Department : *Computer Science and Engineering*

Programme Name : *B.Tech.*

Academic Year : 2020-21

List of Courses Focus on Employability/ Entrepreneurship/Skill

Sr. No.	Course Code	Name of the Course
01.	CS02TES02	Programming for Problem Solving
02.	CS03TES03	Computer Organization Architecture
03.	CS03TPC01	Digital Logic & Design
04.	CS03TPC02	IT Workshop (C++/Python)
05.	CS03TPC03	Computer Network
06.	CS03TBS05	Mathematics-III
07.	CS04TPC04	Discrete Mathematics
08.	CS04TES04	Electronic Device and Circuits
09.	CS04TPC05	Operating System
10.	CS04TPC06	Data Structure & Algorithms
11.	CS04TPC07	System Software
12.	CS05TES05	Microprocessor and Interfaces
13.	CS05TPC08	RDBMS
14.	CS05TPC09	Formal Language of Automata Theory
15.	CS05TPC10	Parallel Computing
16.	CS05TPE04	Software Engineering
17.	CS06TPC11	Design and Analysis of Algorithm
18.	CS06TPC12	Java
19.	CS06TPC13	Computer Graphics
20.	CS06TPE05	Digital Image Processing
21.	CS06TPE07	Artificial Intelligence
22.	CS06TOE01	Management Information System
23.	CS7TPC01	Compiler Design
24.	CS7TOE01	Web Tecnologies
25.	CS7TPE01	Data Mining
26.	CS7TPE02	Wireless Sensor Network
27.	CS8TPC01	Network Security
28.	CS8TOE01	Enterprise Resource Planning
29.	CS8TPE01	Soft Computing
30	CS7TPC02	Artificial Intelligence

SCHEME OF EXAMINATION
B.TECH (FOUR YEARS) DEGREE COURSE
FIRST YEAR , COMPUTER SCIENCE AND ENGINEERING
SEMESTER II (COURSE-B)
EFFECTIVE FROM SESSION 2018-19

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	CS 02TBS03	MATHEMATICS-II	3	1	0	30	70	100	4
2	CS 02TBS04	CHEMISTRY	3	1	0	30	70	100	4
3	CS 02TES02	PROGRAMMING FOR PROBLEM SOLVING	3	0	0	30	70	100	3
4	CS 02THS03	HUMANITIES-I	3	1	0	30	70	100	4
PRACTICAL									
1	CS02PBS02	CHEMISTRY LAB	0	0	3	30	20	50	1.5
2	CS02PES03	PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	30	20	50	1.5
3	CS02PES04	WORKSHOP & MANUFACTURING PRACTICES	1	0	3	30	20	50	2.5
								TOTAL	20.5

IA – INTERNAL ASSESSMENT ESE – END SEMESTER EXAM. L- LECTURE T- TUTORIAL P-PRACTICAL

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
SECOND YEAR, COMPUTER SCIENCE AND ENGINEERING
SEMESTER -III Session 2019-20

Branch :- Computer Science & Engg. Year : II Sem- III

s.no	Code no.	Subject	Periods			Evaluation scheme			Credits
			L	T	P	IA	ESE	TOTAL	
1	CS03TES03	Computer Organization Architecture	3	1	0	30	70	100	4
2	CS03TPC01	Digital logic & Design	3	1	0	30	70	100	4
3	CS03TPC02	IT workshop (C++ / python)	3	1	0	30	70	100	4
4	CS03TPCO3	Computer Network	3	1	0	30	70	100	4
5	CS03TBS05	Mathematics III	3	1	0	30	70	100	4
	PRACTICAL								
1	CS03PPC01	IT workshop (C++ / python)	-	-	4	30	20	50	2
2	CS03PPC02	Digital Logic & Design Lab	-	-	4	30	20	50	2
3	CS03PES05	Computer Network	-	-	4	30	20	50	2
		Total							26

Year : II Sem.- IV

s.no	Code no.	Subject	Periods			Evaluation scheme			Credits
			L	T	P	IA	ESE	TOTAL	
1	CS04TPC04	Discrete Mathematics	3	1	-	30	70	100	4
2	CS04TES04	Electronic Device & Circuits	3	0	--	30	70	100	3
3	CS04TPC05	Operating System	3	1	--	30	70	100	4
4	CS04TPC06	Data Structure & Algorithms	3	1	--	30	70	100	4
5	CS04TPC07	System Software	3	1	-	30	70	100	4
	PRACTICAL								
1	CS04PPC01	Data Structure & Algorithms	--	--	3	30	20	50	2
2	CS04PPC02	Operating System	--	--	3	30	20	50	2
3	CS04PES05	Electronic Device & Circuits	--	--	3	30	20	50	2
							Total		25

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF STUDIES IN ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA
THIRD YEAR, SEMESTER - V
W.E.F. SESSION 2020-21

Branch :- Computer Science & Engg. Year : III Sem- V

S. No.	Code no.	Subject	Periods			Evaluation Scheme			Credits
			L	T	P	IA	ESE	Total	
1	CS05TES05	Microprocessor and Interfaces	3	0	0	30	70	100	3
2	CS05TPC08	Relational Data Base Management System	3	0	0	30	70	100	3
3	CS05TPC09	Formal Language and Automata Theory	3	0	0	30	70	100	3
4	CS05TPC10	Parallel Computing	3	0	0	30	70	100	3
5	CS05TPEX	Professional Elective-I	3	0	0	30	70	100	3
6	CS05TMC02	Constitution of India	3	0	0	0	0	0	0
	PRACTICAL								
1	CS05PPC05	Relational Data Base Management System Lab	0	0	3	30	20	50	1.5
2	CS05PPC06	Parallel Computing Lab	0	0	3	30	20	50	1.5
3	CS05PPR01	Minor Project- I	0	0	3	30	20	50	1.5
						Total			19.5

Professional Elective-I Subject V Sem.			
S. No.	Subject Code	Subject	Credits
1	CS05TPE01	Software Engineering	3
2	CS05TPE02	Information Theory & coding	3
3	CS05TPE03	Mobile Communication	3
4	CS05TPE04	Multimedia System Design	3

SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
COMPUTER SCIENCE AND ENGINEERING
SCHOOL OF STUDIES IN ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA
THIRD YEAR, SEMESTER - VI
W.E.F. SESSION 2020-21

Branch :- Computer Science & Engg. Year : III Sem- VI

S. No.	Code no.	Subject	Periods			Evaluation Scheme			Credits
			L	T	P	IA	ESE	Total	
1	CS06TPC11	Design and Analysis of Algorithms	3	0	0	30	70	100	3
2	CS06TPC12	Java	3	0	0	30	70	100	3
3	CS06TPC13	Computer Graphics	3	0	0	30	70	100	3
4	CS06TPEX	Professional Elective-I	3	0	0	30	70	100	3
5	CS06TPEX	Professional Elective-II	3	0	0	30	70	100	3
6	CS06TOEX	Open Elective-I	3	0	0	30	70	100	3
	PRACTICAL								
1	CS06PPC07	Design and Analysis of Algorithms Lab	0	0	3	30	20	50	1.5
2	CS06PPC08	Java Lab	0	0	3	30	20	50	1.5
3	CS06PPR02	Minor Project-II	0	0	3	30	20	50	1.5
		Total							22.5

Professional Elective-I & II Subject VI Sem.				Open Elective-I Subject VI Sem.			
S.No	Subject Code	Subject	Credits	S.No.	Subject Code	Subject	Credit
1	CS06TPE05	Digital Image Processing	3	1	CS06TOE01	Management Information System	3
2	CS06TPE06	Robotics	3	2	CS06TOE02	E-Commerce	3
3	CS06TPE07	Artificial Intelligence	3	3	CS06TOE03	Human Resource Management	3
4	CS06TPE08	Software Testing and Quality Assurance	3	4	CS06TOE04	Business Intelligence	3

35

Sem- VII

S No.	Subject Code	Subjects	Period /week			Evaluation Scheme			Total Credit
			L[1]	T[2]	P[3]	IA	ESE	TOTAL	
1	CS7TPC01	Compiler Design	3	1	0	40	60	100	4
2	CS7TPC02	Artificial Intelligence	3	1	0	40	60	100	4
3	CS7TPEXX	PE Choice –I VIIth Semester	3	1	0	40	60	100	4
4	CS7TPEXX	PE Choice –II VIIth Semester	3	1	0	40	60	100	4
5	CS7TOEXX	OE-I VII th Semester	3	0	0	40	60	100	3
	PRACTICAL								
1	CS7LPC01	Compiler Design Lab	0	0	3	30	20	50	2
2	CS7LPC02	Artificial Intelligence Lab	0	0	3	30	20	50	2
3	CS7LPR01	Seminar	0	0	3	30	20	50	2
4	CS7LPR02	Minor Project Lab	0	0	3	30	20	50	2
					Total Credits			700	27

IA- Internal Assessment , ESE – End Semester Examination

Open Elective Subjects VIIth Semester			Credit	Professional Elective Subject VII th Semester			Credit
SN	Subject Code	Subject		SN	Subject Code	Subject	
1	CS7TOE01	Web Technologies	3	1	CS7TPE01	Data Mining	4
2	CS7TOE02	Information Theory and Coding	3	2	CS7TPE02	Wireless Sensor Network	4
3	CS7TOE03	Swarm Intelligence, Co-evolution and Rough Sets	3	3	CS7TPE03	Intrusion Detection System	4
4	CS7TOE04	Digital Image Processing	3	4	CS7TPE04	Cyber Crime and Security	4

Sem- VIII

S. No.	Subject Code	Subjects	Period /week			Evaluation Scheme			Total Credit
			L[1]	T[2]	P[3]	IA	ESE	TOTAL	
1	CS8TPC01	Network Security	3	1	0	40	60	100	4
2	CS8TPEXX	PE-I VIIIth Semester	3	1	0	40	60	100	4
3	CS8TOEXX	OE-I VIIIth Semester	3	1	0	40	60	100	4
	PRACTICAL								
1	CS8LPR01	Major Project	0	0	20	150	100	250	10
2	CS8LPC01	Network Security Lab	0	0	3	30	20	50	2
						Total Credits		600	24

Open Elective Subjects VIII Semester			Credit	Professional Elective Subject VIII Semester			Credit
SN	Subject Code	Subject		SN	Subject Code	Subject	
1	CS8TOE01	Enterprise Resource Management	4	1	CS8TPE01	Soft Computing	4
2	CS8TOE02	Cloud Computing	4	2	CS8TPE02	Introduction to Computational Intelligence	4
3	CS8TOE03	Internet of Things	4	3	CS8TPE03	Neural Network Learning and Fuzzy Systems	4
4	CS8TOE04	Distributed Computing	4	4	CS8TPE04	TCP-IP	4

Subject code/NAME	L	T	P	Credit
CS02TES02/PROGRAMMING FOR PROBLEM SOLVING	3	0	0	3

Unit 1

Introduction to Programming (3 lectures)
Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) -
Idea of Algorithm (3 lectures): steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.
From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Unit 2

Arithmetic expressions and precedence (12 lectures)
Conditional Branching and Loops
Writing and evaluation of conditionals and consequent branching
Iteration and loops
Arrays (6 lectures) Arrays (1-D, 2-D), Character arrays and strings

Unit 3

Basic Algorithms (6 lectures)
Searching ,concept of binary search etc , Basic Sorting Algorithms Bubble sort etc,Finding roots of equations, introduction of Algorithm complexity

Unit *4*

Function (5 lectures)
Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference binary search etc
Recursion functions (5 lectures) Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, etc.

Unit 5

Structure (4 lectures)
Structures, Defining structures and Array of Structures
Pointers (3 lectures) Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

Suggested Text Books

(i) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
(ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Suggested Reference Books

(i) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

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SUBJECT CODE/NAME	L	T	P	Credit
CS02PES03/PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	1.5

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]

Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment

Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions

Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures

Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series

Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation

Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations

Tutorial 7: Functions, call by value:
Lab 7: Simple functions

Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):
Lab 8 and 9: Programming for solving Numerical methods problems

Tutorial 10: Recursion, structure of recursive calls
Lab 10: Recursive functions

Tutorial 11: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures

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31/7/18

SUBJECT CODE /NAME	L	T	P	Credit
CS03TES03/ Computer Organization Architecture	3	1	0	4

UNIT-I

Basic of Computer Organization & Architecture: Introduction, Computer Organization vs. Computer architecture, Von Neumann Architecture vs. Harvard Architecture.

Input & Output Organization: Introduction, Simple Bus Architecture, Types of Buses, I/O Communication Methodologies: Programmed I/O (Polling), Interrupt-driven I/O & Direct Memory Access (DMA), I/O channel & I/O Processor, Accessing I/O device: Memory Mapped I/O, Isolated or I/O Mapped.

UNIT-II

Computer Arithmetic: Introduction, Addition & Subtraction: Addition & Subtraction with Signed-Magnitude Data, Hardware Implementation & Algorithm, Addition & Subtraction with Signed-2's Complement Data, Multiplication Algorithm: Hardware Implementation for Signed-Magnitude Data, Hardware Algorithm, Booth Multiplication Algorithm, Array Multiplier, Division Algorithms: Hardware Implementation for Signed-Magnitude Data & Algorithm , Carry Look Ahead Adder.

UNIT-III

Memory Organization: Introduction, Types of Memory, Memory Hierarchy, Main Memory, Cache Memory, Virtual Memory, Associative Memory.

Processor Organization: Introduction, Control Unit: Hardwired Control Unit, Micro programmed Control Unit, Instruction Set Computer: Reduced Instruction Set Computer (RISC) vs. Complex Instruction Set Computer (CISC).

UNIT-IV

Pipelining: Introduction, Concept of Instruction Pipeline, Design Problems with Pipeline: Structural Hazard, Data Hazard & Control Hazard, Extension in Pipeline Designed: Super Pipelining, Superscalar Processor, Very Long Instruction Width (VLIW) Architecture.

UNIT-V

Multiprocessor System: Introduction, Shared Memory Multiprocessor, Distributed Memory Multiprocessor, Flynn's Classification: Single Instruction Single Data (SISD), Single Instruction Multiple Data (SIMD), Multiple Instruction Single Data (MISD), Multiple Instruction Multiple Data (MIMD), Cache Coherence, Message Passing Model, Cluster Computing, Distributed Computing.

Text Books & References :

Computer System Architecture, M. Morris Mano, Pearson Education India.
Computer Organization & Architecture, W. Stalling, Pearson Education India.
Computer Architecture & Organization, J. P. Hayes, McGraw-Hill India.
Computer System Organization, Naresh Jotwani, Mc Graw Hill, India.
Computer System Architecture, P. V. S. Rao, PHI India.
Advanced Computer Architecture, Rajiv Chopra, S. Chand India.
Computer Organization & Architecture, Lalit K. Arora, Anjali Arora, S. K. Kataria & Sons, India.
Computer Fundamentals Architecture & Organization, B Ram, Sanjay Kumar, New Age International, India.

SUBJECT CODE /NAME	L	T	P	Credit
CS03TPC01/ Digital logic & Design	3	1	0	4

UNIT-I BINARY SYSTEM

Binary Number , Number Base conversion , Octal and Hexadecimal Numbers Complements, Binary Codes Binary Storage and Registers , Binary Logic , Integrated Circuits

BOOLEAN ALGEBRA AND LOGIC GATES:

Basic Definitions Axiomatic Definition of Boolean algebra .Basic Theorems and Properties of Boolean algebra Boolean Functions Canonical and Standard Forms .Other Logic Operations Digital Logic Gates . IC Digital Logic Families ,NAND, NOR, EOR gates.

UNIT II BOOLEAN FUNCTIONS COMBINATION LOIGC

The map method Two and Three Variable Maps, Four Variable Map Product of sums Simplification, NAND and NOR implementation, Don't Care Conditions. The Tabulation Method

COMBINATIONAL LOGIC Introduction, Design procedure Adders, Sub tractors .Code Conversion, Analysis Equivalence Functions

UNIT III COMBINATIONAL LOGIC WITH MSI AND LSI

Introduction Binary Parallel Adder, Decimal, Adder, Magnitude Comparator, Decoders, Multiplexers, Read – Only Memory (ROM), Programmable Logic Array (PLA) Concluding Remarks

UNIT IV SEQUENTIAL LOGIC

Introduction, Flip –Flops, triggering of Flips –Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment. Flip –Flop Excitation Tables Design Procedure. Design of Counters, Design with State Equations.

UNIT V REGISTERS, COUNTERS, MEMORY UNIT & FPGA PROGRAMING

Introduction, Registers, shift Registers .Ripple Counters, Synchronous Counters. Timing Sequences, The Memory Unit Examples of Random Access Memories, FPGA: Introduction, FPGA Programming

Text Books & References :

- Digital Logic & Computer Design PH1 M Mano
- Switching Circuit & Finite automata –ZVI Kohavi (TMH)
- Fletcher W.I.: An engineering approach to Digital design PH1

SUBJECT CODE /NAME	L	T	P	Credit
CS03TPC02/ IT workshop (C++ /python)	3	1	0	4

Unit 1 : Abstract data types and programming environment.
TC++ Environment, variables, Compilation and Linking steps, functions and parameters Object identity, concept of Classes. arrays, control statements. C++ in different plate forms DOSBOX etc.

Unit 2 : Object-oriented programming
Programming using Class and objects, Encapsulation, Constructors, Destructors ,Copy constructor ,memory management operators.

Unit 3: Advance concepts of Object-oriented programming
Pointers, Polymorphism operator and function overloading, Inheritance in object oriented design, Brief concepts of Aggregation ,Generalization, Specification. Design concepts Flowchart , Decision table

Unit 4:File handling
Streaming and File input and output handling

Unit 5 : Introduction to Research tool
Introduction of Python Programming , applications of python for research ,Programming Environment, Data representation, Elementary Basic programming in python.

Text books & References:

1. Object Oriented Programming with C++ by E Balaguruswami, TMH
2. Object Oriented Programming with C++ by Robert Lafore, Waite Group
3. Introduction to python by Bill Luboveni by O'Relly
4. Object Oriented Programming with C++ by M P Bhave S,A. Patekar, Pearson Education
5. The Complete reference by Herbit Schildt,Mc Graw Hill
6. The C++ Programming Language,Bajanstroustrup ,Addition Wesley
7. C++ premier by F.B. Lippman, Addition Wesley
8. Machine Learning Tom M. Michell,Mc Graw Hill ,Indian addition
9. Applied Machine Learning by M. Gopal ,McGraw Hill Education

SUBJECT CODE /NAME	L	T	P	Credit
CS03TPCO3/ Computer Network	3	1	0	4

UNIT I OVERVIEW OF DATA COMMUNICATION AND NETWORKING:
Introduction; Data communications: components, data representation, direction of data flow(simplex, half duplex, full duplex)
Networks: distributed processing, network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN,WAN);Internet: brief history, internet today; Protocols and standard
Reference models: OSI reference model, TCP/IP reference model, their comparative study
PHYSICAL LAYER:
Overview of data(analog & digital), signal(analog & digital), transmission (analog & digital)& transmission media (guided & non-guided); TDM, FDM, WDM

UNIT-II DATA LINK LAYER:
Types of errors, framing(character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ
Medium access sub layer: Point to point protocol, token ring, Reservation, polling, concentration; Multiple access protocols: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA

UNIT III NETWORK LAYER:
Internetworking & devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway; Addressing : Internet address, classful address, subnetting
Routing : techniques, static vs. dynamic routing , routing table for classful address; Routing algorithms: shortest path algorithm, flooding, distance vector routing, link state routing;
Protocols: ARP, RARP, IP, ICMP, IPV6

UNIT IV TRANSPORT LAYER:
Process to process delivery; UDP; TCP; Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, choke packets; Quality of service: techniques to improve Qos.

UNIT V APPLICATION LAYER:
DNS; SMTP, SNMP, FTP, HTTP & WWW;
Security: Cryptography, user authentication, security protocols in internet, Firewalls.
Modern topics

Text Books & References :

1. B. A. Forouzan – "Data Communications and Networking (3rd Ed.) " – TMH
2. S. Tanenbaum – "Computer Networks (4th Ed.)" – Pearson Education/PHI
3. W. Stallings – "Data and Computer Communications (5th Ed.)" – PHI
4. & Akhtar, Network for Computer Scientists & Engineers, OUP
5. Kurose and Rose – " Computer Networking -A top down approach featuring the internet" – Pearson Education
6. Zheng Comer – "Internetworking with TCP/IP, vol. 1, 2, 3(4 th Ed.)" – Pearson Education/PHI

SUBJECT CODE /NAME	L	T	P	Credit
CS03TBS05/ Mathematics III (Numerical Methods)	3	1	0	4

UNIT- I Introduction of Errors and their Analysis, types of errors, numerical problems on error analysis, curve fitting: method of least squares, fitting of exponential curves$y = ae^{bx}$, fitting of the curve $y = ab^x$, fitting of the curve $y = ax^b$.Method of moments

UNIT- II Numerical Solution of Algebraic and Transcendental Equations: Graphical method bisection Method, Secant Method, Regula-falsi Method, Newton Raphson Method, Solution of a system of simultaneous linear algebraic Equations Direct methods: Gauss elimination Method, Gauss Jordan method, Iterative methods Jacobi Iterative Method, Gauss Seidel Iterative method.

UNIT- III The Calculus of Finite Differences: Finite differences, Difference formula, operators and relation between operators. Inverse Operator, Interpolation with equal intervals: - Newton's forward and backward interpolation formula. Interpolation with Unequal intervals: - Lagrange's interpolation Newton's differenceformula, inverse interpolation.

UNIT- IV Numerical Differentiation and Integration: - Numerical Differentiation Newton's forward and Backward difference interpolation formula. Maxima and Minima of aTabulated function, Numerical Integration :-Trapezoidol rule, simpson's (1/3) rd and (3/8) th rule, Boole's rule, weddle rule.
Difference Equations: Definition ;order and degree of a difference equation, Linear difference equations, Difference equations reducible to Linear form, simultaneous difference equations with constant coefficients.

UNIT- V Numerical solution of ordinary differential equation : Taylor series method, Euler's method, Modified Euler method Runge's method Runge-Kutta method, numerical method for solution of partial differential equations. General linear partial differential equation.Laplace equation and Poisson equation.

Books Recommended :

1. JAIN & IYNGAR Numerical Methods for Scientific and Engineering Computations.
2. RAO G.S. Numerical Anlysis.
3. Grewal B S Numerical Methods In Engineering and Science.
4. Das K K Advance Engineering Methods.
5. Rajaraman V Computer Oriented Numerical Methods
6. P. Kandasamy K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
7. S. S. Sastry, Introduction methods of Numerical Analysis, PHI, 4th Edition, 2005.
8. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

SUBJECT CODE /NAME	L	T	P	Credit
CS04TPC04/ Discrete Mathematics	3	1	0	4

Module 1:

Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

Module 2:

Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination. Principle of Mathematical Induction, The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor, Euclidean Algorithm, The Fundamental Theorem of Arithmetic.

Module 3:

Propositional Logic: Basic Connectives and Truth Tables, Logical Equivalence, The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers.

Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

Module 4:

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Module 5:

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Colouring, Colouring maps and Planar Graphs, Four colour conjecture, trees and rooted trees, binary trees.

Suggested books :

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth Publishing Co. Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer Oriented Approach, 3rd Edition by, Tata McGraw – Hill.

Text Books & References :

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application to Computer Science", TMG Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw - Hill

SUBJECT CODE /NAME	L	T	P	Credit
CS04TES04/ Electronic Device & Circuits	3	0	0	3

UNIT –I JUNCTION DIODE AND ITS APPLICATION:

Properties of P-N Junction, Open Circuited P-N Junction, Current component of PN Diode, V-I Characteristics, Temperature dependence of V-I Characteristics, Diode resistance, Diode as a rectifier-Half wave & Full wave rectifier, Clipper, Clamper.

UNIT –II BIPOLAR JUNCTION TRANSISTOR AND FET:

Introduction to Bipolar Junction Transistor, Transistor current components. Transistor as an amplifier, Transistor construction, Transistor Circuit Configuration (Common Base , Common Emitter, Common Collector) and Characteristics CE current gain, Analytical expression for transistor characteristics. Introduction to JFET, MOSFET, V-I and Transfer characteristics of JFET.

UNIT – III LOW FREQUENCY TRANSISTOR AMPLIFIER:

Graphical Analysis of CE amplifier, h-parameter Models, Transistor hybrid model, Analysis of Transistor amplifier using H-Parameter for CB, CE, CC configurations, Comparison of Transistor Amplifier Configuration, Darlington Pair.

HIGH FREQUENCY: CE hybrid-pi model: Validity and parameter Variation, Current Gain with Resistive load, frequency response of a single stage CE Amplifier, Gain-Bandwidth product.

UNIT-IV FEEDBACK AMPLIFIER:

Classification of feedback amplifier, Feedback concept, Properties of feedback amplifier, Effect of feedback on gain and impedance, Emitter and Source follower.

OSCILLATOR: Barkhausen criteria, Wien bridge, Tuned, Hartley, Colpitt and RC Phase shift oscillators.

UNIT –V OPERATIONAL AMPLIFIERS:

OPAMP Symbol and terminal characteristics, Block Schematic of OPAMP, Ideal OPAMP Characteristics, Practical OPAMP Characteristics, Inverting Amplifier, Non-Inverting Amplifier, Voltage Follower, Adder, Substractor, Comparator, Integrator, Differentiator, IC Timer-555, Introduction to Multivibrators, Monostable, Bistable, Astable Multivibrator.

Text Books & References :

- Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman & Halkias, TMH.
- Electronic Devices and Circuit Theory – Boylestad & Nashelsky, 8th Ed. PHI.
- Electronic Devices & Circuits – Allen Mottershead, PHI

SUBJECT CODE /NAME	L	T	P	Credit
CS04TPC05/ Operating System	3	1	-	4

UNIT I

Introduction to Operating System objective and function . system components system services , system structure ,batch interactive , time –Sharing and real time operating system ,Protection. The introduction of window NT,DOS, Window 07, Unix ,Linux (Red hat)

UNIT II

Concurrent Process : Process concepts , principal of concurrency , the producer consumer problem , the critical section problem , semaphore, classical problem in concurrency , inter process communication , process generation , process scheduling .

UNIT III

CPU Scheduling : scheduling concepts , performance criteria scheduling algorithms. algorithm evaluation , multiprocessor scheduling .

I/O management and Disk scheduling I/O devices and organization of the I/O functions. I/O buffering disk I/O operating system design issues .

UNIT IV

Dead Locks system models , deadlock characterization , prevention , avoidance and detection recovery from deadlock , combined approach.

UNIT V

Memory Management : Base machine , Residence monitor , multiprogramming with fixed partition , multiprogramming with variable partitions, multiple base register , paging , segmentation , paging segmentation, virtual memory concepts , demand paging performance , page replacement algorithms , allocation of frames, thrashing , cache memory organization impact on performance .

Text Books & References :

1. Milenkovic M. , "Operating System concepts ", MGH
2. Tanenbaubm A. S. "Operating System design and implementation ", PHI
3. Silberschartz A.and Patterson J.l. , " Operating system concepts ", Wisley.
4. Stilling William " Operating System ", Maxwell McMillan International Edition 1992.
5. Dectel H.N. , "An introduction to operating system ", Addision Wisley.

SUBJECT CODE /NAME	L	T	P	Credit
CS04TPC06/ Data Structure & Algorithms	3	1	-	4

UNIT I: String algorithms, pattern search and editing, Arrays algorithms, development simple examples of algorithm development, complexity, Divided & conquer, binary search, selection sort, insertion sort, merge sort, quick sort complexity of sorting.

UNIT II: Linear list: Stacks, application of Stacks, arithmetic notations, recursion, queues and circular queues, Linked list definition, insertion and deletion of nodes, circular and doubly linked list, Header nodes.

UNIT III: Trees, AVL trees, Threaded trees, Heap sort, B-tress.

UNIT IV: Graph and representation: graph algorithms, optimization and Greedy methods, minimum spanning tree, shortest path, DFS, BFS search, examples of backtracking sets UNION and FIND operations tables and information retrievals, hashing.

UNIT V: Files: File organization, sequential file, direct file organization, index sequential file organization, Data storage and management.

Text Books & References :

1. Data Structures and Algorithm Analysis in C++, 2/e by Mark Allen Weiss, Pearson Education • Wirth Niclaus , "Algorithm + Data Structure = Programs " PHI
2. Horwitz E. and Sahani S. "Fundamentals and Data Structure ", Computer Science Press.
3. Knuth D. "Threat of Computer Programming ", Vol 1-2 Addision - Wesley
4. Aho A.V.Hopcraft and Ullman J.E. "Data Structure and Algorithms" addsion Wesley ".
5. Tanonbaum , A. M. and Augenstein , M.J. "Data Structure with Pascal" PHI.
6. Trambley and Sorenson "Data Structure using Pascal", MGH.
7. Stubbs D. "Data Structure with Abstract Data Type and Modula 2", Brooks & Cole Fublication Comp.

SUBJECT CODE /NAME	L	T	P	Credit
CS04TPC07/ System Software	3	1	-	4

UNIT I

Machine architecture, CPU Machine Architecture, Simplified Instruction Computer(SIC),SIC/XE, Traditional CISC Machines, VAX Architecture, Pentium Pro Machine Architecture, RISC Architecture, instruction set, addressing modes, Type of addressing modes with example Programming review of syntax of C with emphasis on features like pointers, bit operations.

UNIT II

DOS: Introduction to interrupts, software interrupts, Hardware interrupt, internal structure of DOS, COM & EXE program's BIOS memory resident programs, Running batch files.

UNIT III

Assemblers, Types of Assembler, PASS-I Assembler, PASS-II Assembler, Cross assemblers, two assembler design data structure and algorithms.

UNIT IV

Macro processors: Definitions, nested macro definitions, macro expansion and condtional macro expansion.

UNIT V

Introduction of Linker, Loader, Types of Loader, loading and relocation, static and dynamic linking, Editors, Types of Editors, Debuggers, Programming environments.

Text Books & References :

1. System Software : An Introduction to Systems Programming, 3/e by Leland L. Beck, Pearson Education
2. Donovan J. J. "System Programming ", TMH
3. Dhamdhare D.M. " Introduction to system software's" ,TMH 1986
4. Michael Tischer , " PC System Programming ", Abacus.
5. Cooper Mullish, " The Sprit of C, An Introduction to modern programming ", Jaico publication New Delhi 1987.
6. Dhamdhare " System Programming And Operating System ", TMH
7. Gottfried , " Programming with C, Schaum Series ", TMGH.

Sub Title: MICROPROCESSOR AND INTERFACES		
Sub Code: CS05TES05	No. of Credits : 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To describe the basic architecture of 8086.
2. To discuss the Instruction set of 8086.
3. Evaluate the different technique of interfacing with memory and IO devices.
4. Develop knowledge about interfacing devices and peripheral devices.
5. To describe the basic architecture of 80386 and co-processor.

UNIT No	Syllabus Content	No of Hours
1	Microprocessor Architecture -8086, Register organization of 8086, Signal descriptions of 8086 chip, Physical Memory organization, Introduction to Maximum and Minimum mode operation, Processor 8088.	8
2	Instruction formats, Addressing modes, Instruction Set of 8086: Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Shift and rotate instructions, String Manipulation instructions, Machine Control Instruction, Flag Manipulation Instruction, Assembler Directive and Operators, Programming with an Assembler, Programming examples.	7
3	Introduction to Stack, Stack Structure of 8086, Interrupt, Interrupt and Interrupt Service Routines, Non Maskable Interrupt, Maskable Interrupt. Subroutine, MACROS: Defining a MACRO, Passing Parameters to MACRO.	7
4	Memory Interfacing, Interfacing I/O Ports, Programmable Interval Timer 8253: Architecture and Signal Description, Operating modes, Programming and Interfacing 8253, DMA Controller 8257: Architecture and Signal Description, Keyboard/Display Controller 8279: Architecture and Signal Description, Mode of Operation, Floppy Disk Controller 8272: Architecture and Signal Description, Commands.	7
5	Multi microprocessor System: Numeric Processor 8087, IO Processor 8089, 80386: Features, Architecture and Signal Description, Register Organization, Real Mode, Protected Mode, Virtual Mode, Paging, Segmentation.	7

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Sub Title: FORMAL LANGUAGE AND AUTOMATA THEORY		
Sub Code: CS05TPC09	No. of Credits : =3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To learn fundamentals of Regular and Context Free Grammars and Languages
2. To understand the relation between Regular Language and Finite Automata and machines.
3. To learn how to design Automata's and machines as Acceptors, Verifiers and Translators.
4. To understand the relation between Contexts free Languages, PDA and TM.
5. To learn how to design PDA as acceptor and TM as Calculators.
6. To learn how to correlate Automata's with Programs and Functions.

UNIT No	Syllabus Content	No of Hours
1	**Finite Automata & Regular Expression:** Deterministic and Non-deterministic Finite automata, Regular Expression, Two way finite automata, Finite automata with output, Properties of regular set, Pumping lemma, Closure	8
2	**Context Free Grammars (CFG):** Introduction of CFG, Derivation trees, Simplification of normal forms, CNF, GNF, Regular Grammars, Unrestricted Grammars and Relations between Classes of languages.	7
3	**Push Down Automata:** Introduction of PDA, Definitions relationship between PDA and Context Free Languages, properties of CGL's, Decision Algorithms.	7
4	**Turing Machine:** The Turing machine model, Computable languages and functions, Modification of Turing machines, Church's Hypothesis	7
5	**Recursive and Recursive Enumerable Languages:** Properties of recursive and recursive enumerable languages Universal Turing machine, Undesirability Post correspondence problem, Introduction to Recursive function theory.	7

Sub Title: PARALLEL COMPUTING		
Sub Code: CS051PC10	No. of Credits : 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To introduce parallel, distributed and cloud computing, the major concept, ideas and various hardware model of parallel and distributed system.
2. To study design the multiprocessor system by various interconnection network like static and dynamic etc.
3. To study various technique for vector pipeline architecture design to achieve parallelism (concurrency)
4. To study about advanced and more power full processor technology
5. To study about parallel algorithm design, programming language and tools like Python, CUDA. To study about architecture design of GPU.

UNIT No	Syllabus Content	No of Hours
1	**Introduction Of Parallelism:** Introduction -parallelism in Uniprocessor systems, Principles of Scalable Performance, architectural classification schemes, SISD, SIMD, MISD, MIMD architectures, multiprocessor and multicomputer, UMA, NUMA, COMA, NORMA model Parallel algorithms: Various Soritng	8
2	**Parallel Models & Interconnection Network:** System Interconnect architecture – static, dynamic, multistage interconnection networks, design considerations throughputs, delay, blocking and non-blocking properties interconnected memory organization - C-Access, S-Access, C-S access.	7
3	**Pipeline & Vector Processing:** Principal of Pipelining - Over lapped parallelism, principal of Liner pipelining processor, General pipelining and reservation tables, arithmetic pipelining, Design of pipeline Instruction units, arithmetic pipelining design example, hazard detection and resolution, JOB sequencing and collision prevention, vector processing function organization of instructions in IBM 360/91.	7
4	**Advanced Processor and Parallelism:** Advanced processor technology – RISC & CISC computers, super scalar architecture, principles of multithreading, multithreaded architectures of MP systems. Context switching policies, shared variables, locks, semaphores, monitor, multitasking and Cray multiprocessor.	7

5	**Parallel Programming Design Coding And Dubugging:** CPU parallelism, GPU parallelism- program, Exploiting parallelism in programmed-multidimensional arrays, directed acyclic graphs, distance and direction vectors, data flow computer and data flow graphs. Parallel algorithm structure, analyzing parallel algorithm. Elementary parallel algorithms, Programming: Parallel programming with Synchronous and Asynchronous, Various API of MPS, PYTHON, CUDA, OpenCL.	7

COURSE OUTCOMES: The students would have learnt

CO1: Spontaneously able to design the multiprocessor system with various hardware electronics circuit like CU, ALU, RAM etc.
CO2: Design new interconnection network which connects the processors and other devices like input and output devices (I/O)
CO3: Spontaneously try and invented a new type of pipeline processor architecture in which throughput can be as better as possible than all other.
CO4: How do combine the techniques of parallelism to obtain a more power full architecture as a outcome.
CO5: Course outcomes are skills and abilities to make parallel algorithm and program to enhance the speed up of execution of process.

Text Books:

1. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs.(MGH).
2. Advanced Computer Architecture with Parallel Programming", K. Hwang, MGH.
3. Quinn, Parallel computing – theory and practice, Tata McGraw Hill.
4. Sima and Fountain, Advanced Computer Architectures, Pearson Education
5. Ed. Afonso Ferreira and Jose' D. P. Rolin, Parallel Algorithms for irregular problems - State of the art, Kluwer Academic Publishers

Reference Books:

1. Parallel Computers: Arch.& Prog., Rajaraman & Siva Ram Murthy, PHI.
2. Parallel computing- Theory and practice - Michael J Quinn- Mc Graw Hill
3. Selim G. Akl, The Design and Analysis of Parallel Algorithms, PH International.

Sub Title: SOFTWARE ENGINEERING		
Sub Code: CS05TPE01	No. of Credits :3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To discuss the fundamental concepts of Software Engineering.
2. To discuss the Various Models of Software.
3. Acquire skills and knowledge to advance their career, including continually upgrading professional, communication, analytic, and technical skills.
4. To Learn the ability to work effectively as a team member and/or leader in an ever-changing professional environment
5. Learn to develop a small Software.

UNIT No	Syllabus Content	No of Hours
1	**Software Engineering:** What is software, Evolution of Software, Characteristics of software, Types of Software, Applications of software, Layered Technology , **Software Process Models:** Linear Sequential model, Prototype model, RAD model, Incremental model, Spiral Model, Component Based Development Model.	8
2	**Managing Software Project** **The Management Spectrum:** People, Product, Process, Project. Software Process and Project Metrics – Measures and Metrics , Software Measurement-Size Oriented Metrics, Function Oriented Metrics, Metrics for Quality-Overview, Measuring Quality, DRE. Software Requirement Specification-Problem Analysis, Requirement Specification. Validation and verification, The Make /Buy Decision.	7
3	**System Design:** Introduction, design principles, Problem partitioning, abstraction, top-down and bottom-up design, Low level Design:- Modularization, Structure Chart, Flow chart, Functional versus Object oriented approach, design specification, Design verification, monitoring and control.	7

4	**Coding:** Top-down and bottom-up structured programming, information hiding, programming style, internal documentation, verification, monitoring and control. **Software testing:** Software Testing fundamentals, white box testing, Basis path testing, Cyclomatic Complexity, A strategic Issues, Unit testing, Integration testing, validation testing, System Testing.	7
5	**Software Project Management:** Cost estimation, project scheduling, Software configuration management, Quality assurance, Project Monitoring, Risk management.	7

COURSE OUTCOMES: The students would have learnt

CO1: The Fundamentals Of Software Engineering
CO2: How to apply the software engineering lifecycle
CO3: Understand of different software architectural styles and Process frame work.
CO4: Describe software measurement and software risks.
CO5: To Develop a Project.

Text Books:

1. Software Engg by Bharat bhushan agrawal, Sumit Prakash Tayal,

Reference Books:

1. Software Engg by Pressmen
2. Software Engg by Pankaj Jalote
3. Software Project Management by Manish Kumar Jha.

Sub Title: DESIGN AND ANALYSIS OF ALGORITHMS		
Sub Code: CS06TPC11	No. of Credits : 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To Analysis efficiency of algorithms on the basis of their time complexity and space complexity by mathematically foundation (asymptotic notation)
2. To study about design and analysis of divide and conquer and greedy algorithm on the basis of their attributes and also describe when could be used these technique and which situation for which problem
3. To know dynamic programming(DP) paradigm and algorithm for problems on the different data structure like graph and array
4. Know a branch and bound technique and backtracking technique for problems
5. Know the classes of problems like P,NP on their basis of nature (running time complexity)

UNIT No	Syllabus Content	No of Hours
1	**Algorithms Analysis:** Space and Time Complexity, Asymptotic Notations, mathematical foundations: growth functions, complexity analysis of algorithms, Recursive algorithms, analysis of no-recursive and recursive algorithms, Recurrences equation and their solution. Master method, recursive tree and backward substitution method.	8
2	**Divide & Conquer and Greedy Method:** Divide and conquer-Finding Maxima and Minima Binary search, Merge Sort, Quick Sort, and selection sort. Stassen's Matrix multiplication Greedy method-introduction, Knapsack problem, travelling sales person problem, Minimum Spanning trees- kruskal's algorithm, prim's algorithm, Single source shortest path-Dijkstra's algorithm, Huffman codes.	7
3	**Dynamic Programming and Search Techniques:** Dynamic Programming: Introduction, Matrix chain multiplication, Single source shortest path-Bellman-Ford, all pairs shortest path, optimal binary search tree, o/1 knapsack problem, travelling sales person problem, longest common subsequence Search techniques: Techniques for binary trees, techniques for graphs –DES and BFS, connected components, Bi-connected components, and Strongly-connected components, Topological sorting. **Heap Data Structure:** Min and Max Heap, Fibonacci Heap, Binomial heap, Amortized Analysis, Heap sort.	7

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4	**Back Tracking and Branch and Bound:** Backtracking: Back tracking and Recursive back tracking, applications of back tracking paradigm, the 8-queen problem, graph coloring, Hamiltonian cycles. **Branch and Bound:** introduction, 0/1 knapsack problem, travelling sales person problem, Least Cost (LC) search – the 15-puzzle problem.	7
5	**Complexity Class Theory and Pattern Matching :** Problem classes, Optimization problem, decision making problem, P VS NP VS NPC VS NPH, Venn diagram and their analysis, deterministic and non-deterministic polynomial time algorithm, Cook Levin theorem, Verification algorithms for some NP Class: subset sum problem, clique problem, vertex cover, independent set problem, Circuit Satisfiability problem, 2-SAT, 3-SAT etc. Pattern matching: Basic concept of pattern reorganization and their algorithms.	7

COURSE OUTCOMES: The students would have learnt

CO1: Technique to calculate and obtain the running time complexity and space complexity of any kind of algorithm.

CO2: Design divide and conquer and greedy algorithm for problems and at the same time they will able to know that which data structure are adequate to enhance the running time complexity.

CO3: Spontaneously able to described and analyze the dynamic-programming (DP) algorithm moreover when an algorithmic design situation calls for it and can construct a new DP algorithm for given a particular problem.

CO4: Spontaneously able to construct and design branch & bound and backtracking algorithm for a particular problem on the basis of the problem nature analysis and requirement.

CO5: Analyzed and write verification algorithm for some NP and NPH class problems.

Text Books:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald Rivest, Clifford Stein, "Introduction to Algorithm" ,Publisher PHI. ISBN 81-203-2141-3
2. Sanjoy Dasgupta, Christos H. Papadimitriou and Umesh V. Vazirani, Algorithms, Tata McGraw-Hill, 2008
3. Jon Kleinberg and Éva Tardos, Algorithm Design, Pearson, 2005.
4. Michael T Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Interne Examples, Second Edition, Wiley, 2006.

Reference Books:

1. Udi Manber, Algorithms – A Creative Approach, Addison-Wesley, Reading, MA, 1989.
2. Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins, 1997

Sub Title: JAVA		
Sub Code: CS06TPC12	No. of Credits : 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To discuss the fundamental concepts of OOPs and Java
2. To discuss the Differences between C/C++ and Java.
3. Knowledge of Multithreading, Packages and Applet.
4. Use of Java on different Platform.
5. Learn to develop a small project using Java

UNIT No	Syllabus Content	No of Hours
1	**Java Fundamentals:** Basic Concepts of Object-Oriented Programming, Java History, Java Features, How Java Differs from C and C++, Web Browsers, Java Environment, Java Program Structure, Java Tokens, Installing and Configuring Java, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style.	8
2	Constants, Variables and Data Types, Declaration of Variables, Giving values to variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Java Operators, Arithmetic Expression, Evaluation of Expressions, Precedence of Arithmetic Operators, Operator Precedence and Associativity, Mathematical Functions, Control Statements (if statement, switch statement and Conditional operator statement), Decision Making and Looping (while construct, do construct, for construct), Jumps in Loops.	7
3	**Class,Objects and Methods:** Introduction of Class, Defining a Class, Fields Declaration, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, **Inheritance:** Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Abstract Methods and Classes, Visibility Control **Introduction of Array:** One Dimensional Array, Creating an array, Two-Dimensional arrays, Strings, Wrapper Classes. **Interfaces:** Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, **Packages:** Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes, Static Import.	7

4	**Introduction to Multithreaded Programming:** Difference between Multithreading and Multitasking, Creating threads, Extending the thread class, Stopping and Blocking a thread, Life Cycle of a thread, Using thread Methods, Thread Exception, Thread Priority, Synchronization, Implementing the Runnable Interface, Inter-thread Communication. **Managing Errors and Exceptions:** Types of Errors, Exceptions, Syntax of	7
5	Introduction of Applet Programming, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML file, Running the Applet, Passing Parameters to Applets, Aligning the Display, Displaying Numeric values, Getting input from the user, Event handling, Introduction of Graphics Programming, Introduction to AWT package, **Managing Input/Output Files in Java:** Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Other useful I/O classes, Using the file class, Input/Output exceptions.	7

COURSE OUTCOMES: The students would have learnt

CO1: Understanding of basic concept of Java Programming
CO2: Knowledge of the structure of Java.
CO3: The Concept of Exception Handling, Package and Applet
CO4: To use the Java programming language for various programming technologies (understanding)
CO5: To develop a software in the Java programming language.

Text Books:

1. E.Balagurusamy, Programming with Java A Primer, Fourth Edition, McGrawHill, 2010.

Reference Books:

1. H.Schildt, Java TM 2: The Complete Reference, Fourth Edition, Tata McGrawHill, 2001.
2. K. A. Mughal and R. W. Rasmussen, A Programmer's Guide to Java TM SCJP
3. Certification A Comprehensive Primer, Third Edition, Addison Wesley, 2008.

Sub Title: COMPUTER GRAPHICS		
Sub Code: CS06TPC13	No. of Credits : 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.
2. To learn the basic principles of 3-dimensional computer graphics.
3. Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
4. Provide an understanding of mapping from a world co-ordinates to device coordinates, clipping, and projections.
5. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
6. To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles, and applications.

UNIT No	Syllabus Content	No of Hours
1	Line Generation Points, lines, Plaines Vector, pixels and frame buffers, Vector and character generation. Graphics Primitives, Display devices, Primitive operation, Display- file structure, Display control text.	8
2	**Polygons:** Polygons representation, Entering polygons, Filling Polygons. Transformation: Matrices of 2D Transformation, transformation routines Display procedures.	7
3	**Segments:** Segments table, Creating Deleting and renaming a segment Visibility, Image transformation. **Windowing and Clipping:** Viewing transforming, Clipping, Generalized clipping, multiple windowing.	7
4	**Three Dimensions:** 3-D Geometry Primitives, Transformation, Projection, Clipping, Hidden line and SurfacesBack-face Removal Algorithms, Hidden line methods.	7
5	**Rendering and Illumination:** Introduction to curve generation. Bezier, Hermit and B-spline algorithms and their comparisons.	7

Sub Title: DIGITAL IMAGE PROCESSING		
Sub Code: CS06TPE05	No. of Credits : 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To discuss the fundamental concepts of digital image processing
2. To discuss the various image transform with respect to basic functions, properties and application.
3. To discuss image enhancement technique in spatial and frequency domain.
4. To discuss image segmentation and restoration technique in spatial and frequency domain.
5. To discuss the simple image processing technique.

UNIT No	Syllabus Content	No of Hours
1	**Digital Image Fundamentals:** Background, digital image representation, examples of field that use DIP, fundamental steps in digital image processing, Simple image model, basic relationships between pixels: neighborhood of a pixel, Connectivity, Basic transformations: translational, rotational, scaling. Color models and transformations, Pseudo color Image Processing.	8
2	**Image Transforms:** Introduction to 2D Transforms: Fourier Transform and Properties, DCT and Properties, Hadmard Tranformand Properties,WHT and properties **Image Compression:** Fundamentals, image compression models, elements of Information theory, Image Compression: lossy and non lossy compression, image compression standards.	7
3	**Image Enhancement Spatial Domain:** Background, Basic gray level transformations, histogram: Computation histogram , histogram specification, histogram equalization, enhancement using arithmetic/logic operations, basics of spatial filtering, smoothing sharpening spatial filters, combining spatial enhancement methods. **Edge Detection Methods:** Prewit, Sobeland Robert **Frequency Domain:** Background, introduction to the frequency domain, smoothing and sharpening frequency domain filters, homomorphic filtering, generation of spatial masks from frequency domain specifications.	7
4	**Image Segmentation:** Detection of discontinuities, edge linking & boundary detection, thresholding, Region based segmentation, morphological water sheds, the use of motion in segmentation	7

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5	**Image Restoration :** Degradation model, Noise models, restoration in the presence of noise only (Spatial and frequency domain filters),Inverse filtering, LMS filtering, Wiener filter, constrained least square restoration, interactive restoration, restoration in the spatial domain	7

COURSE OUTCOMES: The students would have learnt

CO1: Understanding of basic image processing techniques. CO2:Image analysis using 2-D image transforms
CO2: Image enhancement technique in spatial and frequency domain
CO3: Image processing application such as compression, segmentation and restoration.
CO4: Learn to apply different image processing technique.

Text Books:

1. Digital Image Processing, R C Gonzalez & R E Woods, PearsonEducation,3 edition.
2. Digital Image Processing and Computer Vision, Milan Sonka, Cengagelearning, Firstedition.

Reference Books:

1. Digital Image Processing, S.Jayaraman,S.Esakkirajan, T.Veerakumar, Tata McgrawHill,2009.
2. Fundamentals of Digital Image processing, A K Jain, PHI/PearsonEducation,1989.
3. Digital Image Processing, Sid Ahmed, McGraw Hill.

Sub Title: ARTIFICIAL INTELLIGENCE		
Sub Code: CS06TPE07	No. of Credits : 3=3: 0: 0(L-T-P)	No of lecture hours/week :03
Exam Duration : 3 hours	IA+ESE=30+70	Total no of contact hours:36

COURSE OBJECTIVE:

1. To create appreciation and understanding of both the achievements of AI and the theory underlying those achievements.
2. To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
3. To review the different stages of development of the AI field from human like behavior to Rational Agents.

UNIT No	Syllabus Content	No of Hours
1	Introduction of Artificial Intelligence(AI), Difference between Intelligence and Artificial Intelligence, Definitions of AI, Strong AI and Weak AI, Application areas of AI, Comparison of Conventional and AI Computing, History of AI, Turing Test, Branches of AI, Intelligent Agents, State Space Representation, Production System, Heuristic Search, Search Methods (Uninformed Search and Informed Search), Breadth First Search, Depth First Search, Difference between Breadth First Search and Depth First Search, Hill Climbing, Best First Search.	8
2	Role of Knowledge Representation in AI, Types of Knowledge, Properties of Knowledge Representation System, Categories of Knowledge Representation Scheme, First Order Predicate Calculus, Well Formed Formula in Predicate Logic, Conversion to Clausal Form, Resolution in Predicate Logic, Semantic Nets, Properties of Semantic Nets, Frames, Scripts, Advantages and Disadvantages of Scripts.	7
3	Introduction of Expert System, Comparison between Human Expert and Expert System, Comparison between Expert System and Software System, Difference between Knowledgebase and Database, Basic Components of an Expert System, Characteristics of Expert System, Life Cycle Development of Expert System, Advantages of Expert System, Limitation of Expert System, Expert System Tools, Existing Expert Systems (DENDRAL and MYCIN).	7

4	**Introduction to LISP :** Syntax and Numeric Functions, Working with GNU CLISP, Basic Data Objects in GNU CLISP, Basic List Manipulation Functions in GNU CLISP (setq, car, cdr, cons, list, append, last, member, reverse), User Defined Functions in GNU CLISP, Predicates (atom, equal, evenp, 69odell, oddp, zerop, >=, <=, listp, null) and Conditionals (cond and if) in GNU CLISP, Logical Functions (not, or, and) in GNU CLISP, Input / Output and Local Variables (read, print, princ, terpri, format, let, prog) in GNU CLISP, Recursion and Iteration(do) in GNU CLISP, Arrays in GNU CLISP	7
5	Introduction to PROLOG, Term, Ground Term, Function, Predicate, Features of PROLOG, Program Clause, Unit Clause, Logic Program, Goal Clause, Empty Clause, Simple Query, Conjunctive Query, Structure of PROLOG Program, Working with SWI-Prolog General Syntax of PROLOG, Execution of a Query in Logic Program (Ground Query and Non-Ground Query), Law of Universal modus ponen, Ground Reduction, PROLOG Control Strategy, Search Tree and Proof Tree, Relational and Arithmetic Operators, Recursion in PROLOG, Lists manipulation in PROLOG, Iterative programming in PROLOG.	7

COURSE OUTCOMES: The students would have learnt

CO1: Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.
CO2: Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them.
CO3: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
CO4: Attain the capability to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
CO5: Formulate and solve problems with uncertain information using Bayesia approaches.
CO6: Apply concept Natural Language processing to problems leading to understanding of cognitive computing

Text Books:

1. E. Rich and K. Knight, Artificial Intelligence, Forty Sixth Edition, Tata McGrawHill, 2007.
2. D.W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Tenth Edition, Prentice Hall of India, 2001.

Reference Books:

1. S. Kaushik, Logic and Prolog Programming, New Age International Limited, 2006.

Class: Bachelor of Technology Seventh Semester Computer Science and Engineering
Subject Name: Compiler Design
Subject Code: CS7TPC01

UNIT-I

Overview of translation process., Definition, Phases of Compiler, Lexical analysis: Introduction, Functions of lexical Analysis, automatic generation of lexical analyzers.

UNIT-II

Parsing theory: Introduction, Difference between Top Down and bottom up parses. Different Types of Parsers : Predictive Parser, Shift-Reduce Parser, LR Parsers(SLR, CLR, LALR), Operator Precedence Parser Automatic generation of parsers.

UNIT-III

Intermediate code generation: Different intermediate forms: Syntax tree , TAC , Quadruples, Triples, , Indirect Triples, Syntax directed translation mechanism and attributed definition.
Code Optimization: Global data flow analyses, A few selected optimizations like command sub expression removal, loop invariant code motion, strength reduction etc.

UNIT-IV

Code generation: DAG , Machine model, order of evaluation, registers allocation and code selection, Code generation algorithm.

UNIT-V
Run time theory management: static memory allocation and stack based memory allocation schemes. Symbol table management.

References:

1. A.V.Aho, Ravi Sethi, J.D.Ullman, *Compilers tools and Techniques*, Addison Wesley.
2. D.M.Dhamdhere, *Compiler Construction-Principles and practice*, Macmillan, India.
3. Tremblay J.P. and Sorenson, *P.G. the theory and practice of compiler writing*, McGraw Hill.
4. Waite W.N. and Goos G., *Compiler construction*, Springer Verlag.
5. Gulshan Goyal, *Compiler Design* , Sun India publication.
6. Anamika Jain, *Compiler Design*.

Class: Bachelor of Technology Seventh Semester Computer Science and Engineering
Subject Name: Artificial Intelligence
Subject Code: CS7TPC02

UNIT-I

Introduction of Artificial Intelligence(AI), Difference between Intelligence and Artificial Intelligence, Definitions of AI, Strong AI and Weak AI, Application areas of AI, Comparison of Conventional and AI Computing, History of AI, Turing Test, Branches of AI, Intelligent Agents, State Space Representation, Production System, Heuristic Search, Search Methods (Uninformed Search and Informed Search), Breadth First Search, Depth First Search, Difference between Breadth First Search and Depth First Search, Hill Climbing, Best First Search.

Unit-II

Role of Knowledge Representation in AI, Types of Knowledge, Properties of Knowledge Representation System, Categories of Knowledge Representation Scheme, First Order Predicate Calculus, Well Formed Formula in Predicate Logic, Conversion to Clausal Form, Resolution in Predicate Logic, Semantic Nets, Properties of Semantic Nets, Frames, Scripts, Advantages and Disadvantages of Scripts.

Unit-III

Introduction of Expert System, Comparison between Human Expert and Expert System, Comparison between Expert System and Software System, Difference between Knowledgebase and Database, Basic Components of an Expert System, Characteristics of Expert System, Life Cycle Development of Expert System, Advantages of Expert System, Limitation of Expert System, Expert System Tools, Existing Expert Systems (DENDRAL and MYCIN).

Unit-IV

Introduction to LISP : Syntax and Numeric Functions, Working with GNU CLISP; Basic Data Objects in GNU CLISP, Basic List Manipulation Functions in GNU CLISP (setq, car, cdr, cons, list, append, last, member, reverse), User Defined Functions in GNU CLISP, Predicates (atom, equal, evenp, numberp, oddp, zerop, >=, <=, listp, null) and Conditionals (cond and if) in GNU CLISP, Logical Functions (not, or, and) in GNU CLISP, Input / Output and Local Variables (read, print, princ, terpri, format, let, prog) in GNU CLISP, Recursion and Iteration(do) in GNU CLISP, Arrays in GNU CLISP.

Unit-V

Introduction to PROLOG, Term, Ground Term, Function, Predicate, Features of PROLOG, Program Clause, Unit Clause, Logic Program, Goal Clause, Empty Clause, Simple Query, Conjunctive Query, Structure of PROLOG Program, Working with SWI-Prolog, General

Syntax of PROLOG, Execution of a Query in Logic Program (Ground Query and Non-Ground Query), Law of Universal modus ponen, Ground Reduction, PROLOG Control Strategy, Search Tree and Proof Tree, Relational and Arithmetic Operators, Recursion in PROLOG, Lists manipulations in PROLOG, Iterative programming in PROLOG.

Recommended books:

Text Book:

1. E. Rich and K. Knight, *Artificial Intelligence*, Forty Sixth Edition, Tata McGrawHill, 2007.
2. D.W. Patterson, *Introduction to Artificial Intelligence and Expert Systems*, Tenth Edition, Prentice Hall of India, 2001.
3. S. Kaushik, *Logic and Prolog Programming*, New Age International Limited, 2006.

Other References:

1. www.wikipedia.org
2. www.tutorialspoint.com

Class: Bachelor of Technology Seventh Semester Computer Science and Engineering
Subject Name: Data Mining
Subject Code: CS7TPE01

UNIT-I

Data Ware Housing :- Introduction, Multidimensional data model, OLAP Operation , Warehouse schema ,Data Ware Housing Architecture, Warehouse Server, Metadata , OLAP , engine. Data Mining:- Introduction, KDD Vs. Data mining, DBMS Vs DM , DM Techniques , Other mining problem , Issues & Challenges in DM , DM Application Areas.

UNIT-II

Association rules: -Introduction, methods to discover association rules, A Priori Algorithm, Partition Algorithm, Pincer –Search algorithm , Dynamic Item set counting algorithm , FP-tree Growth algorithm , Incremental algorithm, Border algorithm.

UNIT-III

Clustering Techniques :- Introduction , clustering paradigms , partitioning algorithms, k-Medoid Algorithm, CLARA ,CLARANS , Hierarchical clustering , DBSCAN , BIRCH, CURE, Categorical clustering algorithms , STIRR, ROCK , CACTUS.

UNIT -IV

Decision Trees:-Introduction, Tree construction principal , Best spilt splitting indices, splitting criteria , Decision tree construction algorithm, CART, ID3, C4.5 , CHAID , Decision tree construction with presorting , Rainforest , CLOUDS, BOAT .

UNIT-V

Web Mining: - Web mining, Web content mining, Web structure mining, Web usage mining, Textmining, Episode rule discovery for texts, Hierarchy of categories, text clustering.

Books & References:-

1. Arun K Pujari , *Data Mining techniques*, Universities press.
2. Jiaweihan , Michelinekamber , *Data Mining concepts & techniques*, Morgan Kaufmann publisher Elsevier India.
3. Cios , Pedrycz , swiniarski, *Data Mining methods for knowledge Discovery*, Kluwer academic publishers London.

Class: Bachelor of Technology Seventh Semester Computer Science and Engineering
Subject Name: Wireless Sensor Network
Subject Code: CS7TPE02

UNIT- I

Wireless Sensor Network: Introduction, Architecture, Hardware and Software used in Wireless Sensor Network.

UNIT- II

Sensor network application: Motion monitoring, Environmental monitoring, Generic Architecture, Sensor network Evolution.

UNIT- III

Wireless Sensor Network : Design , Goals and Issues , Sensor deployment, Scheduling and coverage issues, self-configuration and topology control, Querying, data collection and processing, Collaborative information processing and group connectivity.

UNIT- IV

Wireless Sensor Routing Protocols: Data Centric, Hierarchical, Location based, Energy efficient routing

UNIT- V

Sensor Network Challenges- Miniaturization, power management, scalability, remote management, usability, standardization and security, System Challenges- Tiny OS, Network Sensor Platforms.

Books & References:-

1. Robert Faludi Binding , *Building Wireless Sensor Networks* , Paperback Publisher: O'reilly.

2. Zhao Feng, Guibas Leonidas, *Wireless Sensor Networks*, Binding: Paperback Publisher: Elsevier India.

3. C. S Raghavendra, Krishna M. Sivalingam, TaiebZnati , *Wireless Sensor Networks*, Binding: Paperback Publisher: Springer/bsp Books.

Class: Bachelor of Technology Seventh Semester Computer Science and Engineering
Subject Name: **Web Technologies**
Subject Code: **CS7TOE01**

UNIT-I

Fundamentals of Web, History of the Web, Growth of the Web in post decade, Web function. Security aspects on he web, Computational features encompassing the Web. Working Web Browsers, concepts of search Engines, Searching the Web, Web Servers.

UNIT-II

Internet: - Networks, Client & Server, WWW, URL, HTTP, Internet requirements, Internet Services, Internet Java Script introduction, operators, statements, loops, object manipulation, function, objects, events handler, always, events.

UNIT-III

HTML: - Introduction, cascading style sheets, content positioning HTML content, Downloadable fonts, vising Java Script with positioned content, Layer object, Handling events using localized scripts, Animating images, VB script, Introduction, Adding VB script to Web Range, Working with variables, constants, arrays, objects, conditional statements loop statements, Forms.

UNIT-IV

Active Server Page(ASP)Introduction , Hs Internet Information System , A authentication , Basic authentication , NT challenge response , active server page, asp objects , server objects , file system objects , session ,accessing database with an ASP page, create an ODBC ADO connection object, common methods & Properties events , collections ADO record set object.

UNIT-V

XML :- Introduction, TO XML ,XML schemas ,DOM structure model, using XML queries. Building a path , Sharing functions. Introduction of personal home page (PHP) design.

References:

1. Achyut S Goldbole and atul khute, *Web Technology*, Tata McGraw Hill.
2. Gopalan NP Akilandeswari, *Web Technology : A neveloper's perspechive* , PHI.
3. C Xavier, *Web Technology & Design*, Tata McGraw Hill.

Department of Computer Science & Engineering, IT, GGV, Bilaspur (Chhattisgarh) India

Class: **Bachelor of Technology Eighth Semester Computer Science and Engineering**
Subject Name: **Network Security**
Subject Code: **CS8TPC01**

UNIT-I

Services , Mechanisms ,and Attacks , The OSI Security Architecture , A Model for Network Security , symmetric cipher model , substitution techniques Transposition techniques, Rotor machines , Steganography .

UNIT-II

Block ciphers and the Data Encryption Standard , simplified DES , Block cipher principles , The data Encryption Standard ,The Strength of DES. Differential and Linear Cryptanalysis ,Block Cipher Design principles ,Block Cipher Modes of Operation , Evaluation Criteria for AES The AES cipher , Triple DES , blowfish , RC5, RC4 Stream Cipher ,

UNIT–III

Principles of Public –Key Cryptosystems , Public –Key Cryptosystems , Applications for public –Key Cryptosystems , Requirements for public –Key Cryptosystems , Public –Key Cryptosystems , The RAS Algorithm , Computational Aspects , The Security of RSA , Key management , Distribution of public keys , public –Key Distribution of Secret Keys , Differ – Hellmann Key Exchange,

UNIT-IV

Web Security :Web Security Threats , Web Traffic Security Approaches , SSL Architecture , SSL Record Protocol , Change Cipher Spec Protocol ,Alert Protocol , Handshake Protocol , Cryptographic Computations ,Transport Layer Security , Secure Electronic Transaction ,

UNIT V

Intruders : Intrusion Techniques ,Intrusion Detection , Audit Records , Statistical Anomaly Detection ,Rule –Based Intrusion Detection ,The Base –Rate Fallacy , Distributed Intrusion Detection , Honeypots , Intrusion Detection Exchange Format Firewall Design principles , Firewall Characteristics , Types of Firewalls , Firewall Configurations .

Reference Books :

1. William Stallings, *Cryptography and Network Security* , Principles and Practice.

Class: Bachelor of Technology Seventh Semester Computer Science and Engineering
Subject Name: **Digital Image Processing**
Subject Code: **CS7TOE04**

UNIT- I

Introduction to Image Processing: Overview, Digital Image Representation,Types of Image,Image Processing steps, Application. Digital Imaging Systems: Overview, Physical Aspects of Image acquisition, sampling, Quantization, Image storage and formats.

UNIT-II

Digital Image Transform: Types of Image transform, Basis for transform, Fourier transform, Discrete Cosine transform, sine transform, Walsh transform, Hadamard transform, Haar transform, Slant transform.

UNIT-III

Image Enhancement : Need for Image Enhancement, Image Enhancement operation, Image Enhancement in Spatial Domain, Histogram based Techniques, Spatial Filtering concept, Image smoothing and sharpening in spatial Domain and Frequency Domain.

UNIT-IV

Image Restoration: Introduction to Degradation, types of Image Degradation, Noise Modeling, Image Restoration in presence of Noise: Mean filters,Geometric mean filter, Median filter, Maximum andMinimum filter, Midpoint filter, Band pass filter. Image Restoration Technique: Unconstrained method and constrained method.

UNIT-V

Image Compression: fundamental of Image compression, Compression Algorithm and its types, lossless compression algorithm and lossy compression algorithm.

References Books:

1. Gonzalez and Woods, *Digital Image Processing*, Pearson Education.
2. S.Sridhar, *Digital Image Processing*, Oxford University Press.
3. Jayaraman, Esakkirajan and Veerakumar, *Digital Image Processing*, TMH.
4. Anil Jain, *Fundamentals of Digital Image Processing*, PHI Learning.
5. Sonka, Hlavac and Boyle, *Digital Image Processing and Computer Vision*, Cengage Learning.

Class: Bachelor of Technology Eighth Semester Computer Science and Engineering
Subject Name: **Enterprise Resource Management**
Subject Code: **CS8TOE01**

UNIT-I

ERP: An Overview, Enterprise – An Overview, Benefits of ERP, ERP-I, ERP-II, Function of Business Organizations: Business Models, Functions and Integrated View of ERP for Accounting Financial Management, Marketing and Sales Management, Manufacturing Managements, Human Resource Management etc., Sales Order Processing.

UNIT-II

Business Functions and Processes ,Mainstream, Supportive and Administrative Processes in Enterprise, ERP and Related Technologies- Business Process Reengineering (BPR) Characteristics, Building Steps, Difference Between Business Improvement and BPR, Types of BPR etc. Electronic Commerce, Brief Introduction of Knowledge Based System, AI and Expert System, Networking and Multi Tier Architecture. Data Warehousing, Data Mining, OLAP, SCM.

UNIT-III

Management Information System: MIS, DSS,EIS and ESS, Data & Information, Levels of Management, Characteristics of Information, Information Attributes, Quality Issues of Information Prevention of Misuse of Information, etc.

UNIT-IV

Information and Planning: MRP, MRP-II, Forecasting and it's Varies Aspects, Qualitative and Quantitative Forecasting, Various Methods in Forecasting, Scheduling Like Single Machine/Job Scheduling etc.

UNIT-V

ERP Implementation: Lifecycle, Software Development Life Cycle, Pre-Evaluation Schemes, Post-Implement Issues, Hidden Costs, , Implementation Methodology, Vendors, Case Studies.

Text Books

1. Leon Alexis, *Enterprise Resource Planning*, McGraw-Hill.
2. Kenneth C. Laudon, J. P. Laudon, *Management Information Systems*, Pearson Education

Department of Computer Science & Engineering, IT, GGV, Bilaspur (Chhattisgarh) India

Class: Bachelor of Technology Eighth Semester Computer Science and Engineering
Subject Name: **Soft Computing**
Subject Code: **CS8TPE01**

UNIT-I

Introduction of Soft Computing, Difference between Hard and Soft Computing, Introduction of Artificial Neural Network (ANN), Features of Biological Neural Networks, Biological Neural Network, Performance Comparison of Computer and Biological Neural Network, Historical Development of Neural Network Principles, Benefits of Neural Networks, Basic Elements of Artificial Neural Network, Basic Representation Techniques of Artificial Neural Network (Block Diagram Representation, Signal Flow Graph, Architectural Graph) , Activation Functions, Network Architectures (Single-Layer Feed-forward, Multi-Layer Feed-forward and Recurrent Network), Examples of Artificial Neural Network Systems.

Unit-II

Mendel and McClaren Definition of Learning in the Context of Neural Network, Error Correction Learning, Hebbian Learning, Competitive Learning, Supervised and Unsupervised Learning, Some Basic Artificial Neural Network Models: McCulloch-Pitts Model and Rosenblatt's Perceptron Model, Delta Learning Rule, Widrow-Hoff Learning Rule, Construction of Logic Gates (AND, OR, NOR, NAND, NOT) using Artificial Neural Network, XOR Problem, Tourtzky and Pomerleau solution to the XOR problem, Backpropagation Algorithm, Multilayer Perceptron, Adaline, Madaline.

Unit-III

Introduction of Fuzzy Logic, Crisp Sets, Operations on Classical Sets, Properties of Crisp Sets, Fuzzy Sets, Membership Function, Fuzzy Set Operations, Properties of Fuzzy Sets, Crisp Relations, Operations on Crisp relations, Fuzzy Relation, Operation on Fuzzy Relations, FAM System Architecture, Similarities and Dissimilarities between Fuzzy Logic and Neural Networks.

Unit-IV

Introduction to Genetic Algorithms(GA), Genetic Algorithms, Flowchart of GA, Some Genetic Representations (Binary Representation, Octal Representation, Hexadecimal Representation), Selection, Genetic Operators, Mutation, Brief Introduction to Evolutionary Programming, Brief Introduction to Swarm Intelligence.

Unit-V

Introduction to Application of ANN, Direct Application (Travelling Salesman Problem), Application Areas (NETtalk, Phonetic Typewriter, Recognition of Handwritten Digits), Neural Truck Backer-Upper Control System, Fuzzy Truck Backer-Upper Control System, Comparison of Fuzzy and Neural Truck Backer-Upper Control Systems.