II/IV B.Tech IT Syllabus of Admitted Batch 2015-2016

UG PROGRAM – B.TECH (IT)

W.E.F. Admitted Batch 2015-2016

DEPARTMENT OF INFORMATION TECHNOLOGY

PRAGNANAM BRAHMA
ANITS

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES

(UGC AUTONOMOUS)

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SEMESTER-1

DATA STRUCTURES

IT211 **Credits:4**
Instruction: 4 Periods & 1Tut/week Sessional Marks:40
End- Exam:3Hours End-Exam-Marks: 60

Prerequisite: C Programming

Course Objective:

- Assess how the choice of data structures impacts the performance ofprograms.
- Choose the appropriate data structure and algorithm design method for a specified application.
- Solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Compare and contrast the benefits of dynamic and static data structures: linked lists and arrays.
2.	Evaluation of infix, prefix and postfix expressions and conversion between infix, prefix and postfix using stacks. Implement linear data structure Queue using arrays and linked lists.
3.	Implement sorting and searching techniques and analyze their computational complexity worst, average and best in terms of the size of the list(n)
4.	Solve and analyze time complexities of shortest path problem usingnonlinear data structures trees and graphs with Prims and Krushkals algorithms and Dijkstra's & Warshall's algorithms.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	1	2	3					1	1	1		1	3	2
	2	1	1	2					1	1	1		1	3	2
	3	2	2	3					1	1	1		1	3	2
	4	2	3	2					1	1	1		1	3	2

SYLLABUS

Unit-I:Introduction **12 Periods**

Introduction to data structures, arrays and structures. Dynamic Memory Management, Abstract Data Type (ADT). Introduction to Time and Space complexity and their tradeoffs.

List: Definition and examples- Primitive Operations- Representation using array and Linked List. Types of Linked Lists and implementation: single, double and circular. The array and linked list advantages, disadvantages and applications.

Unit-II: StacksandQueues **12 Periods**

The Stack ADT: Definition, Primitive Operations and representation. Stack ADT implementation using array and linked list. Applications of Stacks: Prefix, infix and Postfix notations, conversion between infix, prefix and postfix, postfix evaluation using stacks. Recursion: definition and examples (ex: Towers of Hanoi Problem, other examples).

Queue ADT: Definition, Primitive operations and Representation. Queue ADT implementation using array and linked list. Types of Queue: Circular Queue, Priority Queue, De-queue Operations and implementation using array and linked list. The queues advantages, disadvantages, and applications.

Unit - III: SortingandSearching **12Periods**

Sorting: General background, selection sort, bubble sort, insertion sort, shell sort, radix sort, quick sort and merge Sort.

Searching: General background, linear search, binary search and Interpolation search. Introduction to Hashing, Hash Function, Hashing techniques, Collision Resolution Methods: Open Addressing, Chaining.

Unit-IV:Trees **12 Periods**

Trees: Introduction, Terminology, Binary trees: Terminology, Representation. Binary tree implementation using array and linked list. Tree Traversal Techniques, applications and threaded binary trees.

Types: Heap, Binary Search Tree, AVL Tree, B-Tree of order m, introduction to Red-Black tree.

Unit-V:Graphs **16periods**

Graphs: Introduction- terminology, Representation of graphs-linked list and adjacency matrix, Representation in C, Implementation of graphs using arrays and linked list, Graph traversals- Breadth-First Search, Depth-First Search. Spanning Trees: Introduction and terminology, Minimum Spanning Tree algorithms: Prims and Krushkals. Applications of Graphs: Dijkstra’s & Warshall’s Algorithm.

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni, Fundamentals of Data Structure, computer sciencePress.

REFERENCE BOOKS:

1. Y.Langsam,M.AugenstinandA.Tannenbaum,“DataStructuresusingC”PearsonEducation, 2nd Edition, 1995.
2. Richard F, Gilberg ,Forouzan, Cengage ,”Data Structures”, 2/e,2005.

DIGITAL LOGIC DESIGN
(COMMON FOR CSE & IT)

IT212	**Credits:3**
Instruction: 3 Periods & 1Tut/week	Sessional Marks:40
End- Exam :3Hours	End-Exam-Marks:60

Prerequisite:

Computer fundamentals.

Course Objective:

- To provide knowledge and understanding of Boolean algebra and digitalconcepts.
- To provide the knowledge of analyzing and designing of combinational and sequential logicnetworks.
- HDL in this course provides the ability to synthesize the designs in Verilog HDL or VHDL.

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Analyze and synthesize logic circuits by applying the knowledge of number systems, codes, Boolean algebra and digital logic circuits to solve typical problems on the same.
2.	Minimize the given Switching function in SOP and POS forms using K-Map & Design of different types of combinational logic circuits using various logic gates.
3.	Design and analyze synchronous sequential logic circuits including registers & counters using gates & flip-flops
4.	Design combinational logic circuits using different types of PLDs, namely, PROM, PLA and PAL.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	2								3		3		2	2
	2	3								3		3		3	3
	3	3								3		3		2	2
	4	3								3		3.		3	3

SYLLABUS

UNIT-I: Binary Systems, Boolean Algebra andLogicGates 10 Periods

Digital Systems, Binary Numbers, Number Systems, Base Conversion Methods, Complements, Signed Binary Numbers, Binary Codes, BinaryLogic.

Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra. Boolean Functions, Canonical and Standard Forms, Different Logic Operations, Digital Logic Gates.

UNIT-II:Gate-LevelMinimization 4Periods

The Map Method, Minimal Functions and their properties, Don't-Care Conditions, Tabulation Method, NAND and NOR Implementation, Other Two- Level Implementations, Verilog Hardware Description Language (Verilog HDL).

CombinationalLogicDesign: **6Periods**

Combinational Circuits, Analysis Procedure, Design Procedure, Design of adders, subtractors, adder-subtractor circuit, BCD adder circuit, applications of adders, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, Demultiplexers, Verilog HDL For CombinationalCircuits.

UNIT-III: SequentialLogicCircuits 5 Periods

Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits,Flip-Flop Conversions, Verilog HDL for SequentialCircuits.

RegistersandCounters 6Periods

Registers, Shift Registers, Ripple Counters, Synchronous Counters, Johnson and Ring counters, Verilog HDL for Registers and Counters.

UNIT-IV: SynchronousSequentialLogic 4Periods

Basic Design Steps, Serial Adder Example, State Reduction & Assignment Problem.

Fundamentals of AsynchronousSequentialLogic 5 Periods

Introduction, Analysis Procedure, Design Procedure, circuits with latches, Races andHazards.

UNIT-V: ProgrammableLogicDevices 8 Periods

Programmable Logic Devices : PROM, PLA, PAL, realization of switching functions using PROM, PLA and PAL; comparison of PROM, PLA and PAL, Programming tables of PROM, PLA and PAL, Sequential ProgrammableDevices.

Text Books :

1. M. Morris Mano, Digital Design, Pearson Education, Inc., 2008, 4thEdition.

Reference Books:

2. ZviKohavi, Switching and Finite Automata Theory, Tata McGraw-Hill, 1978, 2ndEdition.
3. Frederick,IntroductiontoSwitchingTheoryandLogicalDesign,2011&J.HillandGerald R. Peterson, John Wiley and Sons, 2011, 3rd Edition.
4. William I. Fletcher, An Engineering Approach to Digital Design, PHI,2008.

DISCRETE MATHEMATICAL STRUCTURES
(COMMON FOR CSE & IT)

IT213	**Credits:4**
Instruction: 4 Periods & 1Tut/week	Sessional Marks:40
End- Exam:3Hours	End-Exam-Marks:60

Prerequisite:

Engineering Mathematics-1, Engineering Mathematics-2.

Course Objective:

- The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in differentdisciplines.

Course Outcomes:

After completion of this course, a student will be able to :	
1.	To understand set theory, relations, mathematical logic, mathematical reasoning and to study about the validity of the arguments.
2.	Be able to apply basic counting techniques to solve combinatorial problems.
3.	To understand Recurrence Relation, Generating functions and solving problems involving recurrence equations.
4.	To familiarize the different types of binary relations and related algorithms on transitive closure.
5.	To familiarize with the applications of graphs, trees and algorithms on minimal spanning tress.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	2								2		2	3	3	3
	2	3	2											3	3
	3	2												2	2
	4	2												2	2
	5	2		2										2	2

SYLLABUS

UNIT-I:MATHEMATICALLOGIC 15Periods

Sets-Operations on sets-relations-functions-Fundamentals of Logic- Logical inferences-Methods of proof of an implication-First Order logic and other methods Proof -Rules of inference for quantified Propositions –Mathematical Induction.

UNIT II:**ELEMENTARYCOMBINATORICS 8Periods**

Basics of Counting- Combinations and Permutations-Their Enumeration with and without repetition-Binomial coefficients-Binomial and Multinomial Theorems-The Principle of Inclusion-Exclusion.

UNIT III:RECURRENCERELATIONS 8Periods

Generating Functions of Sequences-Calculating their Coefficients-Recurrence relations-Solving recurrence relations-Method of characteristic Roots- Non-homogeneous Recurrence relations and their solutions.

UNIT IV: RELATIONSANDDIGRAPHS 9Periods

Relations and directed Graphs - Special Properties of Binary relations- Equivalence Relations-Ordering Relations-Lattices and Enumeration- Operations on relations-Paths and Closures-Directed Graphs and Adjacency matrices .

UNITV:GRAPHS 20Periods

Introduction to Graphs – types of Graphs – Graphs basic terminology and special types of simple graphs – representation of graphs and graph isomorphism – Euler paths and circuits- Hamilton paths and circuits – Planar graphs – Euler's formula.

Introduction to Trees and their properties – Spanning Trees – Depth First Search , Breadth First Search – Minimum Spanning Trees – Kruskal's Algorithm and Prim's Algorithm.

Text Books:

1) Joe L. Mott, Abraham Kandel & T. P. Baker, "Discrete Mathematics for computer scientists & Mathematicians" Prentice Hall of India Ltd, New Delhi.

Reference Books:

1) Keneth. H. Rosen, "Discrete mathematics and its applications", Tata McGraw- Hill Publishing Company, NewDelhi.
2) Richard Johnsonbaug ,"Discrete mathematics" , Pearson Education, NewDelhi.

COMPUTER ORGANIZATION

IT214 **Credits:4**

Instruction: 4 Periods & 1Tut/week Sessional Marks:40

End Exam:3Hours End Exam Marks:60

Prerequisite:

Computer fundamentals.

Course Objectives:

- Clearly differentiate between Computer Organization and ComputerArchitecture.
- Identify and describe the functions of all the basic components making up a computer system.
- Present, as clearly and completely as possible, the characteristics of modern-day computer systems, highlighting on the CPU Organization & Operation, Number systems, Operating Systems Memory Systems, Logic Circuits Design and I/O andInterfacing.
- Engage into contrast discussions based on the two CPU design philosophies i.e the Complex Instruction Set.
- Computers (CISC) and Reduced Instruction Set Computers (RISC)systems

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Solve problems using micro operations and perform computer arithmetic operations on integer and real numbers.
2.	Discriminate hardwired and micro programmed way of designing the control unit of a digital computer
3.	Describe the organization of digital computers and identify addressing modes, Instruction formats and types of instructions. or Write an ALP for a given task with the knowledge of computer organization, addressing modes and instruction set.
4.	Evaluate the performance of CPU, Memory and I/O operations.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3	2	1	2				1	2		2	2	2	1
	2	2	2	2	3					2	1	2	2	2	1
	3	3	2	2	2	3			1		1	2	3	2	1
	4	2	2	2	3					3		3	3	2	1

SYLLABUS

UNIT-I: 14Periods

Register transfer and micro operations:

Register Transfer Language, Bus and Memory Transfers, Arithmetic, Logic and Shift Micro operations, Arithmetic Logic Shift Unit

Computer Arithmetic:

Introduction, Addition and Subtraction, Booth Multiplication Algorithm, Decimal Arithmetic Unit.

UNIT-II: 12Periods

Basic Computer Organization:

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description.

UNIT-III: 12Periods

Control Design:

Hardwired & Micro Programmed (Control Unit), Control Memory, Address Sequencing, Conditional and Unconditional Branching, Micro program Example.

UNIT-IV: 12Periods

Central Processing Unit:

Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes with numerical examples, Data Transfer and Manipulation, Program Control, Program Interrupt, Types of interrupts, CISC Characteristics, RISC Characteristics..

UNIT-V: 14Periods

Input-Output Organization:

Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access.

Memory Organization:

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, VirtualMemory.

TEXTBOOKS:

1. M.MorrisMano ,Computer System Architecture, Third Edition, Pearson Education Inc., 2003

REFERENCE BOOKS:

1. John D. Carpinelli, Computer Systems Organization and Architecture,Pearson Education Inc.,2003.
2. William Stallings, Computer Organization and Architecture,5th Edition,2000.

DATA COMMUNICATIONS

IT215 **Credits:3**

Instruction: 3 Periods & 1Tut/week Sessional Marks:40

End Exam:3Hours End Exam Marks:60

Prerequisite:

Computer fundamentals.

Course Objectives:

- Introduce students to the evolution of computer networks and the concepts data communication
- Introduce students the general principles of network design and compare the different networktopologies
- Introduce students to the digital and analogue representations andchannels
- Describe the mechanism and techniques ofencoding
- Introduce students to the general principles of circuit and packetswitching
- Introduce students to the wireless Local AreaNetworks
- Provide students with in-depth knowledge of data link layer fundamental such as error detection, correction and flow control techniques; multiple access controltechniques

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Understand the basic concepts of Data Communications and different models
2.	Understand and analyses the characteristics of signals propagated through different transmission Media
3.	Apply signal encoding techniques, error detection, correction techniques and learn interfacing
4.	Distinguish various Multiplexing techniques and learn various modems like ADSL, xDSL.
5.	Illustrate various Data link control protocols namely flow control, error control and HDLC

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3	2		3	1						3		3	3
	2	3	3							2				3	3
	3	2	3			1								3	3
	4	3		2			1						1	3	3
	5	2	2	3								1		3	3

SYLLABUS

UNIT:I **12periods**

Data Communication overview: A communication model, Data communications, Data Communication networking- Introduction to WAN, LAN, wireless Networks, MAN, an example configuration **Data Transmission**: Concepts and Terminology-Transmission terminology, Frequency, spectrum and Bandwidth Analog and Digital Data Transmission-

Introduction to Analog and Digital Data, Analog and Digital Signals, Analog and Digital Transmission, Transmission Impairments-Attenuation, Delay Distortion, Noise, channel Capacity-Nyquist Bandwidth, Shannon Capacity Formula, The expression Eb/N0 **Transmission media**: guided transmission media-Twisted pair, coaxial cable, Optical fiber, Wireless transmission – Antennas, terrestrial microwave, satellite microwave, Broadcast Radio, Infrared Wireless Propagation- Ground wave propagation, sky wave propagation, Line- of-sight Propagation, Line-of-sight Transmission- free space loss, Atmospheric Absorption, Multipath, Refraction

UNIT:II 10periods

Signal Encoding Techniques: Digital Data Digital signals (Nonreturn to Zero(NRZ), multilevel Binary, Biphase, Modulation rate), Digital Data Analog Signals (Amplitude shift keying, frequency shift keying, Phase Shift keying, Quadrature Amplitude Modulation), Analog Data Digital Signals (Pulse code Modulation, Delta Modulation), Analog Data Analog Signals (Amplitude Modulation, AngleModulation)

UNIT:III 6periods

Digital Data communication Techniques: Asynchronous and synchronous Transmission-Asynchronous Transmission, synchronous transmission, Types of Errors, Error Detection-parity check, CRC, Error correction-Block Code Principles, Line configuration-Topology, Full Duplex and Half Duplex, Interfacing – V.24/EIA-232-F, ISDN PhysicalInterface

UNIT:IV 10periods

Multiplexing: Frequency Division Multiplexing -Characteristics, Analog carrier systems, wave length-Division Multiplexing, Synchronous Time Division Multiplexing-Characteristics, TDM link control, Digital carrier systems, SONET/SDH , Statistical Time Division Multiplexing- characteristics, performance, cable modem, Asymmetric digital subscriber line-ADSL Design, Discrete Multitone, xDSL-HDSL,SDSL,VDSL,modems

UNIT:V 10 periods

Data Link Control: Flow Control-stop and wait flow control, sliding window flow control, Error Control- stop-and-wait ARQ, selective- Reject ARQ , High Level Data Link Control (HDLC) – Basic Characteristics, Frame Structure, operation **,** Architecture of computer network, layered approach,X.25, Frame relay,ATM.

Basic hardware: RJ-45, Network interface card, rack, cable standard-Category 5,6, and 7, cross connection, straight connection cable coding standards.

Text Books:

1. William Stallings ,"Data& Computer Communication", Pearson Education, 7th edition

Reference Books:

1. Forouzan, "Data communication and networking", TATA McGraw, 4thedition
2. Gupta Prakash C.,"Data communication", PHILearning
3. Tomasi, "Introduction to Data Communication & Networking", PearsonEducation.
4. A.S Tanenbum, "Computer Network", PearsonEducation

DATA STRUCTURES LAB

IT216	**Credits:2**
Practical: 3Periods/week	Sessional Marks:50
End Exam:3Hours	End Exam Marks:50

Prerequisite:

C Programming, Data Structures.

Course Objective:

- Assess how the choice of data structures impacts the performance ofprograms.
- Choose the appropriate data structure and algorithm design method for a specified application.
- Solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Implement linear data structures such as stacks, queues, linked lists and apply on real time problem like conversions & evaluations of expressions.
2.	Implement non linear data structures such as Trees and Graphs and apply on real time problem like finding shortest path.
3.	Implement different sorting and searching techniques.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3	3	3	3	3	2	2		3	2	3	3	3	3
	2	3	3	3	3	3	2	2		3	2	3	3	3	3
	3	3	3	3	3	3	2	2		3	2	3	3	3	3

List of Programs:

1) Programs to implement the following using anarray.

a) Stack b)Queue

2) Programs to implement the following using a singly linkedlist.

a) Stack b)Queue

3) Program to do thefollowing

a) Infix topostfixconversion. b) Evaluation of postfixexpression.

4) Programs to implement the following datastructures.
a) CircularQueue b) PriorityQueue

5) Implement primitive operations of de-queue (double ended queue) using a doubly linkedlist and anarray.

6) Program to perform the followingoperations:

a) Insert an element into a binary searchtree.
b) Delete an element from a binary searchtree.
c) Search for a key element in a binary searchtree.

7) Program that use non-recursive functions to traverse the given binary treein
a) Preorder b)In-order c)Post-order.

8) Program to implement bfs and dfs for a givengraph.

9)) Program to implement the following sortingmethods:
a) Mergesort b)Quicksort c) InsertionSort d) SelectionSort

10)) Program to implement the following searchingmethods:
a) LinearSearch b) Binarysearch

11) Program to store **k** keys into an array of size n at the location computed using a Hash function, loc = key % n, where k<=n and k takes values from [1 to m], m>n, where m is sizeof the hashtable.

12) Write a C program to handle the collisions using the following collisionresolution Technique
a) Linearprobing b) Quadratic probing c) SeparateChaining

Reference Books:

1. Y. Langsam, M. Augenstin and A. Tannenbaum, "Data Structures using C"Pearson Education, 2nd Edition, 1995.
2. Richard F, Gilberg, Forouzan, Cengage, Data Structures, 2/e,2005.
3. Data Structures using C, 2/2, ISRDGroup.

DIGITAL ELECTRONICS LAB
(COMMON FOR CSE & IT)

IT217 **Credits:2**
Practical: 3Periods/week Sessional Marks:50
End Exam:3Hours End Exam Marks: 50

Prerequisite:
Digital electronics concepts.

Course Objectives:

- To understand how to design and analyze the electronic circuits usingsemiconductor diodes and operationalamplifiers
- To understand how to design various combinational and sequentialcircuits.
- To develop and test VHDL Program code for combinational and sequentialcircuits.

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Identify various analog (active and passive), digital electronic components.
2.	Design and Analyze different circuits using analog ICs like operational amplifier and regulators.
3.	Simplify the given Boolean function and implement using logic gates using Integrated Circuits.
4.	Design, Analyze and Implement combinational and sequential digital circuits.
5.	Model combinational and sequential digital circuits using VHDL program in behavioral, structural, and dataflow models.
6.	Develop test benches to simulate combinational and sequential circuits, perform functional and timing verifications of digital circuits.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	2					2			3	2	2	1		
	2	2					2			3	2	2	1		
	3	3	1	3	2		1			3	2	2	2		
	4	3	1	3	2		2			3	2	2	2		
	5	2	2	2	3	1	2			3		3	1		
	6	2	2	2	3	1	2			3		3	1		

LIST OF LABORATORY EXPERIMENTS

CYCLE I:

1. Study of passive, active components & IntegratedCircuits.
2. To study the regulation characteristics of given IntegratedCircuits.
3. To verify the adder operation & subtractor operation using Operationalamplifiers.
4. To verify the truth tables of given LogicGates.

CYCLE II:

1. Verification of truth tables of Logic gates usingIC's.
2. Design a combinational circuit for Code Converters usingIC's.
3. Design a combinational circuit for Adders & Subtractors (HA & FA) usingIC's.
4. Design a sequential circuit for Flip-flop and verify its characteristics usingIC's..
5. Design a bidirectional Universal Shift Register UsingIC74LS194.
6. Design of Counters usingIC74LS73.

CYCLE III: (Simulation using VHDL)

1. Write a program for verification of BasicGates.
2. Write a program for Adder &Subtractor.
3. Write a program for flipflops.
4. Write a program for MUX &DEMUX.
5. Write a Program for ShiftRegisters.

*** NOTE: FOUR Experiments from each cycle should be donecompulsorily.**

Reference Books:

1. M. Morris Mano, Digital Design, Pearson Education, Inc., 2008, 4th Edition.

PYTHON PROGRAMMING LAB

IT218 **Credits:3**

Practical: 3 Periods & 1Tut/week Sessional Marks: 50

End Exam:3Hours End Exam Marks:50

Prerequisite:

Fundamentals of computers, knowledge in any program language

Course Objective:

- Describe the basic elements of the Python language and the Pythoninterpreter
- Analyze and demonstrate the use of lists, tuples and dictionaries inPython.
- Write classes to demonstrate the ideas of encapsulation, inheritance, interfaces and object oriented programdesign.
- Explain and demonstrate methods of error handling and Pythonexceptions.
- Write to and read from files using intermediate file I/O operations in a Pythonprogram.
- Solve problems that have origins in a variety of disciplines including math, science, the Internet andbusiness.

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Analyse the syntaxes of python programming and incorporate them in problem solving.
2.	Apply python data structures to solve real world problems.
3.	Develop programs using object oriented concepts in python programming
4.	Develop programs using File I/O and exception handling.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3	3	3	3	2	2			2		1	2	3	2
	2	3	3	2	3	3	3			3		2	3	3	3
	3	3	3	3	3	3	3			3		1	3	3	3
	4	3	3	2	3	3	3			3		1	3	3	3

List of the experiments to be done on the following topics

1. Introduction: Introduction to Python programming language, using the interpreter, running scripts, variables, assignments, comments, operators and expressions. Introduction tobasic data types including strings, integers, lists and tuples.

2. Control Flow: Conditional expressions, if statement, for statement and while statement, break and continuestatements.

3. Functions, Methods and Modules: Introduction to built in functions, methods and modules. Introduction to standard library modules like sys, os, time and random. Reading command line arguments. Introduction to writing user defined functions and organizing code intomodules.

4. Data structures: Detailed overview of four major data structures of Python including list, tuple, set and dictionary, including list slicing, sorting lists, listcomprehensions.

5. Working with Files: Introduction to reading and writing files, text and binary mode. Writing parsers for simple textformats.

6. Classes and Exceptions : Introductions to classes, object creation and class inheritance and overriding methods. Introduction to exceptionhandling.

7. Advanced Topics

Introduction to some advanced topics in Python.

- Downloading things fromweb
- Webprogramming
- Datavisualization
- Building simple games usingpygame

LIST OF EXPERIMENTS

LEVEL 1: FUNDAMENTAL PROGRAMMING

1. Installation of Python using python interpreter and printing HELLO WORLDmessage

2. program that accept the user's first and last name and print them in reverse order witha space betweenthem

3. To display the first and last colors from the followinglist.
   color_list = ["Red","Green","White","Black"]

4. To count the number of characters (character frequency) in a string . Sample String: google.com' Expected Result : {'o': 3, 'g': 2, '.': 1, 'e': 1, 'l': 1, 'm': 1, 'c':1}

5. To convert temperatures to and from celsius,fahrenheit.
   [Formula : c/5 = f 32/9 [where c = temperature in celsius and f = temperature in fahrenheit] . *Expected Output* : 60°C is 140 in Fahrenheit 45°F is 7 in Celsius

6. To get a list, sorted in increasing order by the last element in each tuple from a givenlist of non emptytuples.
   Sample List : [(2, 5), (1, 2), (4, 4), (2, 3), (2, 1)]
   Expected Result : [(2, 1), (1, 2), (2, 3), (4, 4), (2, 5)]

7. Write a function translate() that will translate text into "rovarspraket" (Swedish secret language) That is double every consonant and place an occurence of "o" in between .For example translate("this is fun") should return the string "tothohisos isosfofunon"

8. program that prints each item and its corresponding type from the followinglist.
   Sample List :datalist = [1452, 11.23, 1+2j, True, 'w3resource', (0, 1), [5, 12], {"class":'V', "section":'A'}]

9. Write a Python function that takes a list and returns a new list with unique elementsof the first list. *Sample List:*[1,2,3,3,3,3,4,5] *Unique List :* [1, 2, 3, 4,5]

10. programs for thefollowing:
    a. Defining and Accessing aDictionary:
    b. UpdatingDictionary:
    c. Deleting DictionaryElements:
    d. Defining and Accessing, updating ,deletingTuples.

11. To demonstrate the use of built in stringmethod

12. To demonstrate the use oflists

LEVEL 2 : CLASSES AND I/O

13. To implement classes concept inpython
14. To implement inheritance in a Bankingsystem
15. To implementpolymorphism
16. Python Programs on ExceptionHandling
    a. Write a python program to handle Number formaterror
    b. Write a python program to handleIOError
17. Write a python program to perform the following fileoperations.
    a. Create, open & close afile:
    b. write content on to afile
    c. Read content form thefile
    d. Random access operation on files using tell & seekfunctions
    e. other file operations using the Module'os'

LEVEL 3 : PROBLEM SOLVING

18. Cryptography:

In cryptography, a *Caesar cipher* is a very simple encryption techniques in which each letter in the plain text is replaced by a letter some fixed number of positions down the alphabet. For example, with a shift of 3, A would be replaced by D, B would become E, and so on. The method is named after Julius Caesar, who used it to communicate with his generals. *ROT 13* ("rotate by 13 places") is a widely used example of a Caesar cipher where the shift is 13. In Python, the key for ROT 13 may be represented by means of the following dictionary:

key = {'a':'n', 'b':'o', 'c':'p', 'd':'q', 'e':'r', 'f':'s', 'g':'t', 'h':'u',

a. 'i':'v', 'j':'w', 'k':'x', 'l':'y', 'm':'z', 'n':'a', 'o':'b','p':'c',
b. 'q':'d', 'r':'e', 's':'f', 't':'g', 'u':'h', 'v':'i', 'w':'j','x':'k',
c. 'y':'l', 'z':'m', 'A':'N', 'B':'O', 'C':'P', 'D':'Q', 'E':'R','F':'S',
d. 'G':'T', 'H':'U', 'I':'V', 'J':'W', 'K':'X', 'L':'Y', 'M':'Z','N':'A',
e. 'O':'B', 'P':'C', 'Q':'D', 'R':'E', 'S':'F', 'T':'G', 'U':'H','V':'I',
f. 'W':'J', 'X':'K', 'Y':'L','Z':'M'}

Your task in this exercise is to implement an encoder/decoder of ROT 13. Once you're done, you will be able to read the following secret message:

Pnrfnepvcure? V zhpucersrePnrfnefnynq!

Note that since English has 26 characters, your ROT 13 program will be able to both encode and decode texts written in English.

19. Speech synthesis:

The *International Civil Aviation Organization (ICAO) alphabet* assigns code words tothe letters of the English alphabet acrophonically (Alfa for A, Bravo for B, etc.) so that critical combinations of letters (and numbers) can be pronounced and understood by those who transmit and receive voice messages by radio or telephone regardless of their native language, especially when the safety of navigation or persons is essential. Here is a Python dictionary covering one version of the ICAOalphabet:

d = {'a':'alfa', 'b':'bravo', 'c':'charlie', 'd':'delta', 'e':'echo', 'f':'foxtrot',
'g':'golf', 'h':'hotel', 'i':'india', 'j':'juliett', 'k':'kilo', 'l':'lima',
'm':'mike', 'n':'november', 'o':'oscar', 'p':'papa', 'q':'quebec', 'r':'romeo',
's':'sierra', 't':'tango', 'u':'uniform', 'v':'victor', 'w':'whiskey',
'x':'x ray', 'y':'yankee', 'z':'zulu'}

Your task in this exercise is to write a procedure `speak_ICAO()`able to translate any text (i.e. any string) into *spoken*ICAO words. You need to import at least two libraries: `os`and `time`. On a mac, you have access to the system TTS (Text To Speech) as follows: `os.system('say ' + msg)`, where `msg` is the string to be spoken. (Under UNIX/Linux and Windows, something similar might exist.) Apart from the text to be spoken, your procedure also needs to accept two additional parameters: a float indicating the length of the pause between each spoken ICAO word, and a float indicating the length of the pause between each word spoken

20. Cows and bulls game:

Create a program that will play the “cows and bulls” game with the user. The game works like this:

Randomly generate a 4 digit number. Ask the user to guess a 4 digit number. For every digit that the user guessed correctly *in the correct place*, they have a “cow”. For every digit the user guessed correctly *in the wrong place* is a “bull.” Every time the user makes a guess, tell them how many “cows” and “bulls” they have. Once the user guesses the correct number, the game is over. Keep track of the number of guesses the user makes throughout the game and tell the user at the end.

Say the number generated by the computer is 1038. An example interaction could look like this:

```
Welcome to the Cows and Bulls Game!
Enter a number:
>>> 1234
2 cows, 0 bull
>>> 1256
1 cow, 0 bull
...
```

21. Chip defect

k defects are randomly distributed amongst *n* integrated circuit chips produced by a factory (any number of defects may be found on a chip and each defect is independent of the other defects). Let p(*k*,*n*) represent the probability that there is a chip with at least 3 defects. For instance p(3,7) ≈ 0.0204081633.

Find p(20 000, 1 000 000) and give your answer rounded to 10 decimal places in the form 0.abcdefghij

Reference Books:

1. *Swaroop C H* ,A Byte of Python,http://python.swaroopch.com/
2. *David Beazley* , Python Cookbook, 3rd edition, O'ReillyMedia http://chimera.labs.oreilly.com/books/1230000000393/
3. *Mark Pilgrim* ,Dive Into Python 3, http://www.diveinto.org/python3/

Other References:

1. Project Eulerhttps://projecteuler.net/

SEMESTER-2

COMPUTER NETWORKS

IT221 **Credits:3**
Instruction: 3 Periods & 1Tut/week Sessional Marks:40
End Exam:3Hours End Exam Marks:60

Prerequisite:

Data Communications.

Course Objective:

- To provide the students with a sound theoretical and practical knowledge in computer networks.
- To analyze problems associated while connecting components for sharinginformation.
- To select a protocol stack for specificnetwork.
- To select proper algorithm for the protocols..
- To identify the parameters for real time applications innetworks.
- Prepare students for easy transfer from academia to realworld.

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Be able to analyze different network architecture's and designs
2.	Mathematically model various error control and routing schemes.
3.	Ability to analyze the working of LAN in an organization.
4.	Ability to design network architecture for an organization.
5.	Ability to design and implement a network for scalability and robustness and security.

Mapping of course outcomes with program outcomes:

		PO												PSO	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3				3						3		3	3
	2	3				3				2				3	3
	3	3				3				2				3	3
	4	3				3				2		2		3	3
	5	2										3		3	3

SYLLABUS

UNIT– I **10periods**

Protocol Architecture: The need for a protocol architecture, A simple protocol architecture A three layer model, standardized protocol architectures , OSI The model, standardization within the OSI framework, service primitives and parameters, the OSI layers , The TCP/IP protocol Architecture The TCP/IP layers, TCP and UDP Operation of TCP and IP, TCP/IP applications, protocol Interfaces, **Local area networks: LAN overview:** Background, LAN protocol Architecture LAN standards, IEEE 802, LLC,MAC. Bridges functions, protocol architecture, Fixed routing, spanning tree approach. Layer 2 and Layer 3 switches hubs, layer2 and3 switches. **High speed LANs:** The Emergence of High speed LANs, Ethernet MAC, Ethernet, fast Ethernet, gigabit, 10 gbpsTokenRing Operation, MAC. **Wireless LANs:** overview, Wireless LAN Technology, IEEE802.11 Architecture and services, MAC, PhysicalLayer

UNIT– II **10periods**

Wide Area Networks: circuit switching and packet switching: switched communication networks, circuit switching networks and concepts Space Division Switching, Time division switching, packet switching principles switching technique, packet size, comparisons. **Routing in switched networks:** Routing in circuit switching networks, routing in packet switching networks Characteristics, routing strategies, Examples, Least cost Algorithms Dijikstra's Algorithm, Bellman Ford algorithm, comparison. **Congestion Control in Switched Data Networks:** effects of congestion ideal performance, practical performance, congestion control Backpressure, choke packet, implicit congestion signaling, explicit congestion signaling, traffic management fairness, QOS, Reservations, congestion control in packet switchingnetworks

UNIT – III **10 periods**

Internetworking: Internetwork protocols: Basic protocol Functions, principles of Internetworking requirements, Architectural Approaches, connectionless Internetworking operation of connectionless internetworking scheme, Design issues, Internet protocol IP services, Internet protocols, IP Addresses, ICMP, IPV6 IP next generation, IPv6 structure, IPv6 header, IPv6 Addresses, Hop by Hop options header, routing header, destination options header. **Internetwork operation:** Multicasting, routing protocols Autonomous systems, approaches of routing, BGP, open shortest path first(OSPF)protocol

UNIT– IV **10periods**

The Transport Layer: **The Transport Protocols:** connection Oriented transport protocol mechanisms Reliable sequencing network service, unreliable network service, TCP TCP services, TCP header format, TCP Mechanisms, TCP Implementation policy options, TCP congestion control Retransmission timer management, window management,UDP

Unit– V **8periods**

Application Layer: **Distributed Applications**: Electronic Mail SMTP and MIME Simple mail transfer protocol (SMTP), multipurpose internet mail extensions (MIME). Hypertext transfer protocol (HTTP) HTTP overview, messages, request message, response messages, Entities Network management SNMP network management systems, SNMPv1, SNMPv2

Text Books:

1. William Stallings ,"Data& Computer Communication", Pearson Education ,7th edition

Reference Books:

1. Forouzan, "Data communication", TATAMcGraw
2. Kurose & Ross, "COMPUTER NETWORKS– A Top-down approach featuringthe Internet", Pearson Education, Alberto Leon,Garciak.
3. LeonGartia, IndraWidjaja, "Communication Networks Fundamental Concepts and Key Architectures",TMH.
4. Nader F.Mir, "Computer and Communication Networks",PHI.

INFORMATION SYSTEMS DESIGN

IT222 **Credits:3**

Instruction: 3 Periods & 1Tut/week Sessional Marks:40

End Exam:3Hours End Exam Marks:60

Prerequisite:

Object Oriented Concepts, C++ programming.

Course Objective:

- On performing a background work prior to begin Projectdevelopment.
- To gather information and analyze user requirements in systemdevelopment
- To apply the Process models in developing aproject.
- To translate end user requirements into system and softwarerequirements

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Identify the features of Information systems and systems design.
2.	Apply the knowledge of information gathering and requirement analysis in SoftwareEngineering
3.	Identify specific components of a software design and use in Interface Designing.
4.	Analyze software testing methodologies and estimate the software development cost.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3	2	3	3	2	1	1				2	2	3	3
	2	2	2	2	2	1					2	2	2	3	3
	3	2	3	3	3	3						1	2	3	3
	4	2	2	3	1	3						1	2	2	3

SYLLABUS

UNIT I: TextBook 1 **8Periods**

Information and Management: Types of Information, Computer based information systems, Management Structure , Management and Information Requirements, Qualities of information **(Page No 1 12)**

Examples of Information Systems: Various functions in organizations, Information Processing for a store – An overview , varieties of Information Systems**. (Page No 3122)**

Information Gathering : Strategy to Gather information ,Information Sources, Methods of Searching for Information, Interviewing Techniques, Questionnaires Other methods Case Study – Hostel Information System **(Page No 34 45)**

UNIT – II: TextBook2 **11 Periods**

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths. **(Page No 33 47)**

A Generic view of process: Software engineering A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models. **(Page No 5273)**

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process. **(Page No 7799)**

UNIT – III: TextBook2 **10 Periods**

Requirements Engineering : Requirements Engineering Tasks ,Initiating the requirements engineering process, Eliciting requirements, developing use cases, Building the analysis model, Negotiating requirements, validating requirements. **(Page No 176204)**

Building analysis model: Requirement analysis, Analysis modeling approaches **(Page No 208 212)**

UNIT – IV: TextBook2 **11Periods**

Design Engineering: Design process and Design quality, Design concepts, the design model. **(Page No 261 280) Performing User interface design:** Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation. **(Page No 357382)**

UNIT – V: TextBook2 **8Periods**

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Validation testing, System testing **(Page No 387 404,406 410)**

Black Box and White Box testing, Basic Path Testing, Control Structure Testing **(Page No 423 434)**

Product metrics: Software Quality, A frame work for Product Metrics **(Page No.462 471)**

Text Books:

1. V. Rajaraman, Analysis and Design of Information System, Second Edition,PHI
2. Roger S Pressman, Software Engineering, A practitioner's Approach Sixth edition. McGrawHill InternationalEdition.

Reference Books:

1. Waman S Jawadekar, Software Engineering Principles and Practice, Tata McGrawHill, Ian Sommerville, Software Engineering, Ninth Edition,Pearson

OPERATING SYSTEMS
(COMMON FOR CSE & IT)

IT223 **Credits:4**
Instruction: 4 Periods & 1Tut/week Sessional Marks:40
End Exam:3Hours End Exam Marks:60

Prerequisite:
Knowledge in Computer Organization.

Course Objectives:

- Understand Functions, Services and structure of OperatingSystems.
- Understand processes, threads, schedulers and explanation of CPUscheduling.
- Understand issues related to Process Synchronization and focus on principles of Deadlock and relatedproblems
- Comprehend the mechanisms used in Memory Management and VirtualMemory.
- Understand the concepts of File System, secondary storage management and Disk Scheduling

Course Outcomes:

After completion of this course, a student will be able to :	
1	Analyze basic concepts of operating system and their structures
2	Analyze various issues related to inter process communication like process scheduling, resource management and deadlocks
3	Interpret the issues and challenges of memory management.
4	Synthesize the concepts of I/O management, file system implementation and problems related to security and protection

Mapping of course outcomes with program outcomes:

		PO												PSO	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	2	1	2	3	1					1	2	3	3	3
	2	3	1	2	2				2	2		1	1	1	3
	3	3	2	2	1	2			3	2		1	2	2	3
	4	2	2	1	1	2		1	2	1		1	2	2	3

SYLLABUS

UNIT– I **14Periods**

INTRODUCTION TO OS

Introduction to operating systems – operating system structures – system calls – system structure – virtual machines.

PROCESS MANAGEMENT

Processes: Process concept – Process scheduling – Operations on processes –Cooperating processes – Interprocess communication. Multi threaded programming. Communication in client server systems. Multi Threaded Programming: Overview; Multithreading models; Thread Libraries; Threading issues.

UNIT– II **14Periods**

PROCESS SCHEDULING AND SYNCHRONIZATION

CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple processor scheduling – Real time scheduling – Algorithm Evaluation. Process Synchronization: The critical section problem –Synchronization hardware – Semaphores – Classic problems of synchronization – critical regions – Monitors. Deadlock: System model – Deadlock characterization –Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance, Deadlock detection – Recovery from deadlock.

UNIT– III **12Periods**

MEMORY MANAGEMENT

Memory Management: Background – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing.

UNIT– IV **10Periods**

FILE SYSTEMS AND ITS IMPLEMENTATION

File System Interface: File concept – Access methods – Directory structure – File system mounting – Protection. File System Implementation : Directory implementation – Allocation methods – Free space management – efficiency and performance – recovery – log structured file systems.

UNIT– V **14Periods**

SECONDARY STORAGE STRUCTURES AND PROTECTION

Mass storage structures; Disk structure; Disk attachment; Disk scheduling; Disk management; Swap space management. Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix, Implementation of access matrix, Access control, Revocation of access rights, Capability Basedsystems.

CASE STUDY(Not considered in the examination): THE LINUX OPERATING SYSTEM: Linux history; Design principles; Kernel modules; Process management; Scheduling; Memory management; File systems, Input and output; Inter process communication

Text Book:

1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", Sixth Edition, Wiley India Pvt Ltd, 2003.

Reference Books:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson Education, 2004.
2. Gary Nutt, "Operating Systems", Third Edition, Pearson Education,2004.
3. Harvey M. Deitel, "Operating Systems", Third Edition, Pearson Education,2004.

PROBABILITY STATISTICS & QUEUING THEORY

IT224 **Credits:4**

Instruction: 4 Periods & 1Tut/week Sessional Marks:40

End Exam:3Hours End Exam Marks: 60

Prerequisite:

Engineering Mathematics 1, 2 & Discrete Mathematical Structures.

Course Objective:

- The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their Engineering degree in differentdisciplines.

Course Outcomes:

After completion of this course, a student will be able to:	
1.	Understand the concepts of various statistical measures like mean, variance and standard deviation of a random variable.
2.	Familiarize the different types probability distributions and their properties.
3.	Compute simple correlation between the variables and fit straight line, parabola by the principle of least squares.
4.	Analyze the statistical data and apply various small or large sample tests for testing the hypothesis.
5.	Learn about different Queuing models and its applications

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3	3									3		3	3
	2	2	3									3		2	3
	3	3	3									3		3	3
	4	3	3									3		2	2
	5	3	3									3		2	2

SYLLABUS

UNIT – I: PROBABILITY &MATHEMATICALEXPECTATIONS 12Periods

Introduction to probability: Definition of Random Experiment, Events and Sample space, Definition of probability, Addition and Multiplication theorems, Conditional probability, Baye's Theorem, Simple Problems on Baye's theorem. Random Variables: Discrete and Continuous random variables, Distribution function of random variable, Properties, Probability mass function, Probability density function, Mathematical expectation, Properties of Mathematical expectations, Mean andVariance.

UNIT – II:PROBABILITYDISTRIBUTION 14Periods

Discrete Distributions: Binomial Distribution, Mean and Standard Deviations of Binomial Distribution, Poisson distribution, Mean and Standard Deviations of Poisson Distribution, Applications. Continuous Probability Distributions: Uniform Distribution, Exponential Distribution, Normal Distribution, Properties of Normal Distribution, Importance of Normal Distribution, Area properties of Normal curve.

UNIT – III: CURVE FITTING , CORRELATIONANDREGRESSION 10Periods

Curve Fitting: Principle of Least Squares, Method of Least Squares (Straight Line and Parabola).

Correlation: Definition, Measures of correlation, Correlation for Bivariate Distribution, Rank correlation coefficients.

Regression: Simple linear regression, regression lines and properties.

UNIT – IV: TESTINGOFHYPOTHESIS 14Periods

Formulation of Null Hypothesis, Critical Region, Level of Significance.

Small Samples: Students t distribution (Significance test of a sample mean, Significance test of difference between sample means),F distribution, χ^2test, Goodness offit.

Large samples: Test of Significance of Large Samples – Single Proportion, Difference between two Proportions, Single mean and Difference of means.

UNIT – V:**QUEUEINGTHEORY 10Periods**

Queue description, characteristics of a queuing model, study state solutions of M/M/1: α Model, M/M/1; N Model.

TEXT BOOK:

1. T. Veerarajan, Probability, Statistics and Random Processes, Tata McGraw Hill Publications.

REFERENCE BOOKS:

1. Kishore S. Trivedi ,Probability& Statistics with Reliability, Queuing and Computer Applications , Prentice Hall of India ,1999.

COMPUTER GRAPHICS & MULTIMEDIA

IT225 **Credits:3**
Instruction: 3 Periods & 1Tut/week Sessional Marks:40
End Exam:3Hours End Exam Marks:60

Prerequisite:
Computer fundamentals, C programming.

Course Objective:

- This course provides an introduction to the principles of computer graphics. In particular, the course will consider methods for modeling 2 dimensional & 3 dimensional objects and efficiently generating photorealistic renderings on color raster graphics devices. The emphasis of the course will be placed on understanding how the various elements that underlie computer graphics (algebra, geometry, algorithms and data structures, optics, and photometry) interact in the design of graphics software systems.

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Apply output primitive algorithms for drawing line, circle, ellipse and filled area primitives and transformation on 2D objects
2.	Design and Model objects characteristics using 3D representations and apply transformations on 3D objects.
3.	Design multimedia system architecture for multimedia applications using multimedia technologies digital voice and audio, video image and animation
4.	Construct 2D and 3D multimedia building blocks for developing multimedia applications.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3							1	1	1		1	2	3
	2	1	2	3					1	1	1		1	2	3
	3	1	2	3					1	1	1		1	2	3
	4	3							1	1	1		1	2	3

SYLLABUS

UNIT – I:OUTPUTPRIMITIVES 10hours

Introduction Line Circle and Ellipse Drawing Algorithms – Attributes – Two Dimensional Geometric Transformations – Two Dimensional Clipping and Viewing.

UNIT – II: THREEDIMENSIONALCONCEPTS 8hours

Three Dimensional Object Representations – Three Dimensional Geometric and Modeling Transformations – Three Dimensional Viewing – Color models – Animation.

UNIT III: MULTIMEDIASYSTEMS DESIGN 10hours

An Introduction – Multimedia applications – Multimedia System Architecture – Evolving technologies for Multimedia – Defining objects for Multimedia systems – Multimedia Data interface standards – Multimedia Databases.

UNIT – IV: MULTIMEDIAFILEHANDLING 10hours

Compression & Decompression – Data & File Format standards – Multimedia I/O technologies Digital voice and audio – Video image and animation – Full motion video – Storage and retrieval Technologies.

UNIT –V:HYPERMEDIA 10hours

Multimedia Authoring & User Interface – Hypermedia messaging Mobile Messaging – Hypermedia message component – Creating Hypermedia message – Integrated multimedia message standards – Integrated Document management – Distributed Multimedia Systems.

Text Books:

1. DonaldHearnandM.PaulineBaker,“ComputerGraphicsCVersion”,Pearson Education, 2003. (UNIT I : Chapters 1 to 6; UNIT 2: Chapter 9 – 12, 15, 16)
2. Prabat K Andleigh and Kiran Thakrar, “Multimedia Systems and Design”, PHI,2003. (UNIT 3 to 5)

Reference Books:

1. Judith Jeffcoate, “Multimedia in practice technology and Applications”, PHI,1998.
2. Foley, Vandam, Feiner, Huges, “Computer Graphics: Principles & Practice”,Pearson Education, second edition 2003.

NETWORKING LAB

IT226	**Credits:2**
Practical:3Periods/Week	Sessional Marks:50
End Exam:3Hours	End Exam Marks:50

Prerequisite:
Computer Networks Concepts.

Course Objectives:

- The objective of this lab is to introduce students to the design issues that arise in building and using networks and to give students hands on experience with building and using networkservices.
- The practical issues to be stressed include design and installation of LAN, network operating system, setting up a network system such as users and their permissions and rights, groups and domains, adding workstations and sharing of resources across the network

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Understand and identify the various network infrastructure and command needed for network design and troubleshooting.
2.	Understand the basic concepts and functions of Layer 1 (Hubs), Layer 2(Switches and bridges) and Layer 3 (Router).
3.	Understand the building components of network design.
4.	Understand the basic format of known protocols such as TCP, UDP, ICMP..Etc.
5.	Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Mapping of course outcomes with program outcomes:

		PO												PSO	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3				3								3	3
	2	3				3								3	3
	3	3				3								3	3
	4	3				3								3	3
	5	3				3								3	3

LIST OF EXPERIMENTS

I. StudyExperiments: **2 weeksduration**

This study experiments helps the learners to understand certain network components like Hubs, switches, routers, wireless access modems, transmission medium (coaxial cables, twisted pair cables, optical fiber) and several networkingcomponents

1. Study of specifications of latest desktops andlaptops
2. Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, routersetc.
3. Familiarization with Transmission media and Tools: Co axial cable, UTP Cable, Crimping tool, Connectorsetc.
4. Study of various LAN topologies and their creation using network devices, cables andcomputers
5. Study of Client ServerArchitecture
6. To study LAN using bus, tree, startopology
7. To study pc to pc communication using parallelport
8. To study fiber opticscommunication
9. To study wirelesscommunication

II. Handson Experiments **8 weeksduration**

This set of experiments helps the learners in gaining expertise in developing and maintaining a certain network which includes setting up a LAN network and maintaining it, configuring routers, switches and firewalls using a certain Hardware components.

1. preparing straight and crosscables.
2. Study of network commands and network configurationcommands
3. Implementation of file and printersharing
4. Designing and implementing Class A, B, and CNetworks
5. Subnet planning and itsimplementation.
6. To configure the IP address for a computer connected to LAN and to configure network parameters of a web browser for the samecomputer.
7. To install any one open source packet capture software like wire sharketc.
8. To configureWLAN
9. To install and configure wireless accesspoints
10. To configure modem of acomputer
11. To configure hub/switch androuter
12. Configuring NetworkNeighborhood.
13. Configuring a router basedfirewall

III. ProgrammingExperiments **5weeks duration**

This set of programming experiments helps the learners in simulating different routing protocols, network topologies and several layered protocols using simulators like NS2 and packet tracing software's

1. Configure a network topology using packet tracingsoftware
2. Configure a network using Distance vector routing protocol using packet tracersoftware
3. Static routing using packet tracersoftware
4. DHCP, DNS, HTTP configuration using packet tracersoftware

Experiments beyond the Syllabus:

1. Developing a VPN network for number of 50users
2. TCP, UDP protocol simulation usingNS2

Reference Books:

1. CCNA Studyguide.

COMPUTER GRAPHICS & MULTIMEDIA LAB

IT227 **Credits:2**
Practical:3Periods/Week Sessional Marks:50
End Exam:3Hours End Exam Marks:50

Prerequisite:

Computer Graphics & Multimedia Concepts.

Course Objective:

- The computer graphics and multimedia laboratory is established for the purpose of providing working area for development of computer graphics andmultimedia

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Draw various types of lines and curves.
2.	Create animations using various editing tools
3.	Use audio, video, internet editing tools to develop multimedia applications

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3	3	3	3	3					3		3	3	3
	2	3	3	3	3	3					3		3	3	3
	3	3	3	3	3	3					3		3	3	3

LIST OF EXPERIMENTS

1. To implement Bresenham's algorithms for line, circle and ellipsedrawing
2. To perform 2D Transformations such as translation, rotation, scaling, Reflection and sharing.
3. To implement Cohen–Sutherland 2D clipping and window–viewportmapping
4. To perform 3D Transformations such as translation, rotation andscaling.
5. User Interface Design & Graphics II: Create a user interface for your final project. Include 2 backgrounds and 1 button set. Aim for a cohesivelook.
6. Multimedia Sound: Create 2 soundtracks and 2 EFX sounds for a previousproject.
7. Procedure to create an animation to indicate a ball bouncing onsteps
8. Procedure to simulate movement of acloud.
9. Procedure to create an animation with the following features. WELCOME Letters should appear one by one the fill color of the text should change to a different color after the display of the fullword.
10. Procedure to create an animation to represent the growingmoon
11. Procedure to extract the flower only from given photographic image and organize it on a background. Selecting your own background fororganization.
12. Procedure to use appropriate tool(s) from the toolbox cut the objects from 3 files (f1.jpg, f2.jpg & f3.jpg); organize them in a single file and apply feathereffects.

Reference Books:

1. Vaughan, T. “Multimedia – Making it work (5th edition)”, McGrawHill.
2. Boyle, T. “Design for Multimedia Learning”, Prentice Hall, 1997.

OPERATING SYSTEMS (LINUX) LAB

IT228	**Credits:2**
Practical:3Periods/Week	Sessional Marks:50
End Exam:3Hours	End Exam Marks:50

Prerequisite:

Operating System Concepts.

Course Objectives:

- Analyze the working of an operating system, its programming interface and filesystem.
- Develop algorithms for process scheduling, memory management, pagereplacement algorithms and diskscheduling

Course Outcomes:

After completion of this course, a student will be able to :	
1.	Implement schedulling algorithms, deadlock management.
2.	Implement free space managent and page replacement strategies.
3.	Implement file allocation methods and disk schedulling algorithms.

Mapping of course outcomes with program outcomes:

		PO												**PSO**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO	**1**	3	3	3		3	2	3			3			3	3
	2	3	3	3		3		2	2		3		3	3	3
	3	3	3	3		3		2	2		3		3	3	3

List of Experiments:

1. Shell Programming & AWKscripts
2. Write programs using the following system calls of LINUX operating system: Fork, exec, getpid, exit, wait, close, stat, opendir,readdir
3. Write programs using the I/O system calls of LINUX operating system (open, read, write, etc) and error reporting usingerrno
4. Write C programs to simulate UNIX commands like ls, grep,etc.
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for scheduling algorithms FCFS,SJF, PRIORITY & RR. For each of the scheduling policies, compute and print the average waiting time, average turnaround time and Gantt chart
6. Implement the Producer – Consumer problem using semaphores (using LINUX system calls).
7. Programs usingpipes
8. Implement Banker's algorithm for handlingdeadlock
9. Implement free space management strategies such as First fit, Best fit and Worstfit
10. Implement page replacement algorithms such as FIFO,LRU
11. Implement file allocation techniques (Linked, Indexed and Contiguous)
12. Implement disk arm scheduling algorithms such as FCFS,SSTF

Reference Books:

1. Sumitabha Das, UNIX AND SHELL PROGRAMMING, Tata Mcgraw Hill Publishing CoLtd
2. YashwanthKanetkar , UNIX shell programming, BPBpublications
3. W. Richard Stevens, Stephen A.Rago , Advanced programming in the UNIX environment", 3rd Edition Pearsoneducation.
4. Silberschatz,Galvin,andGagne,“OperatingSystemConcepts”,SixthEdition,Wiley India Pvt Ltd, 2003.