic HTML: Introduction- cascading style sheets: Coding CSS – Properties of tags – Property values – Other style properties – Inline Style Sheets –Embedded Style Sheets – External Style sheets – Grouping – Inheritance – Class as Selector – ID as Selector – Contextual

Selectors – Pseudo Classes and Pseudo-elements – Positioning – Backgrounds – Element Dimensions. (9L)

Text Book:

Web Technology A Developer's Perspective, N.P.Gopalan, J. Akilandeswari ,PHI

Reference Books:

1. Web Technology and Design, C.Xavier, New Age International Publishers
2. Web Technologies TCP/IP Architecture and Java Programming Second Edition, Achyut S. Godbole & Atul Kahate, Tata McGraw Hill
3. Web Technology, S. Padma Priya, SCITECH Publications (India)Pvt. Ltd

Allied

Practical List – Web Design using HTML

L T P

C 0 0 4

2

Objective: To highlight the basic concepts of HTML and help the student to equip with the programming skills in implementing and developing web based applications

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create a website using internal links and images.
2. Design a calendar using table tag.
3. Create a HTML document to display a list of five flowers and link each one to another document displaying brief description of the flower, Add pictures wherever possible.
4. Write an HTML code to display a list of 5 cars in a frame, Link each one to a brief description in second frame. The left frame should display the list and the right frame should display the paragraph about the frame.
5. Create a simple HTML Form covering major form elements.
6. Embed Audio and Video in an HTML page.
7. Rotate an element using CSS.
8. Build a simple quiz.

Skill Based 1 Core

Programming with PHP & MySQL

L T P
C 4 0 0 4

OBJECTIV

ES:

- To understand the concepts of open sources.
- To learn and use open source database management system MySQL
- To create dynamic web pages and websites.
- To connect web pages with database.

UNIT-I

Introduction: Introduction- Open source PHP – PHP history- features-variables- statements operators conditional statements-if-switch-nesting conditions-merging forms with conditional statements-loops-while-do-for – loop iteration with break and continue. (12L)

UNIT – II

Arrays and Functions: Arrays: Creating an array- modifying array-processing array-grouping form with arrays- using array functions- creating user defined functions- using files- sessions- cookies- executing external programs- Creating sample applications using PHP.

(12L)

UNIT –III

File Handling Opening files using fopen - looping over a files content with feof- reading text from a file using fgets - closing a file- reading character with fgetc- reading whole file with file_get contents reading a fle into into an array with file-checking if a file exists-fscanf-parse_ini_file- Getting file information with stat-fseek- copying files with copy- deleting files- writing to a file-reading and writing binary files –locking files

(12L)

UNIT-IV

MySQL: Effectiveness of MySQL -MySQL Tools-Prerequisites for MySQL connection-Databases and tables- MySQL data types-Creating and manipulating tables-Insertion-updation and deletion of rows in tables -Retrieving data- Sorting and filtering retrieved data -Advanced data filteringData manipulation functions-Aggregate functions -Grouping data- Sub queries-Joining Tables- Set operators-Full text searching.

(12L)

UNIT-V

PHP with MySQL: Working MySQL with PHP-database connectivity- usage of MySQL commands in PHP processing result sets of queries- handling errors-debugging and diagnostic functions validating user input through Database layer and Application layer- formatting query output with Character- Numeric- Date and time –sample database applications.

(12L)

Text Books:

1. VIKRAM VASWANI- “PHP and MySQL”- Tata McGraw-Hill- 2005
2. BEN FORTA - ”MySQL Crash course “ SAMS- 2006. 3
- . Steven Holzner , The Complete reference PHP, Tata McGraw Hill, 2008

Books for Reference:

- Tim Converse- Joyce Park and Clark Morgan- ”PHP 5 and MySQL” -Wiley India reprint - 2008.
- Robert Sheldon- Geoff Moes- ”Beginning MySQL”-Wrox- 2005

Non-Major Elective -
1
Fundamentals of Internet

L T P C
2 0 0 2

OBJECTI

VES:

To: study the basic concepts of Internet and understand the services provided by the Internet.

Unit I

The Internet: Introduction – From Computers to the Internet - Advantages of the Internet – Major Internet Services – Hardware and Software in the Internet Age. **Evolution and Growth of the Internet:** Birth of the Internet – Current Networking Technologies – Next Generation Networking..

(5L)

Unit II

Getting Online: Types of Internet Accounts – Selecting Internet Service Providers – **Electronic Mail:** Advantages of E-mails – E-mail addresses – Mail transfer protocols – Working of E-mail system. **World Wide Web:** Architecture of the World Wide Web – Types of websites – Uniform Resource Locator – Domain Name System – Web Pages and Web Links – Visiting Web Pages – Using Internet Explorer – Searching the Web – Google and Yahoo Search Engines.

(7L)

Unit

III Hosting and Promoting Websites: Structure of Websites – Web Development tools – Microsoft Front Page –Adobe Dreamweaver – Visual Studio. NET – Hosting Websites – Getting a Domain /name – Visitor Analysis and Statistics – Website Promoting methods. (6L)

Unit IV

Electronic Commerce: E-Business and E-Commerce – Types of business in the internet – M- Commerce - Marketing Strategies on the Web – Making Payments in Virtual Stores – Shopping in Virtual Stores –Cookies and E-Commerce – Major issues of E-commerce and M-Commerce – Future of E- commerce. (6L)

Unit V

Blogs and Social Networking: Blogs – Uses of Blogs – Blogs System Components – Steps

for Blogging – Building a Blog site – Social Networking – Etiquette in networking sites.

Internet Security: Importance of Internet Security – Internet Threats – Identity theft and Cybersquatting – Hacking – Spamming and Spoofing – Phishing and Pharming – Denial of Service – spyware – Viruses and worms- Security solutions – Firewalls and Intrusion Prevention Systems –Internet Security Precautions- The Information Technology Act. (6L)

Text Book:

The Internet A User's Guide Second Edition by K.L. James – PHI Learning Private Limited .

Reference Books:

1. Internet, World Wide Web, How to program, 4th Edition, Paul Deital, Harvey M Deitel, Pearson
2. Learning Internet & Email, 4th Revised Rdition, Ramesh Bangia, Khanna Book Publishing Co Pvt Ltd.
3. Internet & Ecommerce, C. Nellai Kannan, NELS Publications

Non-Major Elective 2
Basic Programming Design

L T P C
2 0 0 2

OBJECTI

VES:

To: study the basic concepts of Programming and understand the structures of programming constructs.

Unit I

Computer Program: Introduction – Developing a program – Algorithm – Flowchart – Decision Tables. (6L)

Unit II

Program Testing and Debugging – Program Documentation – Program Paradigms: Unstructured programming, Structured programming and Object Oriented Programming – Characteristics of a Good Programming. (6L)

Unit III

Computer Languages: Evolution Programming Languages – Classification of Programming Languages – Generation of Programming Languages – Features of Good Programming language. (6L)

Unit IV

Computer Software: Software Definition – Relationship between Software and Hardware - Software Categories : System Software and Application Software – Terminology Software Firmware, Liveware, Freeware, Public Domain Software, Shareware, Commercial Software and Proprietary Software. (6L)

Unit V

Evolution of Internet - Internet Basics: Basic Internet Terms – Getting connected to Internet - Internet Applications – E-mail – Searching the Web – Internet and Viruses. (6L)

Text Book:

Introduction to Computer Science, ITL Education Solutions Limited, 2/e, Pearson

Reference Books:

1. Fundamentals of Computers, V.Rajaram, 5th Edition, PHI
2. Introduction to Computers, Peter Norton, 7/e, TMH.

VISUAL BASIC

L T P C

4 0 0 4

Objective: Visual Basic Programming introduces event-driven Windows programming, data types, operators, objects and properties, menus, procedures, control structures, and database file processing

Unit I

Getting started with Visual Basic 6.0: Introduction to Visual Basic - Visual Basic 6.0 Programming Environment – Working with Forms – Developing an Application – Variables, Data types and Modules – Procedures and Control Structures – Arrays in Visual Basic – Additional Examples. **Working with Controls:** Introduction – Creating and using Controls – Working with Control Arrays.

(12L)

Unit II

Menus, Mouse Events and Dialog Boxes: Introduction – Mouse Events – Dialog Boxes - additional Examples. **Graphics, MDI, and Flex Grid:** Introduction – Graphics for Applications – Multiple Document Interface(MDI) – Using the Flex Grid Control. (12L)

Unit III

ODBC using Data Access Objects and Remote Data Objects: Open Database Connectivity (ODBC) – Remote Data Objects. (12L)

Unit IV

Object Linking and Embedding: Introduction - OLE Fundamentals – Using OLE Container Controls – Using OLE Automation Objects - OLE Drag and Drop - Additional Examples. **Objects and Classes:** Introduction to Objects – Working with Objects – Classes and Class Modules.

(12L)

Unit V

Working with ActiveX Data Objects: An Overview of ADO and OLE DB – ADO Object Model - Additional Examples. **Files and File System Controls:** Introduction – File System Controls – Accessing Files.

(12L)

Text Book:

Visual Basic 6.0 Programming – Content Development Group – Tata McGraw-Hill Publishing Company Limited, New Delhi.

Reference Books:

1. VISUAL BASIC 6 in Record Time by Steve Brown, BPB Publications.
2. VISUAL BASIC 6 from the Ground UP – GARY CORNELL – Tata McGraw Hill.

INFORMATION SECURITY

L T P C

4 0 0 4

Objective: Information security focuses on the overview of information security, the tools and techniques used to secure information and the procedures and practices that must be followed by organizations to ensure information security.

Unit I

Basics of information security: Introduction – Information – Need for information security – What is an information security breach – What needs to be secured? – Who needs to be concerned on information security. Aspects of information security – Goals of information security – Establishing a Security Equation.

Information Security Threats: Introduction – What is a threat – Threats and Vulnerabilities – Threats, vulnerabilities and counter measures.- Types of threats (12L)

Unit II

Viruses: Introduction – Who creates a virus and why? – How does a virus spread. Types of viruses – Boot sector virus – file virus. Prevention from virus attacks – Impact of a virus attack – Security measures to prevent virus attacks. Antivirus Software – Types of Antivirus software – Deploying Antivirus software. Virus detection and recovery – Virus detection – Recovery from virus attack.

Backups: Introduction – Need for making backups – Types of backups – Backup media – Qualities of a good backup. Backup Strategy – What should be backed up – How frequently and what types of backups should be made – which backup medium should be used – For how long should backups be maintained – who is responsible for making a backup. Backup solutions - Backup solutions used in Linux - Backup solutions used in Windows 2000. (12L)

Unit III

Countermeasures for Information Security Breach: Cryptography – What is cryptography – Need for cryptography – Types of cryptography – Algorithms used in Cryptography – Authentication models used in cryptography – Implementation of cryptography. Biometrics –

Biometrics Authentication process – Biometrics Authentication methods – Areas where Biometrics is used.

Risk Management: Introduction –What is Risk management – Need for risk management - Benefits of risk management – Important roles in risk management – The risk management process. Risk Assessment –Identifying the assets at risk – Assessing the value of assets – identifying the threats to the assets – identifying the vulnerabilities in an organization. Risk Analysis – Analyze the probability of threat occurrence – Analyze the impact of threat occurrence – Determine the levels of risk of each asset – Prepare for a Risk analysis report. Risk Mitigation – Devise an implementation plan and prioritize Assets – Identify security controls – Conduct cost benefit analysis – challenges in Risk management.

(12L)

Unit IV

Security Policies: Introduction – What is security policy – need for security policy – people who are affected by security policies – Role of management in implementing security Policies- Components of a security policy – security policies and Trust. Security Policy Life Cycle – Prerequisites for creating a Security policy – Design and Creation – Implementation – Compliance – Monitor and Review. Key Security Policies- Acceptable use policy –P:assword policy – Remote Access policy – Virus prevention and Protection policy.

Intrusion Detection: Introduction – What is intrusion – How intrusion happens – who can intrude –types of intrusions. Intrusion Detection Systems – Models on which IDS are based – types of IDS. Honeypots – types of honeypots – uses of honey pots. Firewalls-types of firewalls.

(12L)

Unit V

Security Audit: Introduction – Objectives of security audit – when is a security audit required. Auditor – Qualification of an auditor – role of an auditor – responsibilities of an auditor. Conducting Security Audits – Auditing strategies – Phases of a security audit – types of security audits. **Sample Security Policy:** Introduction – Security policy – Roles and responsibilities – policy documentation – security policy compliance – Standards and guidelines for the use of Company Resources and Network facilities V

1.0 - Standards and guidelines for email usage V 1.0 - Standards and guidelines for internet usage V 1.0. Sample Risk Analysis (12L)

Text Book:

Information security, An overview. PHI, 2004.

Reference Books:

1. Information Security: Principles and Practice 2nd Edition, Mark Stamp , Wiley

Publications.

2. Information Security: The Complete Reference 2nd Edition, Mark Rhodes & Ousley, McGraw Hill.

Relational Database Management System

L T P
C 4 0 0
4

OBJECTIVES:

- To learn the fundamental data models and conceptualize and depict a database system using ER diagram
- To make a study of SQL and relational database design using Oracle

UNIT I

Introduction: Database - system applications-Purpose of Database Systems - View of Data- Database languages -Relational Databases - Database Design - Data Storage and Querying - Transaction Management - Database Architecture - Data Mining and Information Retrieval- Specialty Databases - Database Users and Administrators. (12L)

UNIT II

Introduction to the Relational Model and Introduction to SQL: Structure of Relational Databases -Database Schema-Keys-Schema Diagrams- Relational Query Languages- Relational Operations- Overview of the SQL Query Language -SQL Data Definition-Basic Structure of SQL Queries (12L)

UNIT III

SQL operations and Intermediate SQL : Additional Basic Operations-Set Operations- Null values-Aggregate functions- Nested Sub queries- Views - Integrity Constraints - SQL Data Types and Schemas (12L)

UNIT IV

Entity-relationship(E-R) Modeling – Enhanced Entity-Relationship(EER) Model – Data Normalization (12L)

UNIT V

Implementation using Oracle: Creating Table-Modifying Table-Creating SEQUENCE-PL/SQL- Stored procedures and Functions (12L)

Text Book:

- 1.Database System Concepts — Abraham Silberschatz, Henry F.Horth and S.Sudarashan, McGraw-Hill International Sixth Edition.
- 2.Essentials of Database Management Systems – Alexis Leon, Mathews Leon (Chapter 4,5,8 — IV unit)
3. Oracle8i Jose A.Ramalho BPB Publications

Reference Books:

1. Database Management Systems, R.Panneerselvam, PHI Learning Private Limited
2. Database Management Systems, Ramakrishnan and Gehrke, Mc Graw Hill Publications
3. Relational Database Management Systems,P. Simon Navis, Ave Maria Publications
4. RDBMS Concepts and Database Designing, Dr. R.C. Goyal –Ebook url_ http://www.vssut.ac.in/lecture_notes/lecture1423726199.pdf
5. Fundamentals of Database Systems, Ramez Elmasri, Fourth Edition, Pearson Addison Wesley- EBook URL: http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/Database_Systems.pdf
6. An Introduction Relational Database Theory, Hugh Darwen, EBook URL: <http://www.zums.ac.ir/files/research/site/ebooks/it-programming/an-introduction-to-relational-database-theory.pdf>

VISUAL BASIC Lab

L T P C

0 0 4 3

Objective: To highlight the basic concepts of HTML and help the student to equip with the programming skills in implementing and developing web based applications

Each exercise should be completed within three hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Design an Analog Clock.
2. Design a Desktop Calculator.
3. Design Mixing of Colors using basic Colors.
4. Create an application to format the text inside the text box.
5. Create an application using File controls and use two option buttons to show and hide a picture in the Picture box.
6. Create an Editor with File and Edit Menus using Menu Editor Tool.
7. Create a MDI Application with tile and cascade child forms.
8. Create a mailing address database in access `and view the records using Data Control.

Allied
E-Commerce

L T P
C 3 0 0
3

Objective: To impart knowledge about the web technologies and their applications and to understand the basics of web designing.

Unit I

History of E-Commerce : Electronic Commerce - Emergence of the Internet — Emergence of the World Wide Web —Advantages of E— commerce — Disadvantages of E-Commerce - Qnline Extension of a BAM Model — Transition to E-Commerce in India - The Internet and India.

(8L)

Unit II

Business Models for E-Commerce : Social Networking and Facebook – Business Model — E-business Models Based on the Relationship of Transaction Parties — E-business Models Based on the Relationship of Transaction Types. (9L)

Unit III

e-Marketing - Google – Traditional Marketing – The Browsing Behaviour Model – Online Marketing – E-advertising – Internet Marketing Trends –E-branding – Marketing strategies.

(9L)

Unit IV

e-Security : Information System Security – Security on the Internet – E-business Risk Management Issues – Information Security Environments in India. (9L

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Unit V

e-Payment Systems : E-banking at ICICI Bank — Main Concerns in Internet Banking - Digital Payment Requirements —Classification of New Payment Systems - Digital Signature — Online Financial Services in India. (10L)

TEXT BOOK:

1. P.T.Joseph , S . J, E-Commerce – An Indian Perspective, PHI Learning Pvt Ltd.,2013

Reference Books:

- 1 . CSV Murthy, E-Commerce – Concepts Models Strategies, Himalaya Publishing House.
2. Bharat Bhasker, Electronic Commerce Framework, Technologies and application, Tata Mcgraw Hill.

Allied Practical
List – PYTHON

L T P C
0 0 4 2

Objective: Learn to program in Python and understand programming paradigms brought in by Python Expressions.

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
3. WAP to display the first n terms of Fibonacci series.
4. WAP to find factorial of the given number.
5. WAP to find sum of the following series for n terms: $1 - 2/2! + 3/3! - \dots - n/n!$
6. WAP to calculate the sum of two compatible matrices.
7. WAP to calculate the product of two compatible matrices.
8. Explore String functions.
9. Creating a CSV File based on user input.
10. Reading a CSV File already created and display the contents

Reference Books:

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.org 2010
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012

4. <http://docs.python.org/3/tutorial/index.html>
5. <http://interactivepython.org/courselib/static/pythonds>
6. <http://www.ibiblio.org/g2swap/byteofpython/read/>

Skill Based II Core
Android Programming

L T P
C 4 0 0
4

OBJECTIVES

:

To learn the fundamentals of Android Programming using the Android SDK.

UNIT I

Getting Started with Android Programming: What is Android – Android versions –

Features of Android –Android Architecture –Android devices in the market –The Android Market. Obtaining the required tools – Android Studio – Android SDK – Creating Android Virtual Devices – The Android Developer Community – Launching the first Android Application. **Using Android Studio for Android Development** - Exploring the IDE – Using Code completion – Debugging your application – Publishing your application. (12L)

UNIT II

Activities, Fragments and Intents : Understanding Activities - Applying Styles and Themes to an activity – Hiding the Activity title – Displaying a Dialog Window – Displaying a Progress Dialog. Linking Activities using Intents – Returning results from an intent – Passing data using an Intent Object. Fragments – Adding Fragments dynamically - Life cycle of a fragment – Interactions between fragments – Understanding the Intent object – Using intent filters. Displaying notifications. (12L)

UNIT III

Getting to know the Android User Interface : Understanding the components of a screen – View and viewgroups – Frame Layout – Linear Layout (Horizontal and Vertical) – Table layout – Relative layout – Frame layout – Scroll view. Adapting to Display Orientation –

Anchoring views – Managing changes to screen orientation – Persisting State information during changes in configuration – Detecting orientation changes – Controlling the orientation of the Activity. Utilizing the Action Bar – Adding Action items to the Action Bar – Creating the user interface Programmatically – Listening for user Notifications. (12L)

UNIT IV

Designing your User Interface with Views: Using Basic views –TextView view – Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton, and RadioGroup Views –ProgressBar View, AutoCompleteTextView View. Using Picker Views – TimePicker view – DatePicker View. Using List views to display long lists – ListView View – Using the Spinner view. Understanding Specified fragments – Using a list fragment – Using a Dialog fragment – Using a preference fragment. (12L)

UNIT V

Displaying Pictures and Menus with views: Using ImageViews to Display pictures – ImageView view – ImageSwitcher – GridView. Using Menus with Views – Creating the Helper Methods – Options Menu – Context Menu – Using WebView. **Data Persistence:** Saving and Loading User Preferences – Accessing preferences using an activity – Programmatically Retrieving and Modifying the Preferences Values. Persisting Data to Files – Saving to Internal Storage – Saving to External Storage – Choosing the best storage option. Creating and using Databases – Creating the DBAdapter Helper Class – Using the database programmatically. (12L)

Text Book:

Beginning Android Programming with Android Studio, J.F. DiMarzio, Wrox Publications

Reference Books:

1. Beginning Android Programming with Android Studio, Roger Deutsch
2. Android Programming: Mastering Course for Beginners - Quick Start to Develop Your Own App (Android studio, Android Development, App Development. Updated to Android 6 Platform, [Mitchell Schuler](#))

Non-Major Elective 3

HTML

L T P

C 2 0 0

2

OBJECTIVES:

VES:

- To study the basic concepts of Web design using HTML.
- To learn the various tags used in HTML
- To make use of Dynamic HTML

Unit 1:

Introduction to HTML: Designing a Home page – History of HTML – HTML generations- HTML Documents-Anchor tag –Hyper links –Sample HTML documents.

(6L)

Unit 2:

Head and Body section: Header Section –Title-Prologue-Links-Colorful web page – Comments lines Designing the body: Heading printing –Aligning the headings-Horizontal rule-paragraph-Tab settings-Image and pictures-Embedding PNG format Images

(6L)

Unit 3:

Ordered and unordered lists: List-Unordered lists- headings in a list – ordered lists- Nested lists. Table handling: Tables- table creation in HTML- Width of the Tables and cells- Cells spanning multiple rows/Columns- Coloring cells – Column specification

(6L)

Unit 4:

Frames: Frame set - Definition – Frame definition –Nested Frames Web Page Design Project : Frameset Definition – Animals – Birds – Fish Forms: Action attributes –Method attributes –Enctype attribute – Drop down list- sample forms

(6L)

Unit 5:

DHTML and Style sheets: Defining styles –Elements of styles- Linking a style sheet to

an HTML document –Inline styles –Internal & External style sheets –Multiple styles (6L)

Text Book:

World Wide Web Design with HTML, C. Xavier, TMH, 2001

Reference Book:

1. Internet & World Wide Web, H.M.Deital, P.J.Deital & A.B.Goldberg, Pearson Education
2. Fundamentals of information technology, Mathew's lenon and Alxis leon, Vijay Nicole private limited, Chennai.

Non-Major Elective - 4

Programming in C

L T P C

2 0 0 2

OBJECTIVES:

To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

Unit I

C Declarations:- Introduction – Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables – initializing variables – dynamic initialization – type modifiers – type conversion – constant and volatile variables. **Operators and Expressions:-** Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Operator Precedence. (6L)

Unit II

Input and Output in C: Introduction – Formatted Functions – Flags, widths and Precision with Format String – Unformatted Functions – Commonly used Library functions. **Decision Statements :** Introduction – Simple IF statement – The IF...Else Statement – Nesting of IF...Else Statements – The ELSE IF ladder – The Break Statement – The Continue Statement – The Goto Statement – The Switch Statement. (6L)

Unit III

Loop Control:- Introduction –The WHILE Statement – The DO Statement – The FOR statement – Nested FOR Loops. **Arrays :-** Introduction – One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One-dimensional arrays – Array terminology -Two-dimensional arrays – Initialization of Two-dimensional arrays.

(6L)

Unit IV

Strings and Standard functions:- Introduction – Declaring and Initializing String Variables – Display of strings in different formats – String Standard functions – String Conversion Functions. (6L)

Unit V

Functions:- Introduction — Basics of a function - Function definition — The Return statement Types of functions – Call by Value and Reference – Function as an argument – Function with operators – function and decision statements – function and loop statements – functions with arrays.

(6L)

Text Book:

Programming in C – 3th Edition by Ashok Kamthane – Pearson Education

Reference Book:

1. Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited
2. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.

Software Engineering and Testing

L T P C

4 0 0 4

OBJECTIVES:

- To understand the concepts of analysis, design and implementation of a software product.
- To have general understanding about object-oriented software engineering.
- To make students to get experience and be ready for the large scale projects in IT Industry.

Unit I

Introduction:- Evolution – From an Art form on Engineering Discipline: Evolution

of an Art into an Engineering Discipline. – Software Development of Projects: Program versus Product – Emergence of Software Engineering: Early Computer Programming – High Level Language Programming – Control Flow-based Design – Data Structure Oriented Design – Object Oriented Design. **Software Life Cycle Models:-** A few Basic Concepts – Waterfall Model and its Extension: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model. – Rapid Application Development (RAD): Working of RAD. –Spiral Model.

(12L)

Unit

II

Software Project Management:- Responsibilities of a Software Project Manager – Project Planning- Project Estimation Techniques-Risk Management. **Requirements Analysis and Specification:-** Requirements Gathering and Analysis – Software Requirements Specifications (SRS):Users of SRS Document – Characteristics of a Good SRS Document – Important Categories of Customer Requirements – Functional Requirements – How to Identify

the Functional Requirements? – Organisation of the SRS Document.

(12L)

Unit III

Software Design:- Overview of the Design Process: Outcome of the Design Process – Classification of Design Activities. – How to Characterize a good Software Design? **Function-Oriented Software Design:-** Overview of SA/SD Methodology – Structured Analysis — Developing the DFD Model of a System: Context Diagram — Structured Design – Detailed Design.

(12L)

Unit IV

User Interface Design:- Characteristics of a good User Interface - Basic Concepts — Types of User Interfaces — Fundamentals of Components based GUI Development: Window System. **Coding and Testing:-** Coding — Software Documentation — Testing: Basic Concepts and Terminologies — Testing Activities. — Unit Testing — Black-box Testing: Equivalence Class Partitioning — Boundary Value Analysis. — White-box Testing. (12L)

Unit V

Software Reliability and Quality Management:- Software Reliability: Hardware versus Software Reliability. — Software Quality — Software Quality Management System — ISO 9000: What is ISO 9000 Certification? — ISO 9000 for Software Industry — Shortcomings of ISO 9000 Certification. — SEI Capability Maturity Model: Level 1 to Level 5. **Software Maintenance:-** Characteristics of Software Maintenance: Characteristics of Software Evolution — Software Reverse Engineering.

(12L)

Text Book:

Fundamentals of Software Engineering Fourth Edition by Rajib Mall – PHI Learning Private Limited 2015.

Reference Books:

1. Software Engineering 2nd Edition by K L James PHI.
2. Software Engineering 9th Edition by Ian Sommerville - Pearson Education Asia.

Data communication and Computer Network

L T P C

4 0 0 4

OBJECTIVES:

- To understand the concepts of data communication.
- To get through understanding of different topologies.
- To study the function of different layers.
- To get familiarized with different protocols and network components.

Unit I

Introduction - Data communication — Networks-the Internet –Protocols and Standards –**Network Models** –Layered tasks –OSI model- layers in OSI model-TCP/IP protocol Suite-Addressing.

(12L)

Unit

II

Physical layer – Analog and digital – Transmission Impairment –Data rate limits- Performance- Transmission mode -**BandWidth Utilization-** Multiplexing - **Transmission media** – Guided and Unguided media.

(12L)

Unit III

Switching — Circuit Switched Network-Datagram Network — Virtual Circuit Network. **Using telephone and cable networks** – Telephone Network- Dial-Up Modem– Digital Subscriber Line — Cable TV Network and Cable TV for Data transfer.

(12L)

Unit IV

Data Link Layer : Error Detection and Correction- Introduction- Checksum. **Data link control**-Framing-Flow and Error Control-Protocols-Noiseless Channels-Noisy Channels. **Wired LANs**-IEEE standards-Standard Ethernet- Changes in the Standard — Fast Ethernet-Gigabit Ethernet.

(12L)

Unit V

Wireless LANs: IEEE 802.11-Blue tooth. **Connecting LANs :** Connecting devices, Backbone networks. **Wireless WANS:** Cellular Telephony, Satellite Networks. **Network Layer-** IPv4 Address-IPv6 Address-Internetworking. **Transport Layer-** Process to Process delivery –UDP-TCP. **Application Layer-** Name space-DNS.

(12L)

Text Book

Data Communication and Networking –“BEHROUZ A FOROUZAN “,The McGraw- Hill- 4th ed.

References

- 1.Data Communication and Computer Networks – “ Prakash C.Gupta
- 2.Computer Networks Protocols,Standards and Interfaces- “ Uyles Black
3. Data Communications and Computer Networks – Brijendra Singh

Dot NET Technologies

L T P
C 4 0 0
4

OBJECTIVES:

- To highlight the features of ASP.NET and apply it to develop various applications.
- To understand the concepts of .Net framework as a whole and the technologies that constitutes the frame work.
- To make the students to get experience and be ready for the large scale projects in IT industry.

Unit I

The .NET Platform and the Web: The Web Client/Server Model – Components of ASP.NET and the .NET Framework – Overview of Internet Information Server – Overview of ASP.NET – The .NET Common Language Runtime and Class Library – Managed Components in .NET – Web Services – Language Independence in the .NET Framework – COM+ Component Services and .NET – Direction and plans for .NET. **The VB.NET:** What is VB.NET? – First VB application – Variables, Constants and Operators – Modularizing Code – Functions and Subroutines – Controlling Program Flow – Handling Errors and Exceptions – Object Oriented Programming – Multithread Programming.

(12L)

Unit II

Working with ASP.NET: The features of ASP.NET – The Anatomy of ASP.NET Pages –Introducing Web Forms – VS.NET Web Applications and other IDE Basics – Separating Content and Code – the Code- Behind Feature – Application Configuration – Using HTML Forms – Using Web Controls – Web Controls for displaying and formatting data –Web Controls for creating buttons – Web control for inputting text – Web controls for selecting choices – Web controls for creating lists – Miscellaneous Basic Controls – Creating a simple ASP.NET

Application – ASP.NET Page Directives – ASP.NET Rich Controls – Validation Controls – Data List Controls – User Controls - Saving state with the StateBag Object – ASP.NET Intrinsic Objects. (12L)

Unit III

Using the .NET Framework Class Library: Common Features of the .NET Framework Class Library – Using Data Collections – Handling File Input/output and Directories – Watching the File System for Changes – Using the Windows Event Log – Working with Active Directory Services – Using Message Queues – Communicating with Servers on the Internet – Manipulating XML Data – Sending Internet E- mail. (12L)

Unit IV

Building .NET Managed Components for COM+: The concept of Managed Code Execution – The Common Language Runtime – COM+ Component Services – Using VB.NET to develop Managed Components – Serviced Components – Building VB.NET Serviced Components. **Building Web Services:** The need for Web Services – Overview of Web Services – Web Service Description Language - Web Service Wire Formats – Web Services Discovery – Creating a simple Web Service – Calling Web Services with Proxy Classes – Creating a Client for a Web Service – Managing State in Web Services – Using Transactions in Web Services.

(12L)

Unit V

Accessing Data with ADO.NET: Overview of Data Access on the Web – ADO.NET: The next generation of Data-Access Technology – ADO.NET Programming Objects and Architecture – Displaying Database Data – Programming with the DataList and DataGrid Controls – Working with the DataSet and DataTable Objects – Maintaining Data Integrity with the DataRelation Class – Using Manual Database Transactions – Working with Typed DataSet Objects. **Securing .NET Applications:** Windows Security – IIS Authentication and Authorization Security – A crash course in Cryptography – Implementing Data Encryption – ASD.NET Authentication Security.

(12L)

Text Book

ASP.NET and VB.NET Web Programming –by Matt J. Crouch, Pearson.

Reference Books

1. Upgrading Microsoft Visual Basic 6.0 to .NET - by d Robinson, Michael Bond, Robert Ian Oliver, WP Publishers.
2. Visual Basic.NET - by Shirish Chavan, Pearson

Dot NET Practical Listing

L T P C

0 0 4 2

Objective: Learn to program in Dot Net and to develop web pages using ASP.NET

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Build a homepage for XYZ Corporation using Web Controls.
2. Create a login page using user control in a web form.
3. Create a simple multiple choice questionnaire. Submit the answers and display the score.
4. Develop a project to input data through a web form to a database and retrieve the data. Use the calendar control to input date.
5. Develop a project to input data through a web form to a database and validate the data. Use the Required Field Validator and RangeValidator Controls.
6. Check whether a given word or phrase is a palindrome using Web Service.
7. Create an online photo gallery using DataList and DataGrid Controls.
8. Develop code to send email from ASP.NET

DATA STRUCTURE PRACTICAL LIST

L T P

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Objective: To develop skills in implementing data structure algorithms

4 2

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Search an element in a list using Binary Search.
2. Implementation of Stack- Push and Pop.
3. Implementation of Queue – Enqueue and Dequeue
4. Implementation of Binary Tree Traversals using recursion.
 - a) Pre-order b) In-order c) Post-Order
5. Implementation of Breadth First Search algorithm.
6. Implementation of Depth First Search algorithm.
7. Implementation of Merge Sort
8. Implementation of Quick Sort

Mini Project

WEB PROGRAMMING WITH PHP AND MYSQL Practical Listing

L T P C

0 0 4 2

Objective:

To develop applications in PHP using various concepts like arrays, udf's, Sessions and make the students to understand and to establish the connectivity between PHP and MySQL and develop programs to add records, retrieve records and delete records from a table.

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create a simple webpage using PHP.
2. Design a form to create an email. Store the data in a database. Validate all the input fields. Database connectivity in PHP with MySQL.
3. Create a mysql database table tbllogin with fields user name and Password. Perform all database operations like select, insert, delete, update on the table tbllogin

4. Develop a **CRUD** application, which stands for **Create, Read, Update, Delete**.

A quick example of a **CRUD** application would be a database of employees for a company. From the control panel, an admin would be about to add a new employee (create), view a list of employees (read), change an employee's salary (update) or remove a fired employee from the system (delete).

5. Create a table with two columns namely the name of the player and number of wickets. Create a Chart to display the data.

Major Elective 1
Mobile Computing

L T P
C 4 0 0
4

OBJECTIVES:

- To highlight the features of Mobile Communication.
- To understand the concepts of Mobile Protocols
- To learn about package and deploying Applications.

Unit I

Basics of Communication Technologies: Components of a Wireless Communication System – Architecture of a Mobile Telecommunication System – Wireless Local Area Networks – Bluetooth Technology. **Introduction to Mobile Computing and Wireless Networking:** What is Mobile Computing ? Mobile Computing vs. Wireless Networking – Characteristics of Mobile Computing – Structure of Mobile Computing Application-Cellular Mobile Communication –Global System for Mobile Communications (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunications System (UMTS). (12L)

Unit II

MAC Protocols: Properties required of MAC Protocols – Wireless MAC Protocols : Some Issues- A taxonomy of MAC Protocols –Fixed Assignment schemes – Random Assignment Schemes –Reservation based Schemes. **Mobile Internet Protocol:** Mobile IP – Packet Delivery – Overview of Mobile IP – Desirable features of Mobile IP- Key mechanism used in Mobile IP – Route Optimization – Dynamic Host Configuration Protocol. (12L)

Unit III

Mobile Transport Layer: Overview of TCP/IP – Terminologies of TCP/IP – Architecture of TCP/IP – An overview of the operation of TCP – Application Layer Protocols of TCP – TCP in Mobile Networks. **Mobile**

Databases : Issues in Transaction Processing – Transaction Processing Environment –Data dissemination – Transaction Processing in Mobile Environment – Data Replication – Mobile Transaction Models – Rollback Process – Two-Phase Commit Protocol – Query Processing – Recovery. (12L)

Unit IV

Wireless Sensor Networks: WSN vs. MANET – Applications – Architecture of the Sensor Node – Challenges in the design of an effective WSN – Characteristics of Sensor Networks – WSN Routing Protocols – Target Coverage – Clustered Wireless Sensor Networks. **Operating Systems for Mobile Computing:** Special Constraints and requirements of Mobile O/S- A survey of Commercial Mobile Operating Systems – A Comparative study of Mobile OSs.

(12L)

Unit V

Mobile Application Development and Protocols: Mobile Devices as Web Clients – WAP – J2ME – Android Application Development. **Mobile Commerce:** Applications of M-Commerce – Business-to-Business(B2B) Applications – Structure of Mobile Commerce – Pros and Cons of M-Commerce – Mobile Payment Systems. (12L)

Text Book

Fundamentals of Mobile Computing –by Prasant Kumar Pattnaik, Rajib Mall,, PHI.

Reference Books

1. Wireless and Mobile Communication, T.G. Palanivelu & R. Nakkeeran, PHI Learning Private Limited, 2009
2. Wireless and Cellular Telecommunications, Third Edition William C.Y. Lee, McGraw Hill
3. Mobile Computing Technology, Applications and Service Creation, Asoke K. Talukder & Roopa R. Yavagal, TMH Publication
4. Wireless Communications and Networking made simple, Prof. Satish Jain, Vineeta Pillai, BPB Publications

Major Elective - 2
Multimedia Applications

L T P C
4 0 0 4

OBJECTIVES:

- To have general understanding about Multimedia.
- To make the students understand the elements of multimedia
- To learn multimedia and internet

Unit I

Introduction: Objectives – History of Multimedia – Its market – Content copyright – Resources for multimedia developers – Types of produces – Evaluation – Hardware Architecture – OS and Software – Multimedia Architecture — Software library — Drivers. (12L)

Unit II

Text and Graphics : Elements of Text – Text Data files – Using text in Multimedia Application – Hypertext – Elements of Graphics – Images and color – Graphics files and Application formats – Creating images for multimedia use –Using graphics in Application. (12L)

Unit III

Digital Audio and Video : Characteristics of sound and Digital audio — Digital Audio systems — MIDI – Audio file formats – Using Audio in Multimedia Applications – Audio for content – Background as video – Characteristics of digital video – digital video data sizing 0 Video capture and playback systems – computer animation.

(12L)

Unit IV

Product design and Authoring tools: Building blocks – classes of products – Content organizational strategies – story boarding – Multimedia tool selection – Tool feature – categories of Authoring tools – selecting the right authoring paradigm. (12L)

Unit V

Multimedia and Internet : Internet – HTML and web authoring – Multimedia considerations for Internet – Design considerations for web pages.

(12L)

Text Book :

Multimedia Technology and Applications – David Hillman-Galgotia Publications pvt. Ltd, 1998.

Reference Books :

1. Multimedia making it work by Tay Vaughan TMH, 1997
2. Computer Graphics Multimedia and Animation - Malay K. Pakhira PHI , New Delhi - Second edition
3. Principles of Multimedia - Ranjan Parekh - TMGH, New Delhi - Twelfth Reprint,
4. Computer Graphics and Multimedia - Anirban Mukhopadhyay, Arup Chattopadhyay - Vikas Publishing Ltd - Second Edition

Major Elective - 3

Cloud Computing

L T P

C 4 0 0

4

OBJECTIVES:

- Understand core concepts of cloud computing
- Learn the fundamental concepts about data centers to understand the tradeoffs in power, efficiency and cost.
- Understand use of cloud storage in storage systems.

UNIT I:

Introduction Cloud Computing Introduction, From, Collaboration to cloud, Working of Cloud Computing, Pros and Cons, Benefits, Developing Cloud Computing Services, Cloud Service Development, Discovering Cloud Services.

(12L)

UNIT II:

Cloud Computing For Everyone Centralizing Email Communications, Cloud Computing for Community, Collaborating on Schedules, Collaborating on Group Projects and Events, Cloud Computing for Corporation, Mapping Schedules Managing Projects, Presenting on Road.

(12L)

UNIT III:

Using Cloud Services Collaborating on Calendars, Schedules and Task Management, Exploring on Line Scheduling and Planning, Collaborating on Event Management, Collaborating on Contact Management, Collaborating on Project Management, Collaborating on Word Processing, Spreadsheets, and Databases.

(12L)

UNIT IV:

Outside The Cloud Evaluating Web Mail Services, Evaluating Instant Messaging, Evaluating Web Conference Tools, Creating Groups on Social Networks, Evaluating on Line Groupware, Collaborating via Blogs and Wikis.

(12L)

UNIT V:

Storing And Sharing Understanding Cloud Storage, Evaluating on Line File Storage, Exploring on Line Book Marking Services, Exploring on Line Photo Editing Applications, Exploring Photo Sharing Communities, Controlling it with Web Based Desktops.

(12L)

TEXT BOOK:

Cloud Computing, Michael Miller, Pearson Education, New Delhi, 2009.

REFERENCE BOOK:

1. Cloud Computing, V. K. Pachghare, PHI Learning Pvt Ltd, 2016
2. Cloud Computing, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, TMH, 2010.
3. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing, Inc.

Operating Systems

L T P

C 4 0 0

4

OBJECTIVES:

- To acquire the fundamental knowledge of the operating system architecture and components and to know the various operations performed by the operating system.
- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.

Unit I

Introduction: What Operating system do – Computer System Organization – Computer System Architecture – Operating System Structures- Operating System Operation. **System Structures:** Operating System Services – System Calls – System Programs – Operating System Design and Implementation- Operation System Generation- System Boot.

(12L)

Unit II

Process Concept: Process Concept- Process Scheduling –Operation on Processes- Inter Process Communication- Example of IPC System – Communication in Client – Server system. **Process Scheduling :** Basic concept-Scheduling criteria- Scheduling algorithm-Thread scheduling-Multiple Processor Scheduling-Real Time CPU Scheduling-Operating system example- Algorithm evaluation. (12L)

Unit III

Synchronization: Background - The Critical section problem-Peterson's solution - Semaphores – Classic problems of Synchronization. **DeadLocks:** System models-Deadlock Characterization-Methods for handling deadlock - Deadlock Prevention-Deadlock Avoidance-Deadlock detection - Recovery from deadlock.

(12L)

Unit IV

Memory Management: Background – Swapping - Contiguous Memory allocation – Segmentation – paging.

Virtual Memory Management : Background - Demand paging - Copy and Write-page replacement-Allocation of Frames - Thrashing.

(12L)

Unit V

File System : File Concept-Access Method-Directory and Structure--File Sharing-Protection. **Implementing File System:** File System Structure - File System implementation-Directory implementation-Allocation Methods - Free Space Management. **Mass Storage Structure:** Overview of Mass Storage Structure-Disk Structure - Disk Scheduling - Disk Management.

(12L)

Text Book:

Operating System Concepts – Abraham Silberscartz, Peter Baer Galvin, and Greg Gange.
Addision Wesley Publishing Company – Ninth Edition.

Reference Books:

1. Operating System: Internal and Design Principles – Fifth Edition, William Stalling ,PHI Learning Private Limited.
2. Understanding Operating Sysytes: Ida M.Flynn ,Ann McIverMcHoes.

Computer Graphics and Visualization

L T P C

4 0 0 4

OBJECTIVES:

To develop skills and knowledge about computer graphics and Visualization and to understand 2D, 3D transformations.

Unit I

Overview of Graphics System: Video Display Devices – Input Devices - Hard Copy Devices – Graphics Software. **Output Primitives:** Points and Lines –Line drawing algorithms – DDA algorithm- Bresenham's line algorithm- Circle drawing algorithms: properties of circles – Midpointcircle algorithm – Filled Area primitives. (12L)

Unit II

Attributes of Output Primitives: Line attributes – Curve attributes – Character attributes. **Two-Dimensional Geometric Transformation:** Basic Transformations – Matrix Representations and homogenous coordinates — Composite and other Transformations. (12L)

Unit III

Two-Dimensional Viewing: The viewing pipeline, Viewing co-ordinate reference frame — Window to view port co-ordinate transformation — Two-dimensional viewing function. **Clipping Operations:** Point clipping — Line clipping (only Cohen-Sutherland line clipping) – Polygon Clipping (only Sutherland-Hodgeman polygon clipping).

IV

Unit

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Interactive Input Methods: Input of graphical data – Input functions – Three dimensional display methods.

Three Dimensional Geometric and Modeling Transformations: Translation - Rotation - Scaling

(12L)

Unit

V Three Dimensional Viewing: Viewing Pipeline, Projections. **Visible-surface deduction methods:** Back-face deduction – Depth buffer method- A-Buffer Method – Scanline Method.

(12L)

Text Book:

Computer Graphics C version, Second Edition, Donald Hearn, M.Pauline Baker, Pearson Publications.

Reference Books

1. Express Learning - Computer Graphics and Multimedia-ITL Education Solution Ltd.
2. Computer Graphics-A programming Approach 2/e-Steven Harrington-Mc Graw Hill Education Private Limited.
3. Computer Graphics, Multimedia and Animation - Malay K. Pakhira - PHI

DATA WAREHOUSING AND DATA MINING

OBJECTIVES:

- To understand and implement classical models and algorithms in data warehousing and data mining.
- To analyze the data, identify the problems and choose the relevant models and algorithms to apply.
- To assess the strength and weaknesses of various methods and algorithms and analyze the behaviour.

UNIT I : DATA WAREHOUSING – Data warehousing Components: Overall Architecture - Datawarehouse Database- Sourcing, Acquisition, Cleanup, and Transformation tools — Metadata - Access Tools - Data Marts - Data Warehouse Administration and Management - Information Delivery System – **Building a Data warehouse:** Business Considerations : Return on Investment - Design Considerations - Benefits of Data Warehousing.

UNIT II : BUSINESS ANALYSIS -Tools categories - The Need for Applications - Need of OLAP - Multidimensional Data Model - OLAP Guidelines - Multidimensional versus Multirelational OLAP - Categorization of OLAP Tools - OLAP Tools and the Internet.

UNIT III : DATA MINING - Introduction — What is Data Mining? — Kinds of Data — Data Mining Functionalities — Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives –Integration of a Data Mining System with a Data Warehouse – Issues –Data **Preprocessing:** Why Preprocess the Data?- Data Cleaning-Data Integration and Transformation.

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION - Mining Frequent Patterns, Associations and Correlations — Basic Concepts-: **Frequent Itemset Mining Methods** — The Apriori Algorithm — Mining Various Kinds of Association Rules — **Classification and Prediction** - What Is Classification? What Is Prediction? - Classification by Decision Tree Induction : Decision Tree Induction - Bayesian Classification : Bayes' Theorem - Naïve Bayesian Classification — Rule Based Classification : Using IF-THEN Rules for Classification - Rule Extraction from a Decision Tree –Classification by Backpropagation : A Multilayer Feed-Forward Neural Network - Defining a Network Topology — Backpropagation — Prediction : Linear Regression - Nonlinear Regression.

UNIT V CLUSTER ANALYSIS: What Is Cluster Analysis? - Categorization of Major clustering Methods – Partitioning Methods : K means –Hierarchical Methods : Agglomerative and Divisive Hierarchical Clustering—

Density-Based Methods-DBSCAN- Data Mining Applications.

TEXT BOOKS

1. Alex Berson and Stephen J. Smith, “ Data Warehousing, Data Mining & OLAP”, Tata McGraw — Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.

REFERENCE BOOKS

1. Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education 2007.
2. Insight into Data Mining Theory and Practice — K.P.Soman, Shyam Diwakar, V.Ajay, Prentice Hall of India, 2008.
3. Introduction to Data Mining with Case Studies by G.K.Gupta, PHI 3rd Edition, 2015.

Computer Graphics and Multimedia Lab Listing

L T P C

0 0 4 2

Objective:

1. To acquire skills in programming computer graphics
2. To acquire skills in multimedia concepts

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Write a program to draw a line using DDA algorithm
2. Write a program to draw a circle using Bresenham's algorithm.
3. Write a program to draw a line using Bresenham's algorithm.
4. Write a program to scale an image.
5. Write a program to rotate an image.
6. Write a program to translate an image.
7. Write a program for bouncing a ball and moving with sound effect.
8. Write a program to display as many balls in the frame in random position.
9. Write a program to display an image as tiled and cascaded according to the user's option.
10. Write a program so that it should first display the image as the size of applet then it should be reduced

and again it should reduced and so on and finally the image should disappear.

Oracle Lab Listing

L T P C
0 0 4 2

Objective:

1. To acquire skills in SQL statements with various constructs
2. To acquire skills in PL/SQL Programming

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Create an employee database with tables department, employee details, address, pay details and project details. Alter the tables and add constraints relevant to the fields in the tables. Insert records into all the tables.
2. Create queries to retrieve relevant information from a table.
3. Create a table from the existing tables.
4. Develop queries to retrieve information from more than one table.
5. Develop summary queries to retrieve relevant information from the tables.
6. Write a PL/SQL program to print multiplication table
7. Write a PL/SQL program to check whether given string is palindrome or not
8. Write a PL/SQL program to find factorial of numbers using function and procedure.

Students are to take up sample project development activities with the guidelines given below

Preparing a project - brief proposal including

- Problem Identification
- Developing a model for solving the problem
- A statement of system /process specification proposed to be developed (Data Flow Diagram)
- List of possible solution including alternatives and constraints A presentation including the following
- Implementation phase (Hardware/Software/both)
- Testing & Validation of the developed system
- Learning outcomes from the project

Consolidated report preparation

Major Elective -

4

**INTERNET OF
THINGS**

L T P

C 4 0

0 4

OBJECTIVES:

- Learn how the Internet of Things (IOT) has the potential to alleviate some of the world's most significant problems
- To learn IOT technology and architecture.

UNIT I

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. (12L)

UNIT II

M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. **M2M to IoT-An Architectural Overview**– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

(12L)

UNIT III

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service (XaaS), M2M and IoT Analytics, Knowledge Management.

(12L)

UNIT IV

IoT Architecture-State of the Art – Introduction, State of the art, **Architecture Reference Model**-

Introduction, Reference Model and architecture, IoT reference Model.

(12L)

UNIT V

IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. **Real-World Design Constraints-** Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

(12L)

TEXT BOOK

Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, **“From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”**, 1st Edition, Academic Press, 2014.

REFERENCE BOOKS

1. Vijay Madiseti and Arshdeep Bahga, **“Internet of Things (A Hands-on-Approach)”**, 1st Edition, VPT, 2014.
2. Francis da Costa, **“Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”**, 1st Edition, Apress Publications, 2013.

Major Elective 5

BIG DATA ANALYTICS

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4

OBJECTIVES:

- Learn about Big Data.
- To explore novel statistical, algorithmic, and implementation challenges that emerge in processing, storing, and extracting knowledge from Big Data.

UNIT I

What Is Big Data and Why Is It Important? - A Flood of Mythic “Start-Up” Proportions - Big Data Is More Than Merely Big - Why Now? - A Convergence of Key Trends - Relatively Speaking - A Wider Variety of Data - The Expanding Universe of Unstructured Data.

Industry Examples of Big Data: Digital Marketing and the Non-line World - Don’t Abdicate Relationships - Is IT Losing Control of Web Analytics? - Database Marketers, Pioneers of Big Data - Big Data and the New School of Marketing - Consumers Have Changed. So Must Marketers. - The Right Approach: Cross-Channel Lifecycle Marketing - Social and Affiliate Marketing - Empowering Marketing with Social Intelligence (12L)

UNIT II

Fraud and Big Data - Risk and Big Data - Credit Risk Management - Big Data and Algorithmic Trading - Crunching Through Complex Interrelated Data - Intraday Risk Analytics, a Constant Flow of Big Data - Calculating Risk in Marketing - Other Industries Benefit from Financial Services’ Risk Experience - Big Data and Advances in Health Care - “Disruptive Analytics” - A Holistic Value Proposition - BI Is Not Data Science - Pioneering New Frontiers in Medicine - Advertising and Big Data: From Papyrus to Seeing Somebody - Big Data Feeds the Modern-Day Donald Draper - Reach, Resonance, and Reaction - The Need to Act Quickly (Real-Time When Possible) - Measurement Can Be Tricky - Content Delivery Matters Too - Optimization and Marketing Mixed Modeling - Beard’s Take on the Three Big Data Vs in Advertising - Using Consumer Products as a Doorway. (12L)

UNIT III

Big Data Technology : The Elephant in the Room: Hadoop's Parallel World - Old vs. New Approaches - Data Discovery: Work the Way People's Minds Work - Open-Source Technology for Big Data Analytics - The Cloud and Big Data - Predictive Analytics Moves into the Limelight - Software as a Service BI - Mobile Business Intelligence is Going Mainstream - Ease of Mobile Application Deployment - Crowdsourcing Analytics - Inter- and Trans-Firewall Analytics - R&D Approach Helps Adopt New Technology - Adding Big Data Technology into the Mix - Big Data Technology Terms - Data Size 101.

(12L)

UNIT IV

Information Management : The Big Data Foundation - Big Data Computing Platforms (or Computing Platforms That Handle the Big Data Analytics Tsunami) - Big Data Computation - More on Big Data Storage - Big Data Computational Limitations - Big Data Emerging Technologies.

Business Analytics : The Last Mile in Data Analysis - Geospatial Intelligence Will Make Your Life Better - Listening: Is It Signal or Noise? - Consumption of Analytics - From Creation to Consumption - Visualizing: How to Make It Consumable? - Organizations Are Using Data Visualization as a Way to Take Immediate Action - Moving from Sampling to Using All the Data - Thinking Outside the Box - 360° Modeling - Need for Speed - Let's Get Scrappy - What Technology Is Available? - Moving from Beyond the Tools to Analytic Applications. (12L)

UNIT V

The People Part of the Equation : Rise of the Data Scientist - Learning over Knowing - Agility - Scale and Convergence - Multidisciplinary Talent - Innovation - Cost Effectiveness -Using Deep Math, Science, and Computer Science - The 90/10 Rule and Critical Thinking - Analytic Talent and Executive Buy-in - Developing Decision Sciences Talent - Holistic View of Analytics - Creating Talent for Decision Sciences - Creating a Culture That Nurtures Decision Sciences Talent - Setting Up the Right Organizational Structure for Institutionalizing Analytics.

Data Privacy and Ethics : The Privacy Landscape -The Great Data Grab Isn't New - Preferences, Personalization, and Relationships - Rights and Responsibility - Playing in a Global Sandbox - Conscientious and Conscious Responsibility - Privacy May Be the Wrong Focus - Can Data Be Anonymized? - Balancing for Counterintelligence – Now What? (12L)

TEXT BOOK

Michael Minelli, Michele Chamboss, Ambiga Dhiraj , "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for today's businesses" John Wiley , 2014.

REFERENCE BOOKS

1. Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education Services.
2. Bill Franks, Taming The Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Wiley, 2012.
3. Arvind Sathi, Big Data Analytics: Disruptive Technologies for Changing the Game, MC Press, 2012.

Major Elective 6

**NEURAL
NETWORKS**

L T P

C 4 0 0

4

OBJECTIVES:

- Basic neuron models: McCulloch-Pitts model and the generalized one, distance or similarity based neuron model, radial basis function model, etc.
- Basic neural network models: multilayer perceptron, distance or similarity based neural networks, associative memory and self-organizing feature map, radial basis function based multilayer perceptron, neural network decision trees, etc.
- Basic learning algorithms: the delta learning rule, the back propagation algorithm, self-organization learning
- Applications: pattern recognition, function approximation, information visualization, etc.

UNIT I

Introduction to Neural networks: Neural processing- Neural networks- an overview – the rise of neuro computing – introduction to artificial neural networks : introduction- artificial neural networks – historical development of neural networks – biological neural networks – comparison between the brain and the computer – artificial and biological neural networks – basic building blocks of artificial neural networks – artificial neural network terminologies.

(12L)

UNIT II

Fundamental models of artificial neural networks: McCulloch-Pits neuron Model-Learning rules. Perceptron networks: Introduction –single layer perceptron –brief introduction to multi layer perceptron networks.(12L)

UNIT III

Feedback networks: Introduction- discrete Hopfield net-continuous Hopfield net-relation between BAM and

Hopfield nets. Feed forward networks: introduction-back propagation networks.

(12L)

UNIT IV

Kohonen self - organizing feature maps - counter propagation network: introduction-Full counter propagation network-Forward only propagation network.

(12L)

UNIT V

Applications of Neural Networks: Applications of neural networks in Arts-Bioinformatics - Knowledge Extraction – Forecasting - Bankruptcy forecasting-Healthcare-Intrusion - Detection.

(12L)

TEXT BOOK

Introduction to Neural Networks using MATLAB 6.0., S N Sivanandam S Sumathi S N Deepa Tata McGraw Hill, 2006.

REFERENCE BOOKS

1. Artificial neural Networks B.Yegnanarayana, Prentice Hall India, 2005.
2. Neural Networks Algorithms, Applications and programming Techniques, James A Freeman David M Skapura, Pearson Education.
3. Neural Networks for Pattern Recognition, Christopher M. Bishop, Indian Edition, OXFORD University Press.

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc . COMPUTER SCIENCE

(Choice Based Credit System)

(with effect from the academic year 2020-2021 onwards)

Sem	Part I/ II/ III/ IV/ V	Subject No.	Subject Status	Subject Title	Contact Hrs/ Week	L	T	P	Credits
V	III	29	Core	Relational Database Management System	4	4	0	0	4
	III	30	Core	Data Communication and Computer Networks	5	5	0	0	4
	III	31	Core	PHP and mySQL	5	4	1	0	4
	III	32	Major Practical - V	PHP and mySQL Lab	4	0	0	4	2
	III	33	Major Practical - VI	Machine learning practicals	5	0	0	5	2
	III	34	Major Elective – I (Anyone)	1. Mobile application Development 2. Introduction to Security in Computing 3. Cloud Computing	5	5	0	0	4
	III	35	Skill Based Common	Personality Development/ Effective Communication/ Youth Development	2	2	0	*	2
	Subtotal				30	20	1	9	22
VI	III	36	Core	Operating System	5	5	0	0	4
	III	37	Core	Software Engineering and Testing	4	4	0	0	4
	III	38	Core	Computer Graphics and Visualization	5	4	1	0	4
	III	39	Core	Introduction to Digital Image Processing	4	4	0	0	4

	III	40	Major Practical - VII	Computer Graphics Lab	4	0	0	4	2
	III	42	Major Elective - II	1. Internet of Things(IoT) 2. Information Technology Service Management (ITSM) 3. Neural Networks	4	4	0	0	4
	III	41	Project	Digital Image Processing using SciLab/MathLab	4	0	0	4	4
	Subtotal				30	21	1	8	26
	Total credits(including Yoga & Computers for Digital Era)								141

➤ **L-Lecture T-Tutorial P-Practical**

Distribution of marks between External and Internal Assessment is

For Theory 75 : 25

For Practical 50 : 50

Internal Marks for Practical shall be allotted in the following manner

Continuous Assessment: 25 marks “N” number of practical’s being conducted based on the practical prescribed in the syllabus and the marks should be distributed equally for each practical.

Test: 25 marks Two tests should be conducted and average of tests be taken.

Calculation of marks: Sum of marks awarded to number of practicals + the average marks of two tests

Total-50 marks

SEMESTER V

MSU/ 2020-21 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – V /Core

RELATIONAL DATABASE MANAGEMENT SYSTEM

L T P C

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Objectives:

- To understand relational database concepts and transaction management concepts in database system.
- To write SQL programs that use: procedure, function, package, cursor and Exceptions.
- To Use current techniques and tools necessary for complex computing practices.

UNIT I

Introduction: Database - system applications-Purpose of Database Systems - View of Data- Database languages -Relational Databases - Database Design - Data Storage and Querying - Transaction Management - Database Architecture - Data Mining and Information Retrieval-Specialty Databases - Database Users and Administrators. (12L)

UNIT II

Introduction to the Relational Model and Introduction to SQL: Structure of Relational Databases -Database Schema-Keys-Schema Diagrams- Relational Query Languages-Relational Operations- Overview of the SQL Query Language -SQL Data Definition-Basic Structure of SQL Queries (12L)

UNIT III

SQL operations and Intermediate SQL : Additional Basic Operations-Set Operations-Null values-Aggregate functions- Nested Sub queries- Views - Integrity Constraints - SQL Data Types and Schemas . (12L)

UNIT IV :

Database Design using E-R Model & Relational Database Design: Overview – E-R Model – Complex

attributes – Mapping Cardinalities – Primary key – Removing redundant attributes – Reducing E-R diagrams to schema –Extended E-R features –Features of good Relational design – Decomposition – Normal forms – Functional Dependency – Decomposition Functional & Multi value Dependencies – More Normal Forms. (12L)

UNIT V

Implementation using Oracle: Creating Table-Modifying Table-Creating SEQUENCE- Creating a Views - PL/SQL- Stored procedures and Functions. (12L)

Text Books:

1. Database System Concepts – Abraham Silberschatz, Henry F.Horth and S.Sudarashan, McGraw-Hill International Seventh Edition.
2. Oracle8i Jose A.Ramalho BPB Publications

Reference Books:

1. Database Management Systems, R.Panneerselvam, PHI Learning Private Limited
2. Database Management Systems, Ramakrishnan and Gehrke, Mc Graw Hill Publications
3. Relational Database Management Systems,P. Simon Navis, Ave Maria Publications

DATA COMMUNICATION AND COMPUTER NETWORKS

L T P C

5 0 0 4

Objectives:

- To understand the concepts in Computer Network and Data Communication
- To know about the various protocols used in network

Unit-I

Introduction - Data communication – Networks-the Internet –Protocols and Standards.

Network Models –Layered tasks –OSI model- layers in OSI model-TCP/IP protocol Suit-Addressing. (12L)

Unit II

Physical layer – Analog and digital – Transmission Impairment –Data rate limits- Performance- Transmission mode -Bandwidth Utilization- Multiplexing. Transmission media – Guided and Unguided media.(12L)

Unit III

Switching – Circuit Switched Network-Datagram Network – Virtual Circuit Network. Using telephone and cable networks – Telephone Network- Dial-Up Modem–Digital Subscriber line – Cable TV Network - Cable TV for Data transfer. (12L)

Unit IV

Data Link Layer :Error Detection and Correction- Introduction- Checksum. Data link control-Framing-Flow and Error Control-Protocols-Noiseless Channels-Noisy Channels. Wired LANs-IEEE standards-Standard Ethernet- Changes in the Standard – Fast Ethernet-Gigabit Ethernet.(12L)

Unit V

Wireless LANs: IEEE 802.11-Blue tooth. Connecting LANs - Connecting devices. Wireless WANs: Cellular Telephony, Satellite Networks. Network Layer- IPv4 Address-IPv6 Address-Internetworking. Transport Layer- Process to Process delivery –UDP-TCP. Application Layer- Name space-DNS. (12L)

Text Book

Data Communication and Networking –“BEHROUZ A FOROUZAN “,The McGraw- Hill- 4th edition.

References

1. Data Communication and Computer Networks – “ PrakashC.Gupta
2. Computer Networks Protocols,Standards and Interfaces- “ Uyles Black
3. Data Communications and Computer Networks – Brijendra Singh

PHP and mySQL

L T P C

4 1 0 4

Objectives:

- To learn and use open source database management system MySQL
- To create dynamic web pages and websites.
- To connect web pages with database.
- To understand the concepts of open sources

UNIT-I

Introduction: Introduction- Open source PHP – PHP history- features-variables- statements operators conditional statements-if-switch-nesting conditions-merging forms with conditional statements-loops-while-do-for – loop iteration with break and continue. (12L)

UNIT – II

Arrays and Functions: Arrays: Creating an array- modifying array-processing array-grouping form with arrays- using array functions- creating user defined functions- using files- sessions- cookies- executing external programs- Creating sample applications using PHP. (12L)

UNIT –III

File Handling Opening files using fopen - looping over a files content with feof- reading text from a file using fgets - closing a file- reading character with fgetc- reading whole file with file_get contents reading a file into an array with file- checking if a file exists-fscanf-parse_ini_file- Getting file information with stat-fseek- copying files with copy- deleting files-writing to a file-reading and writing binary files –locking files (12L)

UNIT-IV

MySQL: Effectiveness of MySQL -MySQL Tools-Prerequisites for MySQL connection-Databases and tables- MySQL data types-Creating and manipulating tables-Insertion-updation and deletion of rows in tables -Retrieving data- Sorting and filtering retrieved data -Advanced data filteringData manipulation functions-Aggregate functions -Grouping data- Sub queries- Joining Tables- Set operators-Full text searching. (12L)

UNIT-V

PHP with MySQL: Working MySQL with PHP-database connectivity- usage of MYSQLcommands in PHPprocessing result sets of queries- handling errors-debugging and diagnostic functionsvalidating user input through Database layer and Application layer- formatting query output with Character-Numeric- Date and time –sample database applications. (12L)

Text Books:

1. VIKRAM VASWANI- “PHP and MySQL”- McGraw-Hill- 2005
2. BEN FORTA - ”MySQL Crash course “ SAMS- 2006.
- 3 . Steven Holzner , The Complete reference PHP, Tata McGraw Hill,2008

Reference Books:

- Tim Converse- Joyce Park and Clark Morgan- ”PHP 5 and MySQL” -Wiley India reprint - 2008.
- Robert Sheldon- Geoff Moes- ”Beginning MySQL”-Wrox- 2005

MSU/ 2020-21 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – V /Major Practical-V

PHP and mySQL Lab

L T P C

4 0 0 2

Objective:

➤ To develop knowledge about basic PHP Programs.

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement.
2. Write a PHP script to redirect a user to a different page.
3. Write a PHP function to test whether a number is greater than 30, 20 or 10 using ternary operator
4. Create a PHP script which display the capital and country name from the given array. Sort the list by the name of the country
5. Write a PHP script to calculate and display average temperature, five lowest and highest temperatures.
6. Create a script using a for loop to add all the integers between 0 and 30 and display the total.
7. Write a PHP script using nested for loop that creates a chess board.
8. Write a PHP function that checks if a string is all lower case.
9. Write a PHP script to calculate the difference between two dates.
10. Write a PHP script to display time in a specified time zone

MSU/ 2020-21 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – V /Major Practical-IV

Machine learning Practicals

L T P C

0 0 4 2

Exercises

1. Data Visualization with Python Matplotlib
2. Pandas and Data frames
3. Datasets – Training Data, Test Data, Data Normalization
4. Linear Regression with Gradient Descent Optimizer
5. Logistic Regression
6. Support Vector Machines
7. K-Nearest Neighbors
8. Decision Trees
9. Naïve – Bayes
10. K-means Clustering

1. MOBILE APPLICATION DEVELOPMENT

Objective:

To make the students understand the basics of Mobile Applications

Unit-I:

Getting Started: Diving in - Welcome to Androidville - The Android platform - Install Android Studio - How to build the app - Activities and layouts - first Android app - a complete folder structure - Useful files in your project - Edit code with the Android Studio editors - Run the app in the Android emulator - Creating an Android Virtual Device - Run the app in the emulator - watch progress in the console - What's in the layout? - activity_main.xml has two elements - Update the text displayed in the layout.

Building Interactive Apps: Apps that do something: building a Beer Adviser app - Create the project - a default activity and layout - A closer look at the design editor - Add a button using the design editor - activity_find_beer.xml has a new button - A closer look at the layout code - the app, test drive - Hardcoding text makes localization hard - Create the String resource - Use the String resource in your layout - The code for activity_find_beer.xml - Add values to the spinner - Add the string-array to strings.xml - Test drive the spinner - We need to make the button do something - Make the button call a method - The activity code - Add an onClickFindBeer() method to the activity - onClickFindBeer() needs to do something - Once you have a View, you can access its methods - Update the activity code - The first version of the activity - What the code does - Build the custom Java class.(12L)

Unit-II:

Multiple Activities and Intents: State your intent - More than one activity in an app - the app structure - create the project - Update the layout - Create the second activity and layout - Android manifest file - An intent - What happens when you run the app - Pass text to a second activity - Update the text view properties - putExtra() method - Update the CreateMessageActivity code - Get ReceiveMessageActivity

to use the information in the intent - What happens when the user clicks the Send Message button - send messages to other people

How Android apps work - Create an intent that specifies an action - Change the intent to use an action - the intent filter - if users ALWAYS want to choose an activity - when `createChooser()` method is called - Change the code to create a chooser.

The Activity Lifecycle: Being an activity - How do activities really work? - The Stopwatch app - Add String resources - How the activity code will work - Add code for the buttons - The `runTimer()` method - The full `runTimer()` code - The full `StopwatchActivity` code -

Rotating the screen changes the device configuration - The states of an activity - The activity lifecycle: from create to destroy - The updated `StopwatchActivity` code - What happens when you run the app - There's more to an activity's life than create and destroy -

The updated `StopwatchActivity` code - when the app is run - when an app is only partially visible - The activity lifecycle: the foreground lifetime - Stop the stopwatch if the activity's paused - Implement the `onPause()` and `onResume()` methods - The complete `StopwatchActivity` code - Your handy guide to the lifecycle methods.(12L)

Unit-III:

Views and View Groups: Enjoy the view - Your user interface is made up of layouts and GUI components - `LinearLayout` displays - Add a dimension resource file - Using margins - change a basic linear layout - adding weight to a view - Values you can use with the `android:gravity` attribute - The full linear layout code - Frame layouts stack their views - Add an image to your project - The full code to nest a layout - `FrameLayout`: a summary - Playing with views - Editable text view - Toggle button - Switch - Checkboxes - Radio buttons - Spinner - Image view - Adding images to buttons - Scroll views - Toasts.

Constraint Layouts: Put things in their place - Nested layouts can be inefficient - the Constraint Layout - the Constraint Layout Library - Add the String resources to `strings.xml` - Use the blueprint tool - Position views using constraints - Add a vertical constraint - Changes to the blueprint are reflected in the XML - center views - Adjust a view's position by updating its bias - change a view's size - align views - build a real layout.(12L)

Unit-IV:

List views and Adapters: Getting organized - Every app starts with ideas - Use list views to navigate to data - The drink detail activity - The Starbuzz app structure - The `Drink` class - The top-level layout contains an image and a list - The full top-level layout code - Get list views to respond to clicks with a

listener - Set the listener to the list view - A category activity displays the data for a single category - Update activity_drink_category.xml - For nonstatic data, use an adapter - Connect list views to arrays with an array adapter - Add the array adapter to DrinkCategoryActivity - App review - How clicks are handled in TopLevelActivity - The full DrinkCategoryActivity code - Update the views with the data - The DrinkActivity code - when the app is run.

Fragments: Make it modular - Your app needs to look great on ALL devices - Your app may need to behave differently too - Fragments allow you to reuse code - The phone version of the app - Create the project and activities - Add a button to MainActivity's layout - How to add a fragment to your project - The fragment's onCreateView() method - Add a fragment to an activity's layout - Get the fragment and activity to interact - The Workout class - Pass the workout ID to the fragment - Get the activity to set the workout ID - The fragment lifecycle - Set the view's values in the fragment's onStart() method - How to create a list fragment - The updated WorkoutListFragment code - The code for activity_main.xml - Connect the list to the detail - The code for WorkoutListFragment.java - MainActivity needs to implement the interface - DetailActivity needs to pass the ID to WorkoutDetailFragment.(12L)

Unit-V:

SQLite Databases: Fire up the database - Back to Starbuzz - Android uses SQLite databases to persist data - SQLite classes - The current Starbuzz app structure - change the app to use a database - The SQLite helper manages database - Create the SQLite helper - Inside a SQLite database - create tables using Structured Query Language (SQL) - Insert data using the insert() method - Insert multiple records - The StarbuzzDatabaseHelper code - What the SQLite helper code does - What if changes to the database is needed? - SQLite databases have a version number - when the version number is changed - Upgrade your database with onUpgrade() - Downgrade your database with onDowngrade() - upgrade the database - Upgrade an existing database - Update records with the update() method - Apply conditions to multiple columns - Change the database structure - Delete tables by dropping them - The full SQLite helper code.

Basic cursors: Getting data out - The new Starbuzz app structure - change DrinkActivity to use the Starbuzz database - The current DrinkActivity code - Get a reference to the database - Get data from the database with a cursor - Return all the records from a table - Return records in a particular order - Return selected records - The DrinkActivity code so far - To read a record from a cursor, you first need to navigate to it - Navigate cursors - Get cursor values - The DrinkActivity code - The current

DrinkCategoryActivity code - Get a reference to the Starbuzz database - replace the array data in the list view - A simple cursor adapter maps cursor data to views - use a simple cursor adapter - Close the cursor and database - The DrinkCategoryActivity code.(12L)

Text Book:

1. Head First Android Development (Nov 2019) - Dawn Griffiths & David Griffiths, O'Reilly Media/Shroff Publishers & Distributors Pvt. Ltd.- ISBN: 9789352136063 (Chapters 1-7, 9, 15, 16)

Reference Books:

1. Beginning Android Programming with Android Studio (Wrox Beginning Guides) 4e, 2016 - J. F. DiMarzio - Wiley
2. Android Developer Fundamentals Course: 2017
<https://google-developer-training.github.io/android-developer-fundamentals-course-concepts/en/android-developer-fundamentals-course-concepts-en.pdf>
3. Android Programming Unleashed, 1e, 2013 - B.W.Harwani – Pearson

2.INTRODUCTION TO SECURITY IN COMPUTING

Objectives

- To understand the concepts of basic concepts in security in computing
- To know about the various security algorithms

Unit-I

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher PrinciplesDES – Strength of DES – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC4 - Differential and linear cryptanalysis – Placement of encryption function – traffic confidentiality.(12L)

Unit-II

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm –

Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography. (12L)

Unit-III

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS. (12L)

Unit-IV

Authentication applications – Kerberos – X.509 Authentication services - E- mail security – IP security - Web security(12L)

Unit-V

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security(12L)

Text Book:

1. William Stallings, “Cryptography & Network Security”, Pearson Education,Fourth Edition 2010.

Reference Books:

1. Charlie Kaufman, Radia Perlman, Mike Speciner, “Network Security, Private communication in public world”, PHI Second Edition, 2002.
2. Bruce Schneier, Neils Ferguson, “Practical Cryptography”, Wiley Dreamtech India Pvt Ltd, First Edition, 2003.

3. Douglas R Simson “Cryptography – Theory and practice”, CRC Press, First Edition, 1995.

3.CLOUD COMPUTING

Objective:

To know in detail about the various Cloud Computing concepts

UNIT I:

Introduction to cloud computing- History of cloud computing. Fundamentals of the cloud computing ecosystem. Cloud computing characteristics. Technical characteristics of cloud computing Basic characteristics of cloud computing- Advantages and disadvantages of cloud computing. Comparison of traditional and cloud computing paradigms. Cluster computing- Grid computing.. Cloud computing- Evaluating the cloud's business impact and economics Business drivers of cloud computing adoption. Future of the cloud (FoC).

Cloud Services and Deployment Models. Objectives. Cloud deployment models. Public (external) cloud. Private/Internal/Corporate cloud. Hybrid cloud. Cloud Service Models- Infrastructure-as-a-Service (IaaS) Platform-as-a-Service (PaaS). Software as a-Service (SaaS) Cloud infrastructure mechanisms Logical network perimeter (LNP) Virtual server. Cloud storage devices (CSD) Cloud usage monitor -Resource replication. Ready-made environment. Cloud service management.(12L)

UNIT II:

Cloud Computing Architecture.. Objectives. Cloud computing architecture design principles.. Cloud computing life cycle (CCLC). Phase 1- Architect. Phase 2- Engage Phase 3- Operate.. Phase 4- Refresh .Cloud computing reference architecture Load balancing approach Mobile cloud computing (MCC). Mobile computing features.. Challenges.. Mobile cloud computing architecture.

Virtualization Technology. Objectives. Understanding virtualization Adopting virtualization. Techniques of virtualization. How virtualization works? XEN- Kernel-based virtual machine (KVM). VMware. Virtual Box –Citrix.Types of Virtualization Data virtualization-Desktop virtualization -CPU virtualization Network virtualization. Storage virtualization -Server virtualization. Virtualization in Cloud(12L)

UNIT III:

Service oriented Architecture Objectives SOA foundation.. Web Services and SOA .SOA communication. SOA components. SOA Infrastructure. Need of SOA. Business Process Management (BPM).Business Process Management Platform as a Service - BPM PaaS Business Process as a Service-BPaaS.

Cloud Security and Privacy... Objectives. Cloud security - Cloud CIA security model.. Data confidentiality Data integrity.. Data availability., Cloud computing security architecture Service provider security issues. Security issues in virtualization. Cloud legal issues . Performance monitoring and management of cloud services Legal issues in cloud computing Data security in cloud .The cloud risk management framework. Risk management process for cloud consumers- Requirement for risk management in ISO/IEC 27001- Data privacy risks in the cloud. Availability risks. Service provisioning risks . **(12L)**

UNIT IV:

Business continuity and disaster recovery Disaster recovery requirements... Mechanisms for cloud disaster recovery. Disaster recovery as a service. The cloud disaster recovery architecture. Challenges of the cloud disaster recovery. Threats in cloud. Security techniques for threats protection. Cloud service level agreements (SLA) practices Components of a cloud SLA. Types of SLAS. Cloud vendors. Issues of Quality of Cloud Services. Techniques for providing QoS to the cloud applications. Migration of a local server into cloud.. Preliminary checklist/planning for migration. Migration steps. Types of migration for cloud-enabled applications.. Trust management. Trust management evaluation attributes. Cloud trust management techniques

Cloud Computing Applications.. Objectives. Introducing cloud computing applications Google App Engine. Google Apps. Gmail. Google Docs.. Google Calendar Google Drive. Google Cloud Data store. Drop box Cloud. Apple iCloud Microsoft Windows Azure Cloud. Amazon Web Services (AWS) Amazon Elastic Compute Cloud (Amazon EC2) Amazon Simple Storage Service (S3). **(12L)**

UNIT V:

Cloud Computing Technologies, Platforms and Services. Objectives. High-performance computing with cloud technologies. Message Passing Interface (MPI).. Map Reduce programming model. Dryad and DryadLINQ.. Eucalyptus cloud platform. Components of Eucalyptus OpenNebula cloud platform. Layers of OpenNebula Features of OpenNebula. OpenStack cloud platform.. OpenStack components Benefits of Open Stack.. Nimbus Cloud Computing Platform Features of Nimbus. The Apache Hadoop ecosystem

Architecture of Hadoop Major components of Hadoop. Hadoop and cloud..

Adoption of Cloud Computing. Objectives. Adoption of cloud computing in the current era Factors affecting cloud computing adoption. Technological factors. Organizational factors Environmental factors.. Cloud computing existing areas of application.. Cloud computing in education. Cloud computing in healthcare. Cloud computing in politics. Cloud computing in business. Cloud computing in agriculture. Case studies Cloud computing adoption in Sub-Saharan Africa. Cloud computing adoption in India. Cloud computing certifications Google Cloud Certifications.. IBM Cloud Certifications.. Amazon Web Services (AWS) Cloud Certifications.(12L)

Text Book:

Cloud Computing, Kamal Kant Hiran,Ruchi Dosai, Temitayo Fagbola,Mehul Mahrishi, BPB publication, First edition 2019.

Reference Book:

1. Cloud Computing, V. K. Pachghare, PHI Learning Pvt Ltd, 2016
2. 2 Cloud Computing, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, TMH, 2010
3. Cloud Computing Bible, Barrie Sosinsky, Wiley Publishing, Inc.

SEMESTER-VI

MSU/ 2020-21 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – VI /Core

OPERATING SYSTEM

L T P C

5 0 0 4

Objectives:

- To acquire the fundamental knowledge of the operating system architecture and components and to know the various operations performed by the operating system.
- Understand the basic working process of an operating system.
- Understand the importance of process and scheduling.
- Understand the issues in synchronization and memory management.

Unit I

Introduction: What Operating system do? – Computer System Organization – Computer System Architecture – Operating System Structures- Operating System Operation. **System Structures:** Operating System Services – System Calls – System Programs – Operating System Design and Implementation- Operation System Generation- System Boot. (12L)

Unit II

Process Concept: Process Concept- Process Scheduling –Operation on Processes- Inter Process Communication- Example of IPC System – Communication in Client – Server system. **Process Scheduling :** Basic concept-Scheduling criteria- Scheduling algorithm-Thread scheduling-Multiple Processor Scheduling-Real Time CPU Scheduling-Operating system example- Algorithm evaluation. (12L)

Unit III

Synchronization: Background - The Critical section problem-Peterson's solution - Semaphores – Classic problems of Synchronization. **DeadLocks:** System model-Deadlock Characterization- Methods for handling deadlocks- Deadlock Prevention-Deadlock Avoidance-Deadlock detection - Recovery from deadlock. (12L)

Unit IV

Memory Management: Background – Swapping - Contiguous Memory allocation – Segmentation – paging. **Virtual Memory Management :** Background - Demand paging - and Write-page replacement-Allocation of Frames - Thrashing. (12L)

Copy

Unit V

File System : File Concept-Access Method-Directory and Disk Structure--File Sharing-Protection. **Implementing File System:** File System Structure - File System implementation- Directory implementation-Allocation Methods - Free Space Management. **Mass Storage**

Structure: Overview of Mass Storage Structure-Disk Structure - Disk Scheduling - Disk Management. (12L)

Text Book:

Operating System Concepts – Abraham Silberscartz, Peter Baer Galvin, and Greg Gange.
Addision Wesley Publishing Company – Ninth Edition.

Reference Books:

1. Operating System: Internal and Design Principles – Fifth Edition, William Stalling ,PHI Learning Private Limited.
2. Understanding Operating Systes: Ida M.Flynn ,Ann MclverMcHoes.

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SOFTWARE ENGINEERING AND TESTING

L T P C

4 0 0 4

Objectives:

- To acquire the fundamental knowledge of Software Engineering and to know the various testings performed

Unit-I

Introduction:- Evolution – From an Art form on Engineering Discipline: Evolution of an Art into an Engineering Discipline. – Software Development of Projects: Program versus Product – Emergence of Software Engineering: Early Computer Programming – High Level Language

Programming – Control Flow-based Design – Data Structure Oriented Design – Object Oriented Design.

Software Life Cycle Models:- A few Basic Concepts – Waterfall Model and its Extension: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model. – Rapid Application Development (RAD): Working of RAD. – Spiral Model.(12L)

Unit-II -II

Software Project Management::- Responsibilities of a Software Project Manager-

Project Planning- Project Estimation Techniques-Risk Management. **Requirements Analysis and Specification:-** Requirements Gathering and Analysis – Software Requirements Specifications (SRS):Users of SRS Document – Characteristics of a Good SRS Document – Important Categories of Customer Requirements – Functional Requirements – How to Identify the Functional Requirements? – Organisation of the SRS Document.(12L)

Unit-III

Software Design:- Overview of the Design Process: Outcome of the Design Process – Classification of Design Activities. – How to Characterize a good Software Design? **Function-Oriented Software Design:-** Overview of SA/SD Methodology – Structured Analysis – Developing the DFD Model of a System: Context Diagram – Structured Design – Detailed Design.(12L)

Unit-IV

User Interface Design:- Characteristics of a good User Interface - Basic Concepts – Types of User Interfaces – Fundamentals of Components based GUI Development: Window System. **Coding and Testing:-** Coding – Software Documentation – Testing: Basic Concepts and Terminologies – Testing Activities. – Unit Testing – Black-box Testing: Equivalence Class Partitioning – Boundary Value Analysis-White-box Testing.(12L)

Unit-V

Software Reliability and Quality Management:- Software Reliability: Hardware versus Software Reliability. – Software Quality – Software Quality Management System – ISO 9000: What is ISO 9000 Certification? – ISO 9000 for Software Industry – Shortcomings of ISO 9000 Certification. – SEI Capability Maturity Model: Level 1 to Level 5. **Software Maintenance:-** Characteristics of Software

Maintenance: Characteristics of Software Evolution – Software Reverse Engineering.(12L)

Text Book

Fundamentals of Software Engineering Fifth Edition by Rajib Mall – PHI Learning Private Limited 2018.

Reference Books

1. Software Engineering 2nd Edition by K L James PHI.
2. Software Engineering 9th Edition by Ian Sommerville - Pearson Education Asia.

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COMPUTER GRAPHICS AND VISUALIZATION

L T P C

4 1 0 4

Objectives:

- To acquire the fundamental knowledge of Computer Graphics and Visualization.
- To understand the Algorithms in Computer Graphics

Unit I

Overview of Graphics System: Video Display Devices – Input Devices - Hard Copy Devices – Graphics Software. **Output Primitives:** Points and Lines –Line drawing algorithms – DDA algorithm- Bresenham’s line algorithm- Circle drawing algorithms: properties of circles – Midpoint Circle algorithm – Filled Area primitives.

Unit II

Attributes of Output Primitives: Line attributes – Curve attributes – Character attributes. **Two-Dimensional Geometric Transformation:** Basic Transformations – Matrix Representations and homogenous coordinates – Composite and other Transformations.

Unit III

Two-Dimensional Viewing: The viewing pipeline, Viewing co-ordinate reference frame – Window to view port co-ordinate transformation – Two-dimensional viewing function. **Clipping Operations:** Point clipping – Line clipping (only Cohen-Sutherland line clipping) – Polygon Clipping (only Sutherland-Hodgeman polygon clipping).

Unit-IV

Interactive Input Methods: Input of graphical data – Input functions – Three dimensional display methods.

Three Dimensional Geometric and Modeling Transformations: Translation - Rotation - Scaling

Unit-V

Three Dimensional Viewing: Viewing Pipeline, Projections. **Visible-surface deduction methods:** Back-face Detection - Depth buffer method. **Color Models and Color Applications** – RGB color model – YIQ color model – CMY color model – HSV color model.

Text Book:

Computer Graphics C version, Second Edition, Donald Hearn, M.Pauline Baker, Pearson Publications

Reference Books

1. Computer Graphics, Multimedia and Animation - Malay K. Pakhira – PHI.
2. Computer Graphics - Udit Agarwal - S. K. Kataria & Sons, 2009.
3. Express Learning - Computer Graphics and Multimedia-ITL Education Solution Ltd.
4. Computer Graphics-A programming Approach 2/e-Steven Harrington-Mc Graw

Hill Education Private Limited.

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INTRODUCTION TO DIGITAL IMAGE PROCESSING

L T P C

4 0 0 4

Objectives:

- To acquire the fundamental knowledge of introduction to Digital Image Processing.
- To understand the features present in Digital Image Processing.

Unit – I

Introduction & Fundamentals : Definition of Image and Digital Image Processing - Examples of Digital Image Processing - Fundamental Steps in Digital Image Processing - Components of an Image Processing System - Visual Perception - Image Acquisition - A Simple Image Model - Zooming and Shrinking of Digital Image(12L)

Unit – II

Image Enhancement in Spatial Domain : Introduction - Mathematical Analysis of Enhancement in Spatial Domain - Basic Gray Level Transformation - Histogram Processing - Histogram Equalization - Histogram Matching - Image Enhancement using Arithmetic and Logical Operation - Basic Transformations - Basics of Spatial Filtering(12L)

Image Enhancement in Frequency Domain : One Dimensional Fourier Transform and its Inverse - Two Dimensional Fourier Transform and its Inverse - Basics of Filtering in Frequency Domain - Basic Frequency Domain Filters - Homomorphic Filtering.(12L)

Unit – III

Color Image Processing : Introduction - Advantages of Color Image Processing - Categories of Color Image Processing - Color Fundamentals - Primary Colors - Secondary Color - Primary and Secondary Colors for Pigments - Characteristics that are Used for Differentiating Different Colors - Color Models - Conversions between Color Models - Pseudo Color Image Processing - Color Transformation - Color Image Smoothing and Sharpening - Color Segmentation (12L)

Unit – IV

Image Compression : Introduction - Mathematical Analysis - Types of Data Redundancies - Image Compression Model - Compression Strategies.

Morphological Image Processing : Introduction - Basic Concept of Set Theory - Logic Operations Involving Binary Images - Dilation and Erosion - Opening and Closing – (12L)

Unit – V

Features and Image Segmentation - Introduction - Classification of Features - Features of an Image - Attributes of Features - Process of Feature Extraction - Image Segmentation - Thresholding - Region Based Segmentation (12L)

Text Book:

Digital Image Processing - Abhishak Yadav and Poonam Yadav - University Science Press

Reference Books:

1. Digital Image Processing, S Jayaraman, S Esakkirajan, T Veerakumar, McGraw-Hill Education Pvt. Ltd., 2e, 2020
2. Digital Image Processing, 4e, Rafael C Gonzalez, Richard E Woods, Pearson, 2018
3. Digital Image Processing – Sridhar S – 2e – Oxford University Press, 2016

COMPUTER GRAPHICS LAB

L T P C
4 0 0 2

Objectives:

1. To acquire skills in programming computer graphics
2. To acquire skills in multimedia concepts

Each exercise should be completed within two hours.

It is compulsory to complete all the exercises given in the list in the stipulated time.

1. Write a program to draw a line using DDA algorithm
2. Write a program to draw a circle using Bresenham's algorithm.
3. Write a program to draw a line using Bresenham's algorithm.
4. Write a program to scale an image.
5. Write a program to rotate an image.
6. Write a program to translate an image.
7. Write a program for bouncing a ball and moving with sound effect.
8. Write a program to display as many balls in the frame in random position.
9. Write a program to display an image as tiled and cascaded according to the user's option.
10. Write a program so that it should first display the image as the size of applet then it should be reduced and again it should reduced and so on and finally the image should disappear

DIGITAL IMAGE PROCESSING USING SCILAB / MatLab

L T P C

4 0 0 4

Objective:

- To get knowledge about the basic programs on Digital Image Processing
- 1) Perform 2D Linear Convolution, Circular Convolution between two 2D matrices.
- 2) Perform Discrete Fourier Transform(DFT), Discrete Cosine Transform(DCT) of 4x4 gray scale image.
- 3) Perform Brightness enhancement, Contrast Manipulation, Image negative of an image.
- 4) Perform threshold operation on an image.
- 5) Perform Edge detection using different edge detectors.
- 6) Perform Dilation and Erosion operation.
- 7) Perform Opening and closing operations
- 8) Read a colour image and separate the image into red, blue and green planes.

Reference:

- 1) Scilab Textbook Companion for Digital Image Processing, S. Jayaraman, S. Esakkirajan And T. Veerakumar, 2016 (https://scilab.in/textbook_companion/generate_book/125)

MSU/ 2020-21 / UG-Colleges /Part-III (B.Sc. Computer Science) / Semester – VI /Major Elective - II

1. INTERNET OF THINGS

L T P C

4 0 0 4

Objective:

- To give a brief idea about IOT working
- To make the students understand the Architecture of IOT

UNIT I:

Fundamentals of Internet of Things: Introduction – Characteristics of IoT – The Physical Design of IoT – IoT Architecture and Components – Logical design of IoT – Communication Models – IoT Communication API – IoT Architecture and Protocols – Introduction – Fog based Architecture of IoT – Near Field Communication – Wireless Sensor Networks – IoT Network protocol stack – IoT technology stack – Blue tooth – Zig Bee – and 6LowPAN.(12L)

UNIT II:

Programming Framework for IoT: Interoperability – Programming Paradigm – Assembly – Introduction to Arduino Programming – Introduction to Python Programming – Introduction to Raspberry Pi . Virtualization: Introduction – Types – Virtualization and IoT – Embedded Virtualization.(12L)

UNIT III:

IoT Application Area: Introduction – Homes – Health care – Agriculture – Military applications – Politics – Constructions – Other application areas . Cloud and IoT : Introduction – Cloud – IoT – Difference between cloud and IoT – Cloud IoT architecture – challenges.(12L)

UNIT IV:

Smart City using IoT: Introduction – Concept – The emergence – Dimensions and Components – Design strategies – Factors affecting automation – IoT applications in smart cities – Education – E-governance – Industry . IoT Use Cases: Industrial IoT Use Case – IoT and smart energy – Smart transportation – Smart health – Smart home – Smart Education system – Governance use case – Smart cities.(12L)

UNIT V:

Network Security for IoT and M2M communications: Introduction – Network Technologies for IoT and M2M – Security for IoT and M2M Technologies – Securities in IETF M2M network Technologies – Security in ETSI M2M Network Technologies – Other M2M standard Efforts.(12L)

Text Books:

1. Internet of Things – Principles, Paradigms and Applications of IoT by Dr.Kamlesh Lakhwani, Dr.Hemant Kumar Gianey, Joseph Kofi Wireko, Kamal Kant Hiran (BPB publication First Edition 2020)
2. Internet of Things(IoT) Systems and Applications By Jamil Y . Khan & Mehmet R.Yuce Jenny

Stanford Publishing.

Reference Book

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatios Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014

2.INFORMATION TECHNOLOGY SERVICE MANAGEMENT

L T P C
4 0 0 4

Objectives:

- To make the students understand about the various Information Technology Services
- To make them understand the working principles

Unit I

Information Technology – System model Layers – Networks, Hardware, Operating System - Software, Software Tools- Database- Business Process. Service Desk - Omni-channel ticket management - email, social media, live chat, phone - Ticket Workflow (12L)

Unit II

Infrastructure layer and Software Layer – Key Infrastructure management activities – Asset Management - Network – Servers – Operating System -Unix / Windows- Software Tools / platforms- Desktop / Workstation support – Mobile handheld device support License management – Licensing models – Warranty management – Hardware Life cycle management- Remote Infrastructure management – Cloud Infrastructure maintenance(12L)

Unit III

Incident Management – Priority and Severity – L1 – L2- L3- L4 Tickets– Ticket management system – Incident Workflow– Customer Feedback for incident resolution. Root cause analysis (RCA) – Documentation of RCA – Five-Why Analysis – Corrective and Preventive Actions – Tracking the preventive and corrective actions for closure – Managing critical incidents (P1/P2 incidents) – Lessons Learned – Success Stories(12L)

Unit IV

Problem Management – Problem Definition – Problem ticket – Problem ticket workflow - RCA and tracking – scheduling the closure. Change Management – Ticket Workflow – Release management – Maintenance release – minor release – major release. Knowledge Management – Success Stories – Lessons Learned – Documentation – Sharing of the knowledge – Ticket Analysis and Reporting – Incident Reduction – Training the user community and Service Desk L1 support – Automation of mundane jobs(12L)

Unit V

ITIL (Infrastructure Technology Information Library) ITIL v3/ 4 Framework – Service Strategy – Service Design – Service Transition – Service Operations – (Continual) Service Improvement – Ticket Management Tools in the market – Role of Artificial Intelligence in ITSM(12L)

Reference Books:

1. ITSM QuickStart Guide: The Simplified Beginner's Guide to IT Service Management, by ClydeBank Technology, Amazon Books (2016)
2. Measuring ITIL, Randy A. Steinberg, Google Books (2006)
3. Implementing Itsm: From Silos to Services: Transforming the It Organization to an It Service Management Valued Partner, Randy A. Steinberg, Amazon Books (2014)
4. Foundations of IT Service Management based on ITIL Google Books (2005)

3.NEURAL NETWORKS

L T P C
4 0 0 4

OBJECTIVES:

- Basic neuron models: McCulloch-Pitts model and the generalized one, distance or similarity based neuron model, radial basis function model, etc.
- Basic neural network models: multilayer perceptron, distance or similarity based neural networks, associative memory and self-organizing feature map, radial basis function based multilayer perceptron, neural network decision trees, etc.
- Basic learning algorithms: the delta learning rule, the back propagation algorithm, self-organization learning
- Applications: pattern recognition, function approximation, information visualization, etc.

UNIT I

Introduction to Neural networks: Neural processing- Neural networks- an overview – the rise of neuro computing – introduction to artificial neural networks : introduction- artificial neural networks – historical development of neural networks – biological neural networks – comparison between the brain and the computer – artificial and biological neural networks – basic building blocks of artificial neural networks – artificial neural network terminologies. (12L)

UNIT II

Fundamental models of artificial neural networks: McCulloch-Pits neuron Model-Learning rules. Perceptron networks: Introduction –single layer perceptron –brief introduction to multi layer perceptron networks. (12L)

UNIT III

Feedback networks: Introduction- discrete Hopfield net-continuous Hopfield net-relation between BAM and Hopfield nets. Feed forward networks: introduction-back propagation networks. (12L)

UNIT IV

Kohonen self - organizing feature maps - counter propagation network: introduction-Full counter propagation network-Forward only propagation network. (12L)

UNIT V

Applications of Neural Networks: Applications of neural networks in Arts-Bioinformatics - Knowledge Extraction – Forecasting - Bankruptcy forecasting-Healthcare-Intrusion - Detection. (12L)

TEXT BOOK

Introduction to Neural Networks using MATLAB 6.0., S N Sivanandam S Sumathi S N Deepa , McGraw Hill, 2006.

REFERENCE BOOKS

1. Artificial neural Networks B.Yegnanarayana, Prentice Hall India, 2005.
2. Neural Networks Algorithms, Applications and programming Techniques, James A Freeman David M Skapura, Pearson Education.
3. Neural Networks for Pattern Recognition, Christopher M. Bishop, Indian Edition, OXFORD University Press.