

**Scheme and Syllabus of
B.E. (Computer Science and Engineering)
3rd TO 8th Semester 2013-2014**

**University Institute of Engineering and
Technology,
Panjab University, Chandigarh**

Scheme of Examination of B.E. in Computer Science & Engineering
Second Year - Third Semester

Sr.No	Paper Code	Subject Title	Scheme of Teaching					Univesity External Marks	Internal Sessional Marks	Total
			L	T	P	Hours	Credits			
1.	CSE311	Data Structures	3	1	0	4	4	50	50	100
2.	CSE361	Data Structures (Practical)	0	0	3	3	2	-	50	50
3.	CSE313	Peripheral Devices & Interfaces	3	1	0	4	4	50	50	100
4.	CSE363	Hardware Lab (Practical)	0	0	2	2	1	-	50	50
5.	AS301	Engineering Mathematics – III	3	1	0	4	4	50	50	100
6.	EC316	Digital Electronics	3	1	0	4	4	50	50	100
7.	EC366	Digital Electronics (Practical)	0	0	2	2	1	-	50	50
8.	EC317	Microprocessors	3	1	0	4	4	50	50	100
9.	EC367	Microprocessors (Practical)	0	0	2	2	1	-	50	50
Total			15	5	09	29	25	250	450	700

Second Year -Fourth Semester

Sr.No	Paper Code	Subject Title	Scheme of Teaching					University External Marks	Internal Sessional Marks	Total
			L	T	P	Hours	Credit			
1.	CSE411	Analysis & Design of Algorithms	3	1	0	4	4	50	50	100
2.	CSE461	Analysis & Design of Algorithms (Practical)	0	0	3	3	2	-	50	50
3.	CSE412	Database Management System	3	1	0	4	4	50	50	100
4.	CSE462	Database Management System (Practical)	0	0	3	3	2	-	50	50
5.	CSE414	Object Oriented Programming	3	1	0	4	4	50	50	100
6.	CSE464	Object Oriented Programming (Practical)	0	0	3	3	2	-	50	50
7.	ASC405	Cyber Law & IPR	3	0	0	3	3	50	50	100
8.	CSE 415	Computer Architecture & Organization	3	1	0	4	4	50	50	100
Total			15	4	9	28	25	250	400	650

Scheme of Examination of B.E. in Computer Science & Engineering

Third Year - Fifth Semester

Sr.	Paper Code	Subject Title	Scheme of Teaching					Univesity External Marks	Internal Sessional Marks	Total
			L	T	P	Hou rs	Credit s			
1.	CSE511	Operating System	3	1	0	4	4	50	50	100
2.	CSE561	Operating System (Practical)	0	0	3	3	2	-	50	50
3.	CSE512	Software Engineering	3	1	0	4	4	50	50	100
4.	CSE562	Software Engineering (Practical)	0	0	3	3	2	-	50	50
5.	CSE513	Computer Network	3	1	0	4	4	50	50	100
6.	CSE563	Computer Network (Practical)	0	0	3	3	2	-	50	50
7.	CSE514	Principle of Programming Languages	3	1	0	4	4	50	50	100
8.	CSE517	Discrete Structures and Computational Logic	3	1	0	4	4	50	50	100
9.	CSE566	Industrial Training (After 4 th Sem)		-			2	-	50	50
Total			15	5	9	29	28	250	450	700

Third Year - Sixth Semester

Sr.No	Paper Code	Subject Title	Scheme of Teaching					University External Marks	Internal Sessional Marks	Total
			L	T	P	Hrs	Credit			
1.	CSE611	Web Technologies	3	1	0	4	4	50	50	100
2.	CSE661	Web Technologies (Practical)	0	0	3	3	2	-	50	50
3.	CSE612	Distributed Systems	3	1	0	4	4	50	50	100
4.	CSE613	Computer Graphics	3	1	0	4	4	50	50	100
5.	CSE663	Computer Graphics (Practical)	0	0	3	3	2	-	50	50
6.	CSE614	Artificial Intelligence	3	1	0	4	4	50	50	100
7.	CSE664	Artificial Intelligence (Practical)	0	0	3	3	2	-	50	50
8.	CSE615	Modeling & Simulation	3	1	0	4	4	50	50	100
9.	CSE665	Modeling & Simulation (Practical)	0	0	3	3	2	-	50	50
Total			15	5	12	32	28	250	450	700

Scheme of Examination of B.E. in Computer Science & Engineering
Fourth Year - Seventh Semester

Sr. No	Paper Code	Subject Title	Scheme of Teaching					University External Marks	Internal Sessional Marks	Total
			L	T	P	Hrs	Credit			
1.	CSE711	Compiler Design	3	1	0	4	4	50	50	100
2.	CSE761	Compiler Design (Practical)	0	0	3	3	2	-	50	50
3.	CSE712	Multimedia System Design	3	1	0	4	4	50	50	100
4.	CSE713	Software Testing & Quality Assurance	3	1	0	4	4	50	50	100
5.	CSE763	Software Testing & Quality Assurance (Practical)	0	0	3	3	2	-	50	50
6.		Elective -I	3	1	0	4	4	50	50	100
7.	CSE767	Project – I	0	0	6	6	3	-	100	100
8.	CSE768	Seminar	0	0	2	2	1	-	50	50
9.	CSE769	Industrial Training (After 6 th Semester)		-			2	-	100	100
Total			12	4	14	30	26	200	550	750

Elective -I

CSE 714 Information Security

CSE 715 Business Intelligence

CSE 716 Mobile Computing

Fourth Year - Eighth Semester

	Sr. No	Paper Code	Subject Title	Scheme of Teaching					University External Marks	Internal Sessional Marks	Total
				L	T	P	Hr	Credit			
Option 1	1.	CSE811	Advanced Database Systems	3	1	0	4	4	50	50	100
	2.	CSE812	Digital Image Processing	3	1	0	4	4	50	50	100
	3.	CSE862	Digital Image Processing (Practical)	0	0	3	3	2	-	50	50
	4.		Elective –II	3	1	0	4	4	50	50	100
	5.		Elective II (Practical)	0	0	3	3	2	-	50	50
	6.		Elective III	3	0	0	3	3	50	50	100
	7.	CSE858	Project – II	0	0	6	6	3	-	100	100
	Total			12	3	12	27	22	200	400	600
Option 2											
	1.	CSE860	Industrial Training	-	-	-	-	22	200	400	600
	Total			-	-	-	-	22	200	400	600

Elective –II (Theory)		Elective –II (Practical)		Elective –III (Theory)	
CSE 813	Network Programming	CSE 863	Network Programming (Practical)	CSE 816	Soft Computing
CSE814	Visual Programming	CSE864	Visual Programming (Practical)	CSE 817	Embedded Systems
CSE815	Java Technologies	CSE865	Java Technologies (Practical)	CSE 818	Building Enterprise Applications

Conditions for Choosing Option 1 or Option 2 in 8th Semester:

A student may opt for either Option 1 or one semester industrial training (Option 2) in lieu of subjects of 8th Semester (Option1). The marks for six months training will be equal to the total marks of 8th Semester study. A student can opt for six semester training (Option 2) under following conditions:-

- The student got selected for job in campus placement and the employer is willing to take that student for the training.
- The student got offer of pursuing training from reputed government research organization/govt. sponsored projects/govt. research institution provided that student should not be paying any money to get trained. For pursuing this training student needs the prior approval from the Coordinator / Chair Person of the respective branch.

**SYLLABUS FOR
BACHELOR OF ENGINEERING (COMPUTER SC. & ENGG.)
THIRD SEMESTER**

Paper Title: DATA STRUCTURES

Paper Code: CSE311

Credits : 04

Max. Marks (Final Exam): 50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: This course should provide the students with a fairly good concept of the fundamentals of different types of data structures and also the ways to implement them. Algorithm for solving problems like sorting, searching, insertion & deletion of data etc. related to data structures should also be discussed. After completion of this subject student should be able to choose a appropriate data structure for a particular problem.

SECTION – A

Linear Data Structures:

Sequential representations – Arrays (one, two, multi dimensional) and Records, Binary Search, (12)
Stacks, Queues and Circular queues; Link Representation - Linear linked lists, circularly linked
lists. Doubly linked lists, Garbage collection and Compaction.

Recursion:

Design of recursive algorithms, Tail Recursion, When not to use recursion, Removal of recursion. (03)

Sorting Algorithms:

Bubble sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap sort and Radix Sort. (07)

SECTION – B

Non-linear Data Structure:

Trees - Binary Trees, Threaded Binary Trees, Binary Search Trees, Insertion and Deletion (15)
algorithms, AVL trees, B-trees, Application of trees; Graphs - Representations, Breadth-first and
Depth-first Search.

Hashing:

Hashing Functions, collision Resolution Techniques. (02)

File Structures:

Index Techniques: Hashed Indexing, Tree Indexing – B Trees; File Organizations: Sequential, (06)
Random, Linked Organizations, Inverted Files.

Text Books:

1. Y. Langsam, M. J. Augenstein, A. M. : Data Structures using C and C++, 2nd Edition,
Tanenbaum Pearson Education
2. R. Kruse, C. L. Tondo, B. Leung, S. : Data Structures & Program Design in C. 2nd Edition,
Mogalla Pearson Education

References:

1. E. Horowitz, S. Sahni, D. Mehta : Fundamentals of Data Structures in C++, 2nd Edition,
Universities Press
2. Donald E. Knuth : Art of Computer Programming, Volume 1:
Fundamental Algorithms, 3rd Edition, Addison-
Wesley
Art of Computer Programming, Volume 3: Sorting
and Searching, 2nd Edition, Addison-Wesley

Paper Title: DATA STRUCTURES (Practical)

Paper Code:CSE361

Credits : 2

Max. Marks: 50

L T P 0 0 3

Note: At least ten practical should be covered based on the following directions:

Implementation of array operations: Traversal, Insertion & Deletion at and from a given location

Stacks: Implementation of Push, Pop; Conversion of Infix expression to Postfix, Evaluation of Postfix expressions.

Queues: Circular Queue: Adding & deleting elements.

Linked list: inserting, deleting, implementation of stacks & queues using linked lists; Polynomial addition.

Trees: Implementation of Binary & Binary Search Trees, Recursive and Non-recursive traversal of Trees.

Implementation of Graphs

Implementation of sorting and searching algorithms

Hash tables implementation: searching, inserting and deleting

Paper Title: PERIPHERAL DEVICES & INTERFACES

Paper Code:CSE313

Credits : 04

Max. Marks (Final Exam): 50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note:Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions by selecting at least two from each section.

Objectives: The objective of this course is to provide knowledge about integrated circuit memories & the functional details of various peripheral devices.

SECTION – A

The Memory Element:

RAM, Linear Select Memory Organization, Decoders, Dimensions of Memory access, connecting Memory chips to a computer bus, Static RAM, Dynamic RAM, ROM, Digital recording techniques. (12)

System Resources:

Interrupt, DMA Channel, I/O Port Addresses and resolving and resolving the conflict of resources. I/O buses- ISA, PCI, SCSI, EISA, Local bus, VESA Local bus, PCI bus, PCI Express, Accelerated graphics port bus. (10)

SECTION – B

Video Hardware :

Introduction to Multimedia Kit, Multimedia building blocks, Video display technologies, DVI Digital signals for CRT Monitor, LCD Panels, Video adapter types, Integrated Video/ Motherboard chipset, Video RAM, Video driver and multiple Monitor, Graphic accelerators, Advanced 3D Techniques. (12)

Input/ Output Driver software aspects:

Role of device driver, DOS and UNIX/ LINUX device drivers. (11)
Design & Integration of Peripheral devices to a computer system as a Case Study

Text Books:

1. T.C. Bartee : Digital Computer fundamentals, 6th Edition, Tata McGraw Hill.
2. Scott Muller : Upgrading and repairing PC, 16th Edition, Que Publishing.

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Douglas V Hall 2. Silbersehatz and Galvin 3. P. Pal Chandhari 4. Del Corso, H.Kirrmann, JD Nicoud | <p>References:</p> <p>: Microprocessor & Interfacing Programming & H/W, 2nd Edition 1992, Tata McGraw Hill International</p> <p>: Operating System Concepts, Addison Wesley Inc.</p> <p>: Computer Organization and design, Prentice Hall of India Pvt. Ltd. 1994.</p> <p>: Microcomputer buses & links Academic Press 1986.</p> |
|---|---|

Paper Title: HARDWARE LAB. (PRACTICAL)

Paper Code: CSE363
Credits : 02

Max. Marks: 50
L T P 0 0 3

Note: Practical based on:

1. **Introduction to various hardware elements:**
Monitors, Printers, Keyboards, Mouse, Different memory elements.
2. **Different types of buses and their interfaces.**
3. **Assembly of PC**
4. **Introduction to Network elements:**
Routers, Bridges, hubs, Switches, hardware tools and management tools.

Paper Title: ENGINEERING MATHEMATICS-III

Paper Code: AS301
Credits : 04

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions by selecting at least two from each section.

Objectives: The objective of this course is to provide knowledge about engineering mathematics concepts.

SECTION – A

Sequences and Series:

Sequences, Limits of sequences, Infinite series, series of positive terms, Integral test, Comparison test, Ratio test, Root test. Alternating series, Absolute and Conditional Convergence, Leibnitz test. Power series: radius of convergence of power series, Taylor's and Maclaurin's Series, Formulae for remainder term in Taylor and Maclaurin series, Error estimates. (08)
 (Scope as in Chapter 8, Sections 8.1 – 8.10 of Reference 2).

Linear Algebra:

Concept of linear independence and dependence, Rank of a matrix: Row - Echelon form, System of linear equations: Condition for consistency of system of linear equations, Solution by Gauss elimination method. Inverse of a matrix: Gauss -Jordan elimination method. (07)
 (Scope as in Chapter 6, Sections 6.3 - 6.5, 6.7 of Reference 1).

Eigen values, eigen vectors, Cayley- Hamilton theorem (statement only). Similarity of matrices, Basis of eigenvectors, diagonalization. (07)
 (Scope as in Chapter 7, Section 7.1, of reference 1)

SECTION – B

Complex Functions:

Definition of a Complex Function, Concept of continuity and differentiability of a complex function, Cauchy-Riemann equations, necessary and sufficient conditions for differentiability (Statement only). Study of complex functions: Exponential function, Trigonometric functions, Hyperbolic functions, real and imaginary part of trigonometric and hyperbolic functions, Logarithmic functions of a complex variable, complex exponents. (Scope as in Chapter 12, Section 12.3 -12.4, 12.6-12.8 of Reference 1). (08)

Laurent' Series of function of complex variable, Singularities and Zeros, Residues at simple poles and Residue at a pole of any order, Residue Theorem (Statement only) and its simple applications. (Scope as in Chapter 15, Section 15.5, 15.3 of Reference 1) (07)

Conformal Mappings, Linear Fractional Transformations. (Scope as in Chapter 12, Sections 12.5, 12.9 of Reference I) (08)

Text Books:

1. E. Kreyszig : Advanced Engineering Mathematics, 8th Edition, John Wiley.
2. G.B. Thomas, R.L. Finney : Calculus, 9th Edition, Pearson Education.

References:

- 3 Michael D. Greenberg : Advanced Engineering Mathematics, 2nd Edition, Pearson Education.
- 4 R. V. Churchill, J.W. Brown : Complex Variables and Applications, 6th Edition, McGraw Hill, Singapore, 1996.
- 5 VivekSahai , Vikasvisht : Linear Algebra, Narosa Publishing House, New Delhi 2002.

Paper Title: DIGITAL ELECTRONICS

Paper Code: EC316
Credits : 04

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions by selecting at least two from each section.

Objectives:The objective of this course is to provide knowledge about digital electronics circuitry.

SECTION – A

Introduction :

Representation of Logic, Logic Variables, Boolean Algebra, Boolean Expressions and minimization of Boolean expression using K-Map, Review of Logic Gates &, Flip-flops, Design &, Implementation of Adder Subtractor, Multiplexer, DeMultiplexer, Encoder, Decoder, ROM, Digital Comparators, Code Converters (08)

Number System and Code:

Decimal Binary, Hexadecimal, Octal's complement, 2's complement, addition and subtraction, weighted binary codes, Error detecting codes, Error correcting codes, Alphanumeric codes (07)

Counters & Shift Register :

Ripple Counters, Design of Modulo-N ripple counter, Up-Down counter, design of synchronous counters with-and without lockout conditions, design of shift registers with shift-left, shift-right &, parallel load facilities, universal shift registers. (07)

Data Converters :

Sample & Hold switch, D/A converters: Weighted type, R-2R ladder type; A/D Converters: Counter-Ramp' type, Dual Slope Type, Successive approximation type, flash type; Specifications of ADC &, DAC. (08)

SECTION – B**Digital Logic Families :**

Characteristics of digital circuits: Fan in, fan out, power dissipation, propagation delay, noise margin; Transistor-transistor Logic (TTL), TIL, NAND Gate with active Pull Up, its input and output Characteristics, Types of TTL Gates (Schottky, standard, low power, high speed). Emitter Coupled Logic (ECL), ECL gate, its transfer characteristics, level translation in ECL &, TTL, MOS Gates, MOS Inverter, CMOS Inverter, Rise & Fall time of MOS &, CMOS gates, Interfacing TIL &, CMOS Circuits, Comparison of Characteristics of: TTL, ECL, MOS &, CMOS logic circuits, Tristate Logic &, its applications. (07)

Semiconductor Memories & Programmable Logic :

RQM, PROM, EPROM, EEPROM; RAM : Static RAM, Typical Memory Cell, Memory Organization, Dynamic RAM cell, Reading " Writing Operation in RAM, PLA, PAL " FPGA (08)

Text Books:

1. William H. Gothmann : Digital Electronics - An Introduction to Theory and Practice, 2nd Edition.
2. R.P. Jain : Modern Digital Electronics, 2nd Edition, 1997, Tata McGraw Hill

References:

3. J. Herbert Taub & Donald Schilling : Digital Integrated Electronics, Tata McGraw Hill.
4. Millman & Halkias : Integrated Electronics, Tata McGraw Hill.
5. R.J. Tocci : Digital Logic Design, Pearson Education.
6. Morris Mano : Digital System Principles" Applications, PHI Pearson Education.

Paper Title: DIGITAL ELECTRONICS. (PRACTICAL)

Paper Code: EC366

Credits : 01

Max. Marks: 50

L T P 0 0 2

Note: Do any Eight experiments

1. To study truth tables of AND, OR, NOR, NAND, NOT and XOR Gates.
2. To verify the truth tables of RS, of JK and T Flip Flops.
3. To fabricate and test the truth table of half/full adder.
4. To design and implement a Modulo-N Counter.
5. To design and implement a Universal shift register
6. Design and fabrication of synchronous counter
7. Design" fabrication of combinational circuits using Multiplexers
8. To convert 8 bit Digital data to Analog value using DAC.
9. To convert Analog value into 8 bit Digital data using ADC
10. To design and fabricate the given sequential Circuits using Flip-flops as Memory elements

Paper Title: MICROPROCESSORS

Paper Code:EC317

Credit: 04

Max. Marks (Final Exam):50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note:Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: Provide students with the opportunity to gain experience in microprocessor-based system design, assembly language programming, and I/O interfacing to microprocessors.

SECTION – A

Microprocessor Architecture and Microcomputer Systems:

Microprocessor Architecture Memory, Input and Output Devices, The 8085 MPU, Example of an 8085-Based Microcomputer, Memory Interfacing, 4

Interfacing I/O Devices:

Basic Interfacing Concepts, Interfacing Output Displays, Interfacing Input Devices, Memory7" Mapped I/O, Testing and Troubleshooting, I/OInterfacing Circuits. 4

Programming the 8085:

Introduction to 8085 Assembly Language Programming, The 8085 Programming Model, Instruction Classification, Instruction format. Data Transfer (Copy) Operations, Arithmetic Operations, Logic Operations Branch Operations, Writing Assembly Language Programs. 7

Programming Techniques with Additional Instructions:

Programming Techniques Looping, Counting and Indexing, Additional Data Transfer -'arid 16-Bit Arithmetic Instructions, Arithmetic Operations Related to Memory, Logic Operations. 8

SECTION – B

Counters and Time Delays:

Counters and Time Delays, Hexadecimal Counter, Modulo: Ten, Counter, Generating Pulse Waveforms, Debugging Counter and Time-Delay Programs. 5

Stack and Subroutines:

Stack, Subroutine, Conditional Call and Return Instructions. 4

Interrupts:

The 8085 Interrupt, 8085 Vectored interrupts. 5

General-Purpose Programmable Peripheral Devices:

The 82S5A Programmable Peripheral Interface, Illustration: Interfacing Keyboard and Seven- Segment Display, Illustration: Bi- directional-Data Transfer between Two Microcomputers, The 8254 Programmable Interval Timer, The 8259 A Programmable Interrupt Controller, Direct Memory. Access (DMA) and the 8257 DMA Controller, serial communication, Programmable communications interface 8251. 8

Text Book:

1. Ramesh S. Gaonkar : Microprocessor Programming and Architecture, Applications with the 8085, third edition, Publisher (Justified)

References:

1. Charles M.Gilmore : Microprocessor Principles and Applications, Tata McGraw Hill.
2. Douglas V. Hall : Microprocessors and Interfacing programming and Hardware, second edition, Tata McGraw Hill.

Paper Title: MICROPROCESSORS (PRACTICAL)

Paper Code:EC 367

Credit: 02

Max. Marks: 50

L T P 0 0 2

1. Familiarization of 8085 kits.
2. Verification of arithmetic and logic operations using above kits.(At least 5 programs)
3. Development of interfacing circuits of various control applications based on 8085.
4. Application of assembly language using 8085 instructions set to develop various programs.
5. Applications of data movement instructions to develop relevant programs.

**SYLLABUS FOR
BACHELOR OF ENGINEERING (COMPUTER SC. & ENGG.)
FOURTH SEMESTER**

Paper Title: ANALYSIS & DESIGN OF ALGORITHMS

Paper Code:CSE411
Credits : 04

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note:Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions by selecting at least two from each section.

Objectives: The subject will give an insight into performance analysis, measurements and optimization of the various algorithm development techniques. After completing this subject students will be able to choose one algorithm technique for any kind of problem.

SECTION – A

Introduction:

Role of Algorithms in Computing; Growth of functions: Asymptotic Notation, Standard notation & common functions; Introduction to Recurrences: substitution method, recursion-tree method, master method; Randomizing Algorithms; (12)

Divide and Conquer:

Performance analysis of Binary Search, Merge sort, Quick sort, Selection sort; (10)

Greedy Algorithms:

Elements of Greedy strategy, Activity Selection Problem, Knapsack problem, Single source Shortcut paths problem, Minimum Spanning tree problem and analysis of these problems.

SECTION – B

Dynamic Programming:

Elements of dynamic programming, Assembly-line scheduling problem, Matrix-chain multiplication, Multistage Graph, All Pairs Shortest paths, Longest common subsequence, 0/1 Knap Sack. (12)

Back Tracking:

General method, 8 queen's problem, Graph coloring, 0/1 Knap Sack Problem (11)

NP-Completeness:

Polynomial Time, polynomial-time verification, NP-completeness & reducibility, NP-complete problems

Text Book:

- | | | |
|--|---|--|
| 1. Introduction to Algorithms | : | Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest |
| 2. Fundamentals of Computer Algorithms | : | Ellis Horowitz, Sartaj Sahni (Galgotia) |

References:

- | | | |
|--|---|--|
| 1. The Design and Analysis of Computer Algorithms | : | Aho A.V., Hopcroft J.E., Ullman J.D. Pearson Education |
| 2. Introduction to the Design and Analysis of Algorithms | : | Goodman S.E. & Hedetniemi (McGraw-Hill) |

Paper Title: ANALYSIS & DESIGN OF ALGORITHMS (PRACTICAL)

Paper Code: CSE461
Credits : 02

Max. Marks: 50
L T P 0 0 3

Note: Practical based on theory paper to solve problems using following methods:

1. Divide & Conquer
2. Greedy Method
3. Dynamic Programming
4. Backtracking

Paper Title: DATABASE MANAGEMENT SYSTEM

Paper Code: CSE412
Credits : 04

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note: Examiner will set eight questions covering four questions from each section. Candidates will be required to attempt five questions, selecting at least two from each section.

Objectives: This course offers a good understanding of database systems concepts and prepares the student to be in a position to use and design databases for different applications.

SECTION – A

Introduction to Database Systems:

File Systems Versus a DBMS, Advantages of a DBMS, Describing and Storing Data in a DBMS, Database System Architecture, DBMS Layers, Data independence. **(06)**

Physical Data Organization:

File Organization and Indexing, Index Data Structures, Hashing, B-trees, Clustered Index, Sparse Index, Dense Index, Fixed length and Variable Length Records. **(06)**

Data Models:

Relational Model, Network Model, Hierarchical Model, ER Model: Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Database Design with the ER Model, Comparison of Models. **(05)**

The Relational Model:

Introduction to the Relational Model, ER to Relational Model Conversion, Integrity Constraints over Relations, Enforcing Integrity Constraints, Relational Algebra, Relational Calculus, Querying Relational Data. **(05)**

SECTION – B

Relational Query Languages:

SQL: Basic SQL Query, Creating Table and Views, SQL as DML, DDL and DCL, SQL Algebraic Operations, Nested Queries, Aggregate Operations, Cursors, Dynamic SQL, Integrity Constraints in SQL, Triggers and Active Database, Relational Completeness, Basic Query Optimization Strategies, Algebraic Manipulation and Equivalences. **(07)**

Database Design:

Functional Dependencies, Reasoning about Functional Dependencies, Normal Forms, Schema Refinement, First, Second and Third Normal Forms, BCNF, Multi-valued Dependency, Join Dependency, Fourth and Fifth Normal Forms, Domain Key Normal Forms, Decompositions. **(05)**

Transaction Management:

ACID Properties, Serializability, Two-phase Commit Protocol, Concurrency Control, Lock Management, Lost Update Problem, Inconsistent Read Problem, Read-Write Locks, Deadlocks Handling, 2PL protocol. **(06)**

Database Protection:

Threats, Access Control Mechanisms, Discretionary Access Control, Grant and Revoke, Mandatory Access Control, Bell LaPadula Model, Role Based Security, Firewalls, Encryption and Digital Signatures. **(05)**

Text Book:

1. RamezElmasri, ShamkantNavathe : Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2007.

References:

1. C.J. Date : An Introduction to Database Systems, Eighth Edition, Pearson Education.
2. Alexis Leon, Mathews Leon : Database Management Systems, Leon Press.
3. S. K. Singh : Database Systems Concepts, Design and Applications, Pearson Education.
4. Raghu Ramakrishnan, Johannes Gehrke : Database Management Systems, Tata McGraw-Hill.
5. Abraham Silberschatz, Henry F. Korth, S. Sudarshan : Database System Concepts, Tata McGraw-Hill.

Paper Title: DATABASE MANAGEMENT SYSTEM (PRACTICAL)**Paper Code:**CSE462**Credits :** 02**Max. Marks:** 50**L T P 0 0 3**

Note: This practical will enable students to retrieve data from relational databases using SQL. Students will also learn about triggers, cursors, stored procedures etc.

1. Introduction to SQL and installation of SQL Server / Oracle.
2. Data Types, Creating Tables, Retrieval of Rows using Select Statement, Conditional Retrieval of Rows, Alter and Drop Statements.
3. Working with Null Values, Matching a Pattern from a Table, Ordering the Result of a Query, Aggregate Functions, Grouping the Result of a Query, Update and Delete Statements.
4. Set Operators, Nested Queries, Joins, Sequences.
5. Views, Indexes, Database Security and Privileges: Grant and Revoke Commands, Commit and Rollback Commands.
6. PL/SQL Architecture, Assignments and Expressions, Writing PL/SQL Code, Referencing Non-SQL parameters.
7. Stored Procedures and Exception Handling.
8. Triggers and Cursor Management in PL/SQL.

Paper Title: OBJECT ORIENTED PROGRAMMING

Paper Code:CSE 414
Credits : 04

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note:Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: To understand the basic concepts of object oriented programming languages and to learn the techniques of software development in C++.

SECTION – A

- | | |
|--|---|
| 1. Principles of Object Oriented Programming | 2 |
| 2. Tokens, Expressions and control structures, various data types, and data structures, Variable declaration, Operators and scope of operators. | 4 |
| 3. Pointers, Functions, Classes and Objects: Prototyping, referencing the variables in functions, memory allocation for classes and objects, Array of objects, pointers to member functions. | 8 |
| 4. Constructors and Destructors, Operator Overloading and type conversion. | 4 |
| 5. Inheritance: Derived classes, types of inheritance, and various types of classes. | 5 |

SECTION – B

- | | |
|---|---|
| 6. Virtual functions and Polymorphism. | 5 |
| 7. I/O operations on files: Classes for files, Operations on a file, file pointers. | 8 |
| 8. Exception Handling and Generic programming with templates: Introduction to templates, overloading of template functions and Inheritance. | 9 |

Text Book:

- | | |
|----------------------|-------------------------------------|
| 1. Robert and Lafore | : Turbo C++, Galgotia Publications. |
|----------------------|-------------------------------------|

References:

- | | |
|----------------------|---|
| 1. Stephan & PRAT | : C++ Primer Plus, Galgotia Publications. |
| 2. BalaGuruswamy | : Object oriented programming with C++, TATA McGraw Hill |
| 3. Ashok N. Kamthane | : Object-Oriented Programming with ANSI and Turbo C++, Pearson Education. |

Paper Title: OBJECT ORIENTED PROGRAMMING (PRACTICAL)

Paper Code:CSE464
Credits : 02

Max. Marks: 50
L T P 0 0 3

Note: Programs related to:

1. Functions, Classes and Objects
2. Constructors and Destructors
3. Operator Overloading and Type Conversion
4. Inheritance and Virtual Functions
5. Files
6. Exception Handling and Generic Programming

Paper Title: CYBER LAWS & IPR

Paper Code: ASC 405

Credit: 03

Max Marks(Final Exam): 50

Max Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 0 0

Note: Five questions to be attempt out of eight questions

Section –A

Basics of Computer & Internet Technology

(08)

Internet, ISP & domain name; Network Security; Encryption Techniques and Algorithms; Digital Signatures.

Introduction to Cyber World

(02)

Introduction to Cyberspace and Cyber Law; Different Components of cyber Laws; Cyber Law and Netizens.

E-Commerce

(07)

Introduction to E-Commerce; Different E-Commerce Models; E-Commerce Trends and Prospects; E-Commerce and Taxation; Legal Aspects of E-Commerce.

Section –B

Intellectual Property Rights

(12)

IPR Regime in the Digital Society; Copyright and Patents; International Treaties and Conventions; Business Software Patents; Domain Name Disputes and Resolution.

IT Act, 2000

(12)

Aims and Objectives; Overview of the Act; Jurisdiction; Role of Certifying Authority; Regulators under IT Act; Cyber Crimes-Offences and Contraventions; Grey Areas of IT Act.

Project Work

(04)

Candidates will be required to work on a project. At the end of the course students will make a presentation and submit the project report.

Text Books :

A Guide to Cyber Laws & IT Act 2000 with Rules & Notification

NandanKamath

References:

Cyber Cops, Cyber Criminals& Internet

Keith Merill&DeeptiChopra (IK Inter.)

Information Technology Law

Diane Row Land

Handbook of Cyber Laws

Vakul Sharma (McMillian)

Paper Title: COMPUTER ARCHITECTURE AND ORGANIZATION

Paper Code:CSE 415
Credits : 04

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note: Examiner will set eight questions covering four questions from each section. Candidates will be required to attempt five questions, selecting at least two from each section.

Objectives: This course offers a good understanding of the various functional units of a computer system and prepares the student to be in a position to design a basic computer system.

SECTION – A

Register Transfer Language and Micro-Operations:

Basic Concepts, Complements, Fixed and Floating Point Representation, Register Transfer Language, Inter Register Transfer Arithmetic, Bus and Memory Transfers, Arithmetic, Logic and Shift Micro-Operations, Arithmetic Logic Shift Unit. (06)

Basic Computer Origination and Design:

Instruction Codes, Computer Instructions, Timing and Control, Execution of Instructions, Input Output and Interrupt, Design of Basic Computer. (06)

Programming the Basic Computer:

Machine Language, Assembly Language, The Assembler, Program Loops, Programming Arithmetic and Logic Operations, Subroutines, Input-Output Programming. (05)

Central Processing Unit:

General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control. (06)

SECTION – B

Microprogrammed Control and Pipelining:

Control Memory, Address Sequencing, Microinstruction Formats, Pipelining, Arithmetic and Instruction Pipelining. (06)

Computer Arithmetic:

Addition and Subtraction of unsigned Binary Numbers, Addition, Subtraction, Multiplication and Division Algorithm. (05)

Input-Output Organization:

Input-Output Interface, Asynchronous Data Transfer, DMA, Priority Interrupt, I/O Processor, Serial Communication. (06)

Memory Organization:

Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware. (05)

Text Book:

1. M. Morris Mano : Computer System Architecture, Third Edition, Pearson Education.

References:

1. J.P. Hays : Computer Architecture and Organization, Tata McGraw-Hill.

**SYLLABUS FOR
BACHELOR OF ENGINEERING (COMPUTER SC. & ENGG.)
FIFTH SEMESTER**

Paper Title: OPERATING SYSTEM

Paper Code: CS 511
Credit: 04

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note:- Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: This course should provide the students with good understanding of Operating System including its architecture and all its components. Good conceptions on all the subjects like processes, inter-process communication, semaphore, message passing, classical IPC problems, scheduling, memory management, file systems, security and protection mechanism, I/O hardware and software, deadlocks, etc. should be provided

SECTION – A

Introduction: What is an O.S., O.S. Functions; Different types of O.S.: batch, multi-programmed, time sharing, real time, distributed, parallel; General structure of operating system, O/S services, system calls. (5)

Process Management: Introduction to processes - Concept of processes, process scheduling, operations on processes; Inter Process Communication, Critical Sections, Mutual Exclusion with Busy Waiting, Sleep and Wakeup, Semaphores, Message passing; CPU scheduling- scheduling criteria, preemptive & non-preemptive scheduling, Scheduling Algorithms: FCFS, SJF, RR and priority. (10)

Memory Management: background, logical vs. physical address space, memory management without swapping; swapping; contiguous memory allocation, paging, segmentation, segmentation with paging; Virtual Memory, demand paging, performance, page replacement, page replacement algorithms (FIFO, Optimal, LRU); Thrashing. (6)

SECTION – B

File Systems: Files - file concept, file structure, file types, access methods, File attributes, file operations; directory structure, allocation methods (contiguous, linked, indexed), free-space management (bit vector, linked list, grouping), Protection mechanisms. (6)

Secondary Storage : Disk Structure, Disk Scheduling (FCFS, SSTF, SCAN, C-SCAN, LOOK), Disk Management (Disk Formatting, Boot Blocks, Bad Blocks), Swap Space Management (Swap Space use, Swap Space Location, Swap Space Management) (6)

Deadlocks: Introduction to deadlocks, Conditions for deadlock, Resource allocation graphs, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention (6)

Case Studies: Brief introduction of MS-DOS, Windows, UNIX and LINUX. (6)

Text Book:

1. Silberschatz and Galvin : Operating System Concepts”, Addison Wesley Inc.

References:

1. Tanenbaum A.S : Operating System Design & Implementation”, Pearson Education.
2. Bhatt and Chandra : An introduction to Operating Systems Concepts and Practice, Prentice Hall of India Publication
3. Charles Crowley : Operating Systems A Design Oriented Approach, Tata McGraw-Hill Publication.

Paper Title: OPERATING SYSTEM (PRACTICAL)

*Paper Code:*CSE 561

Credit: 02

Note: Practical Problems related to

Max. Marks: 50

L T P 0 0 3

1. Learning Basic Features and Operating Environment of UNIX and LINUX.
2. Introduction to Shell and Shell Commands.
3. Shell programming: creating a script, making a script executable, shell syntax (variables, conditions, control structures, functions, commands).
4. Process: starting new process, replacing a process image, duplicating a process image, waiting for a process.
5. Programming with semaphores.

Paper Title: SOFTWARE ENGINEERING

*Paper Code:*CSE 512

Credit: 04

Max. Marks (Final Exam):50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note: Examiner will set eight questions covering four questions from each section. Candidates will be required to attempt five questions, selecting at least two from each section.

Objectives: This course aims to give students a theoretical foundation in software engineering. Students will learn about the principles and methods of software engineering, including current and emerging software engineering practices and support tools.

SECTION – A

Introduction:

Introduction to Software Engineering, System Engineering Vs Software Engineering, Software Evolution, Software Characteristics, Cost of Software Production, Software Components, Crisis – Problem and Causes, Challenges in Software Engineering.

(05)

Software Process Models:

SDLC, Waterfall Model, Incremental Model, Prototyping Model, Evolutionary Model, Spiral Model, Rapid Application Development Model, Formal Methods, Open Source Development, Object Oriented Life Cycle Model, Agile Methods.

(06)

Project Management Concepts:

Management Activities, Project Planning, Project Scheduling, Size Estimation – LOC, FP; Cost Estimation Models –COCOMO, COCOMO-II.

(06)

Software Requirements Analysis and Specification Concepts:

Requirement Engineering, Requirement Elicitation Techniques, Requirements Documentation, Characteristics and Organization of SRS, Analysis Principles, Analysis Modeling – Data Modeling, Functional Modeling and Behavioral Modeling; Structured vs. Object Oriented Analysis.

(05)

SECTION – B

Software Design and Coding Concepts:

Design Principles, Data Design, Architectural design, Interface Design, Component Level Design, Object Oriented Design Concepts, Cohesion and Coupling and their classification, top-down, bottom-up and middle-out design, Coding, Coding Standards, Coding Conventions, Programming Style.

(06)

Testing:

Verification and Validation, Testing Process, Design of Test Cases, Software Testing Strategies, Unit Testing, Integration Testing, Top Down and Bottom Up Integration Testing, Alpha & Beta Testing, System Testing and Debugging.

(05)**Technical Metrics for Software:**

Software Measurements: What and Why, A Framework for Technical Software Metrics, Metrics for the Analysis Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Software Quality, Metrics for Maintenance.

(06)**CASE (Computer Aided Software Engineering) and Introduction to UML:**

CASE and its Scope, Building blocks of CASE, CASE Tools, CASE Environment, UML Concepts, Use Case Diagrams, Sequence Diagrams, Collaboration Diagrams, Class Diagrams, State Transition Diagrams, Component and Deployment Diagrams.

(06)**Text Book:**

1. Ian Sommerville : Software Engineering, Seventh Edition, Pearson Education.

References:

1. R.S. Pressman : Software Engineering: A Practitioner's Approach, Sixth Edition, McGraw Hill.
2. S.L. Pfleeger, J.M. Atlee : Software Engineering: Theory and Practice, Second Edition, Pearson Education.
3. Douglas Bell : Software Engineering for Students, Fourth Edition, Pearson Education.
4. Pankaj Jalote : An Integrated Approach to Software Engineering, Second Edition, Narosa.
5. K.K. Aggarwal, Yogesh Singh : Software Engineering, Second Edition, New Age International.

Paper Title: SOFTWARE ENGINEERING (PRACTICAL)**Paper Code:**CSE 562**Max. Marks: 50****Credit: 02****L T P 003**

Note: This practical will enable students manage software projects using MS-Project. Students will learn about preparing analysis and design models using UML modeling concepts through Rational Rose. Students will also be exposed to CASE tools.

1. Study the features of MS-Project.
2. Use MS-Project/OpenProj/similar tool to draft project plan for a particular project case study.
3. Use MS-Project/OpenProj/similar tool to generate various reports like Gantt chart, Network diagram, Resource usage sheet.
4. Use MS-Project/OpenProj/similar tool to track the progress of a project.
5. Study the concepts of UML modeling.
6. Use Rational Rose/StarUML/similar tool to generate use case diagrams.
7. Use Rational Rose/StarUML/similar too to generate sequence diagrams.
8. Use Rational Rose/StarUML/similar too to generate class diagrams.
9. Use Rational Rose/StarUML/similar too to generate collaboration diagrams.
10. Study the features of a particular CASE tool for requirements specification, analysis, design and cost estimation.
11. Apply each of the above tools to a particular case study.

Paper Title: COMPUTER NETWORK

Paper Code:CSE 513

Credit: 04

Max. Marks (Final Exam):50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note: Examiner will set eight questions covering four questions from each section. Candidates will be required to attempt five questions, selecting at least two from each section.

Objectives: This course aims to give students a theoretical foundation in software engineering. Students will learn about the principles and methods of software engineering, including current and emerging software engineering practices and support tools.

SECTION – A

Introduction:

Data Communication: Components, Data Flow; Network Categories: LAN, MAN, WAN (Wireless / Wired);
Network Software: Concept of layers, protocols, interfaces and services; Reference Model: OSI, TCP/IP and their comparison;

(06)

Physical Layer :

Concept of Analog & Digital Signal; Bit rate, Bit Length; Transmission Impairments: Attenuation, Distortion, Noise;
Data rate limits: Nyquist formula, Shannon Formula;
Multiplexing: Frequency Division, Time Division, Wavelength Division;
Transmission media: Twisted pair, coaxial cable, fiber optics, wireless transmission (radio, microwave, infrared);
Circuit Switching & Packet Switching..

(08)

Data Link Layer:

Error correction & Detection; Flow & Error Control;
Sliding window protocols: Stop & Wait ARQ, Go back n ARQ, Selective repeat ARQ; Examples of DLL Protocols- HDLC, PPP;
Medium Access Sub layer: Channel Allocation; Random Access: ALOHA, CSMA protocols; Controlled Access: Polling, Reservation, Token Passing;
Examples of IEEE 802.3, 802.11 standards;k

(10)

SECTION – B

Network Layer:

Logical Addressing: IPv4 and IPv6; Packet Formats & their comparison: IPv4 and IPv6;
Routing algorithms: Distance vector, Link State Routing, Hierarchical Routing, Broadcast & Multicast Routing;
Congestion Control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket & Token bucket algorithms

(10)

Transport Layer:

Addressing, flow control & buffering, multiplexing & de-multiplexing, crash recovery;
Example transport protocols: TCP, SCTP and UDP;

(08)

Application Layer:

Network Security; Domain Name System; Simple Network Management Protocol; Electronic Mail;

(03)

Text Book:

1. Andrew S. Tanenbaum : “Computer Networks”, Pearson Education
2. Behrouz A Forouzan : “Data Communication & Networking”, 4th edition, Tata Mcgraw Hill

References:

1. William Stallings : “Data and Computer Communications”, Pearson Education.
2. Douglas E. Comer : “Internet working with TCP/IP”, Pearson Education.

3. Kurose Ross : Computer Networking: A top down approach, 2nd Edition, Pearson Education

Paper Title: COMPUTER NETWORK (Practical)

Paper Code:CSE 563

Credit: 02

Max. Marks: 50

L T P 0 0 3

Note: Practical Problems related to:

1. To familiarize with the various basic tools (crimping, krone etc.) used in establishing a LAN.
2. To study various topologies for establishing computer networks.
3. To familiarize with switch , hub, connectors, cables (cabling standards) used in networks
4. To familiarize with routers & bridges
5. To use some basic commands like ping, trace-root, ipconfig for trouble shooting network related problems.
6. To use various utilities for logging in to remote computer and to transfer files from / to remote computer.
7. To develop a program to compute the Hamming Distance between any two code words.
8. To develop a program to compute checksum for an 'm' bit frame using a generator polynomial.
9. To develop a program for implementing / simulating the sliding window protocol
10. To develop a program for implementing / simulating a routing algorithm
- 11 To study various IEEE standards (802.3, 802.11, 802.16)

Paper Title: PRINCIPLES OF PROGRAMMING LANGUAGES

Paper Code:CSE 514

Credit: 04

Max. Marks (Final Exam):50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note:Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: This course should provide the students with a fairly good concept of fundamental concepts and design issues of programming languages and become familiar with major programming paradigms. Understand similarities and differences between models and know when to use them and also learn programming techniques appropriate for each model.

SECTION – A

Introduction:

Study of principles and major concepts in various programming paradigms like imperative, functional, object-oriented and logic programming. Introduction to various phases of compilers, Formal translation models: BNF Grammars. **5**

Imperative programming:

Location, reference and expressions, assignment and control, data types, blocks, procedures and modules. **10**

Object Oriented Programming: Classes and objects, abstraction and encapsulation, inheritance, Polymorphism, virtual functions and classes, abstract classes.

Logic Programming:

Unification, SLD-resolution, Backtracking, Cuts.

Concepts Of Concurrent Programming: Processes, synchronization primitives. **10**

SECTION – B**Functional Programming:**

Functions as first class objects, higher order functions, polymorphic datatypes, type checking and type inference **10**

Introduction to storage management:

Static storage management, Heap storage management. **10**

Illustration of the above concepts using representative languages: C++, Java, and Prolog etc.

Text Book:

1. Prattt&Zelkowitz, Programming Languages : Design & Implementation, Pearson Education

References:

1. Bruce J. MacLennan : Principles of Programming Languages: Design, Evaluation, and Implementation, Published by Oxford University Press US, 1999, ISBN 0195113063, 9780195113068
2. Friedman, Wand, and Haynes : Essentials of Programming Languages, 2nd ed, MIT Press 2001, ISBN 0262062178, 9780262062176

Paper Title: DISCRETE STRUCTURES AND COMPUTATIONAL LOGIC

Paper Code:CSE 517

Max. Marks (Final Exam):50

Time: 3 Hours

Credit: 04

Max. Marks (Sessional Exam): 50

Total Lectures: 45

L T P 3 1 0

Note:Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: The main aim of this subject is to provide the knowledge of core mathematical foundation of computer science, and to make them familiar with some basic foundation of Artificial Intelligence.

SECTION – A**Set Theory, Relations & Functions:**

Sets, Algebra of Sets, Finite Sets, Power Sets, Partitions, Counting Principles, Product sets , Relations, Type Of Relations, Closure Properties, Equivalence Relations, Partial ordering Relations & Lattice, Functions, Type of Functions, Recursive Functions. **(10)**

Graph Theory & Trees:

Introduction, Graphs Multigraph, Isomorphic Graph, Homeomorphic Graphs, Paths & Circuits, Shortest Paths In waitd Graphs, Eulerian&Hamiltonial Paths & Circuits, Konigsberg Bridge, Complete , Regular, Bipartite Graphs, Planner Graphs, Graph Coloring, Graph Traversal Techniques. **(10)**

Trees, Binary Search Trees , Complete & Extended Binary Trees.

SECTION – B**Propositional Logic:**

Introduction, propositions, compound propositions, basic logical operations, , propositions and truth tables, tautologies and contradiction, logical equivalence, algebra of propositions, conditional and biconditional statements, arguments, logical implications, functions, quantifiers. **(8)**

Predicate logic

Representing- simple facts, instance, and Isa relationship. Computable functions and predicates resolution: conversion to clause form, unification algorithm, resolution in proposition and predicate logic. (7)

Computational Theory

Finite Automata: NFA, DFA, NFA to DFA, state minimization, Moore and Mealy Machines, Regular expressions, grammars, Pushdown automata, Turing Machines. (10)

Text Books:

- | | | |
|--------------------------------|---|---|
| 1. C.L.Liu | : | Elements of Discrete Mathematics, 2 nd Edition, Tata McGraw Hill |
| 2. Hopcroft. J.E., Ullman J.D. | : | Introduction to automata theory, Languages and computation, Narosa, 1979. |

References:

- | | | |
|--|---|---|
| 1. Lipschutz | : | Discrete Mathematics, McGraw Hill |
| 2. Martin. J.C. | : | Introduction to languages and the theory of computation, McGraw-Hill international Editions, Computer Science Series, 1991. |
| 2. B. Kolman, R. C. Busby and S. C. Ross | : | Discrete Mathematical Structures , Prentice Hall of India, 2004 |

**SYLLABUS FOR
BACHELOR OF ENGINEERING (COMPUTER SC. & ENGG.)
SIXTH SEMESTER**

Paper Title: WEB TECHNOLOGIES

Paper Code: CSE 611

Credit: 04

Max. Marks (Final Exam): 50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objective: Aim of this paper is to familiarize the students with current technologies used in Web development and maintenance.

SECTION – A

INTERNET AND WORLD WIDE WEB:

Introduction, Internet Addressing, ISP, types of Internet Connections, Introduction to WWW, WEB Browsers, WEB Servers, URLS, http, WEB applications, Tools for WEB site creation.

(4)

HTML:

Introduction to HTML, Lists, adding graphics to HTML page, creating tables, linking documents, frames, DHTML and Style sheets.

(6)

Java Script:

Introduction, programming constructs: variables, operators and expressions, conditional checking, functions and dialog boxes, JavaScript DOM, creating forms, introduction to Cookies

(11)

SECTION – B

JAVA:

Introduction to java objects and classes, control statements, arrays, inheritance, polymorphism, Exception handling.

(6)

XML:

Why XML, XML syntax rules, XML elements, XML attributes, XML DTD displaying XML with CSS.

(6)

AJAX

Introduction, HTTP request, XMLHttpRequest, AJAX Server Script, AJAX Database.

(6)

PHP

Introduction, syntax, statements, operators, sessions, E-mail, PHP and MySQL, PHP and AJAX.

(6)

Text Books:

- | | | |
|--------------------------------------|---|--|
| 1. Deitel, Deitel, Nieto, and Sandhu | : | XML How to Program, Pearson Education. |
| 2. Herbert Schildt | : | Java 2: The Complete Reference, Fifth Edition, TMH |

References:

1. Ivan Bayross : Web Enabled Commercial Application Development, BPB
2. Schafer : HTML, CSS, JavaScript, Perl, Python and PHP, Wiley India Textbooks.

Paper Title: WEB TECHNOLOGIES (Practical)

Paper Code: CSE 661

Credit: 02

Note: Students have to perform following experiments related to

1. Creation of Web pages using: HTML, DHTML
2. Creation of Web pages using JavaScript
3. Implementing basic concepts of Java
4. Creation of Web pages using AJAX
5. Database and AJAX
6. XML
7. PHP

Max. Marks: 50

L T P 0 0 3

Paper Title: DISTRIBUTED SYSTEMS

Paper Code: CSE612

Credit: 04

Max. Marks (Final Exam): 50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

SECTION – A

Introduction to Distributed Systems:

Definition of distributed systems, their objectives, types, architecture, self management in distributed systems, introduction to XML, SOAP, service oriented architecture.

(06)

Communication:

Interprocess communication, Remote Procedure Call (RPC), Remote Method Invocation (RMI), Remote Object Invocation, Message Oriented Communication.

(06)

Processes:

Introduction to threads, threads in distributed and non distributed systems, virtualization, client side software, design issues for servers, software agents.

(06)

Naming:

General issues with respect to naming, flat naming, structured naming, name resolution, implementation of a name space, domain name system, X.500 name space.

(05)

SECTION – B

Security:

Introduction to security in distributed systems, general issues in authentication and access control, security management: key management, secure group management, authorization management; examples: kerberos, x.509 certificates.

(06)

Distributed Object-based Systems:

Introduction to distributed object based systems, overview of CORBA and DCOM and their comparison. (06)

Distributed File Systems:

Introduction to distributed file systems, their examples: SUN network file system, CODA file system, comparison of distributed file systems. (05)

Document-based Systems:

Introduction to document-based systems, their examples, World Wide Web (WWW), LOTUS NOTES, comparison of WWW and LOTUS NOTES. (05)

Text Book:

1. Andrew S. Tanenbaum: Distributed Systems – Principles and Paradigms, Second Edition, Pearson Education

References:

1. George Coulouris, Jean Dollimore, Distributed Systems – Concepts and Design, Tim Kindberg: Fourth Edition, Pearson Education

2. William Buchanan: Distributed Systems And Networks, McGraw-Hill.

Paper Title: COMPUTER GRAPHICS

Paper Code: CSE613

Credit: 04

Max. Marks (Final Exam): 50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note: Examiner will set eight questions covering four questions from each section. Candidates will be required to attempt five questions, selecting at least two from each section.

Objectives: This course offers a good understanding of computer graphics concepts and prepares the student to be in a position to understand and draw graphics for different applications.

SECTION – A

Overview of Graphics Systems:

Video Display Devices, Direct View Storage Tubes, Flat Panel Displays: Emissive and Non-Emissive Displays; Plasma Panel, Thin Film Electroluminescent and Liquid Crystal Displays, Color Display Techniques: Shadow Mask and Beam-penetration Methods, Three Dimensional Viewing (08)

Devices, Raster Scan Systems, Display Processor, Random Scan Systems, Co-ordinate Representations, Screen Coordinates.

Output Primitives:

Points and Lines, Line Drawing Algorithms: DDA Algorithm, Bresenham's Line Algorithm, (08)
Parallel Line Algorithms, Circle Generating Algorithms, Ellipse Generating Algorithms, Pixel
Addressing and Object Geometry, Boundary Fill Algorithms, Flood Fill Algorithms, Character
Generation, Line, Area-Fill and Character Attributes.

Two Dimensional Geometric Transformations and Viewing:

Basic Transformations: Translation, Rotation and Scaling, Matrix Representations, Composite (08)
Transformations, Viewing Pipeline, Window to Viewport Coordinate Transformation, Clipping
Operations: Line, Polygon, Curve and Text Clipping.

SECTION – B

Three Dimensional Concepts, Transformations and Viewing:

Three Dimensional Display Methods, Three Dimensional Transformations; Three Dimensional (08)
Viewing Pipeline; Viewing Coordinates; Specifying the View Plane, Projections: Parallel
Projections, Perspective Projections.

Splines and Curves:

Curved Lines and Surfaces, Spline Representations, Cubic Splines, Bezier Curves and their (06)
properties, B-Spline Curves.

Visible Surface Detection Methods:

Classification of Visible Surface Detection Methods, Back Face Detection, Depth Buffer, A-Buffer, (07)
Scan Line and Depth-Sorting Methods, Wireframe Methods, Concepts of Computer Animation,
Design of Animation Sequences.

Text Book:

1. Donald Hearn, M.P. Baker : Computer Graphics C Version, Second Edition, Pearson Education.

References:

1. J.D. Foley, A. van Dam, S.K. Feiner, J.F. Hughes : Computer Graphics: principles and practice, Second Edition, Pearson Education.
2. Z. Xiang, R.A. Plastock : Computer Graphics, Second Edition, Schaum's Outlines, Tata McGraw-Hill.
3. N. Krishnamurthy : Introduction to Computer Graphics, Tata McGraw-Hill.
4. David F. Rogers, James Alan Adams : Mathematical Elements for Computer Graphics, Tata McGraw-Hill.
5. S. Harrington : Computer Graphics: A Programming Approach, Tata McGraw-Hill.

Paper Title: COMPUTER GRAPHICS (Practical)

Max. Marks: 50

Paper Code: CSE 663

L T P 0 0 3

Credit: 02

Note: This practical will enable students to draw basic graphics objects, perform transformations and build graphics applications in C.

1. Introduction to graphics programming in C/C++.
2. Initializing graphics system. Basic graphics functions.
3. Drawing lines, circles, ellipses and other common objects.

4. Boundary Fill, Flood Fill and other region filling algorithms.
5. Two dimensional transformations (Translation, Rotation, Scaling Reflection, Shear) on different objects.
6. Clipping algorithms.
7. Programs related to splines and curves, animation sequences.

Paper Title: ARTIFICIAL INTELLIGENCE

Paper Code:CSE 614

Credit: 04

Max. Marks (Final Exam):50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: To introduce the AI techniques to solve problems and search strategies to find optimal solution paths from start to goal state. The course also introduces different knowledge representation methods with introduction to natural language processing and expert systems

SECTION – A

Introduction:

Artificial Intelligence and its applications, Artificial Intelligence Techniques, criteria of success, Intelligent Agents, Nature and structure of Agents, Learning Agents (6)

Problem solving techniques:

State space search, control strategies, heuristic search, problem characteristics, production system characteristics., Generate and test, Hill climbing, best first search, A* search, Constraint satisfaction problem, Mean-end analysis, Min-Max Search, Alpha-Beta Pruning, Additional refinements, Iterative Deepening (9)

Knowledge representation:

Mapping between facts and representations, Approaches to knowledge representation, procedural vs declarative knowledge, Forward vs. Backward reasoning, Matching, conflict resolution, Non-monotonic reasoning, Default reasoning, statistical reasoning, fuzzy logic Weak and Strong filler structures, semantic nets, frame, conceptual dependency, scripts. (8)

SECTION – B

Planning:

The Planning problem, planning with state space search, partial order planning, planning graphs, planning with propositional logic, Analysis of planning approaches, Hierarchical planning, conditional planning, Continuous and Multi Agent planning (6)

Learning :

Forms of Learning, inductive learning, Decision trees, Computational learning theory, Logical formulation, knowledge in learning, Explanation based and relevance based learning, statistical learning, Learning with complete data and hidden variables, instance based learning (10)

Introduction to Natural Language processing and Expert system:

Basic Tasks of Natural Language processing, Expert systems, Expert system examples, Expert System Architectures, Rule base Expert systems, Non Monotonic Expert Systems, Decision tree base Expert Systems. (6)

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Stuart J. Russel, Peter Norvig 2. Elaine Rich, Knight 3. Saroj Kaushik | <p>Text Books:</p> <p>: AI: A Modern Approach, Pearson Education, Latest Edition</p> <p>: Artificial Intelligence, McGraw Hill, 1993</p> <p>: Artificial Intelligence, Cengage Learning, 2011</p> |
|---|--|

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|--|---|
| <ol style="list-style-type: none"> 1. Partick Henry Winston 2. George Luger 3. DAN, W. Patterson 4. A.J. Nilsson | <p>References:</p> <p>: Artificial Intelligence, Addison Wesley, Latest Edition</p> <p>: Artificial Intelligence, Pearson Education, Latest Edition</p> <p>: Introduction to AI and Expert Systems, PHI, latest Edition</p> <p>: Principles of AI, Narosa publications, latest Edition</p> |
|--|---|

Paper Title: ARTIFICIAL INTELLIGENCE (Practical)

Max. Marks: 50
L T P 0 0 3

Paper Code: CSE 664

Credit: 02

Note: Practical Problems related to

1. Program Related to Problem Solving techniques of AI
 - Breadth First Search
 - Depth First Search
 - Heuristic Search
 - Best Search
 - Min-Max Search with alpha-beta pruning
 - Tic-Tac-Toe problem
 - N-Queens and N-Knight problem
 - Unification Algorithm
2. Introduction To AI Languages such as LISP, PROLOG
3. Representing Knowledge using RuleML
4. Using semantic Web
5. Knowledge of using Neural Networks, Fuzz logic, genetic algorithms
6. Other new AI Techniques

Paper Title: MODELING AND SIMULATION

Paper Code: CSE 615

Credit: 04

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: This course should provide the students with good understanding of various techniques of Simulation.

SECTION – A

Introduction: What is modeling and simulation. application areas, definition and types of system, model and simulation, introduction to discrete-event and continuous simulation. (5)

Simulation Methods: Discrete-event Simulation, Time advance Mechanisms, Components and organization of Discrete-event simulation, Flowchart of next-event time advance approach, Continuous Simulation, Monte Carlo Simulation (10)

Queueing Models: Single server queueing system, introduction to arrival and departure time, flowcharts for arrival and departure routine. Event graphs of queueing model. Determining the events and variables, Event graphs for inventory model. (10)

SECTION – B

Random Numbers: Introduction to Random Numbers, Importance of Random Numbers in Simulation, Mid-Square random number generator, Residue method, Arithmetic Congruential generator, Testing Numbers for Randomness, Chi-Square Test. (5)

Distribution Functions : Stochastic activities, Discrete probability functions, Cumulative distribution function, Continuous probability functions. Generation of random numbers following binomial distribution, poisson distribution, continuous distribution, normal distribution, exponential distribution, uniform distribution. (10)

Simulation Languages: Basic Introduction to Special Simulation Languages:-GPSS/ MATLAB/ Network Simulators. (5)

Text Books:

1. Averill M. Law and W. David Kelton : “Simulation Modeling and Analysis”, Tata McGraw-Hill Publication.
2. Geoffery Gordon : “System Simulation”, Prentice-Hall of India.
3. D.S. Hira : “System Simulation”, S. Chand Publication.
4. Stephen J. Chapman : “MATLAB Programming for Engineers”, Thomson learning inc.

References:

1. Jerry Banks, John S. Carson, Barry L. Nelson and David M. Nicol : “Discrete-Event System Simulation”, Prentice-Hall of India.
2. RudraPratap : “Getting Started with MATLAB 7”, Oxford University Press.

Paper Title: MODELING AND SIMULATION (Practical)

Max. Marks: 50
L T P 0 0 3

Paper Code: CSE 665

Credit: 02

Note: Practical Problems related to

1. **Programming in MATLAB:** Introduction, Branching statements, loops, functions, additional data types, plots, arrays, inputs/outputs etc.
2. Introduction regarding usage of any Network Simulator.
3. Practical Implementation of Queuing Models using C/C++.

**SYLLABUS FOR
BACHELOR OF ENGINEERING (COMPUTER SC. & ENGG.)
SEVENTH SEMESTER**

Paper Title: COMPILER DESIGN

Paper Code: CSE711
Credits : 4

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P: 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: This course will provide the in-depth knowledge of different concepts involved while designing a compiler.

SECTION – A

Introduction: Compilers and Translators; The phases of the compiler – Lexical Analysis, Syntax Analysis, Intermediate Code Generation, Optimization, Code generation, Bookkeeping, Error handling. (5)

Lexical Analysis: The role of the lexical analyzer, Tokens, Patterns, Lexemes, Input buffering, Specifications of a token, Recognition of a tokens, Finite automata: Regular expressions, NFA, DFA. Design of a lexical analyzer generator. (5)

Syntax Analysis: The role of a parser, Context free grammars, Writing a grammar, Top down Parsing: Recursive decent parser, Predictive parser, Bottom up Parsing: Handles, Viable prefixes, Operator precedence parsing, LR parsers: SLR, LALR, CLR. Parser generator (YACC). Error Recovery techniques for different parsers. (12)

SECTION – B

Syntax directed translation: Syntax directed definitions, Synthesized and inherited attributes, Construction of syntax trees. (4)

Run time environments: Source language issues (Activation trees, Control stack, scope of declaration, Binding of names), Storage organization (Subdivision of run-time memory, Activation records), Storage allocation strategies, Symbol tables: storage, data structures used. (6)

Intermediate code generation: Intermediate languages, Graphical representation, Three-address code, Implementation of three address statements (Quadruples, Triples, Indirect triples). (3)

Code optimization and code generation: Introduction, Basic blocks & flow graphs, DAG, principle sources of optimization: loop optimization, eliminating induction variable, eliminating common sub-expression, loop unrolling, loop jamming etc. Peephole optimization, Issues in the design of code generator, a simple code generator, Register allocation & assignment. (10)

Text Book:

1. Aho, Ullman : Principles of Compiler Design. Narosa Publication.

References:

1. Dhamdhare : Compiler Construction- Principles and Practice Macmillan, India 198
2. Holub : Compiler Design in C, PHI.

Paper Title: COMPILER DESIGN (PRACTICAL)**Paper Code:**CSE761**Max.Marks(Sessional):50****Credits ; 2****L T P: 0 0 3***Note:* Students have to perform the below-mentioned experiments using any language or tool available.

1. Implementation of lexical analyzer for a hypothetical language.
2. Implementation of LL parser.
3. Implementation of SLR parser.
4. Implementation of CLR parser.
5. Implementation of LALR parser.

Paper Title: MULTIMEDIA SYSTEM DESIGN**Paper Code:** CSE712**Max. Marks (Final Exam): 50****Time: 3 Hours****Credits: 4****Max. Marks (Sessional Exam): 50****Total Lectures: 45****L T P : 3 1 0**

Objectives: This Course introduces the multimedia systems and their applications to students. This course covers the different compression standards used in multimedia, some current technology and related issues.

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

SECTION – A**Introduction:**

Multimedia and its types, Introduction to Hypermedia, Hyper Text, Multimedia Systems and their Characteristics, Challenges, Desirable Features, Components and Applications, Trends in Multimedia (4)

Multimedia Technology:

Multimedia Systems Technology , Multimedia Hardware devices, Multimedia software development tools, Multimedia Authoring Tools, Multimedia Standards for Document Architecture, SGML, ODA, Multimedia Standards for Document interchange, MHEG, Multimedia Software for different media. (6)

Storage Media :

Magnetic and Optical Media, RAID and its levels, Compact Disc and its standards, DVD and its standards, Multimedia Servers (4)

Audio:

Basics of Digital Audio, Application of Digital Audio, Digitization of Sound, Sample Rates and Bit Size, Nyquist's Sampling Theorem Typical Audio Formats Delivering Audio over a Network , Introduction to MIDI (Musical Instrument Digital Interface), Components of a MIDI System Hardware Aspects of MIDI ,MIDI Messages. Audio Compression, Simple Audio Compression Methods, Psychoacoustics ,MPEG Audio Compression (8)

SECTION – B**Basics of Compression :**

Classifying Compression Algorithms, Lossless Compression Algorithms, Entropy Encoding, Run-length Encoding, Pattern Substitution, Basics of Information theory, Huffman Coding, Adaptive Huffman Coding, Arithmetic Coding, Lempel-Ziv-Welch (LZW) Algorithm, Source Coding Techniques: Transform Coding, Frequency Domain Methods, Differential Encoding, (6)

Image and Graphics Compression :

Colour in Images, Types of Colour Models, Graphic/Image File Formats: TIFF, RIFF, BMP, PNG, PDF, Graphic/Image Data, and JPEG Compression, GIF Compression (6)

Video Compression**(6)**

Basics of Video , Video Signals, Analog Video, Digital Video, TV standards, H. 261 Compression, Intra Frame Coding, Inter-frame (P-frame) Coding, MPEG Compression, MPEG Video, The MPEG Video Bitstream , Decoding MPEG Video in Software

Multimedia Communication:**(5)**

Building Communication network, Application Subsystem, Transport Subsystem, QOS, Resource Management, Distributed Multimedia Systems

Text Book:

1. Ralf Steinmetz and Klara Nahrstedt : Multimedia Computing Communications and Applications By Pearson Educations
2. Parag Havaldar, Gerard Medioni : Multimedia Systems, Cengage Learning, 2009

References:

1. Prabhat K. Andleigh, KranThakkar : Multimedia System Design, PHI, Latest Edition
2. Li, Drew : Multimedia Computing, Pearson Education, Latest Edition
3. Fred Halsall : Multimedia Communications, Pearson Education, Latest Edition

Paper Title: SOFTWARE TESTING AND QUALITY ASSURANCE**Paper Code:**CSE713**Max. Marks (Final Exam): 50****Time: 3 Hours****Credits : 4****Max. Marks (Sessional Exam): 50****Total Lectures: 45****L T P : 3 1 0**

Note:Examiner will set eight questions covering four questions from each section. Candidates will be required to attempt five questions, selecting at least two from each section.

Objectives: This course offers a good understanding of the concepts, methods and techniques of software testing and quality assurance and prepares students to be in a position to develop error free and quality software.

SECTION – A**Introduction:**

Overview of Software Engineering, Software Process, Characteristics of a Software Process, Process Models, Project Management Process and its Phases, Software Measurements, Metrics, Scheduling, Estimation. **(07)**

Software Quality Assurance Concepts and Standards :

Quality Concepts, Quality Control, Quality Assurance, SQA Activities, Software Reviews, Formal Technical Reviews, Review Guidelines, Software Reliability, Software Safety, Quality Assurance Standards, ISO 9000, ISO 9001:2000, ISO 9126 Quality Factors, CMM, TQM, Six Sigma, SPICE, Software Quality Assurance Metrics. **(08)**

Risk Management and Change Management:

Software Risks, Risk Identification, Risk Projection, Risk Refinement, The RMMM Plan, Software Configuration Management, Baselines, Software Configuration Items, SCM Process: Version Control, Change Control, Configuration Audit, Configuration Management for Web Engineering. **(07)**

SECTION – B**Software Testing:**

Testing, Verification and Validation, Test Strategies for Conventional and Object Oriented Software, Unit Testing, Integration Testing, Validation Testing, Alpha and Beta Testing, System Testing, Recovery Testing, Security Testing, Stress Testing, Performance Testing, Metrics for Source Code, Metrics for Testing, Debugging Process, Debugging Strategies. **(07)**

Testing Techniques:

Software Testing Fundamentals, Black Box and White Box Testing, Basis Path Testing, Flow Graph Notation, Independent Program Paths, Graph Matrices, Control Structure Testing, Condition Testing, Data Flow Testing, Loop Testing, Graph Based Testing Methods, Equivalence Partitioning, Boundary Value Analysis, Object Oriented Testing Methods: Applicability of Conventional Test Case Design Methods, Fault-Based Testing, Scenario-Based Testing, Random Testing and Partition Testing for Classes, InterClass Test Case Design.(08)

Testing Process and Specialized Systems Testing:

Test Plan Development, Requirement Phase, Design Phase and Program Phase Testing, Testing Client/Server Systems, Testing Web based Systems, Testing Off-the-Shelf Software, Testing in Multiplatform Environment, Testing for Real Time Systems, Testing Security. (08)

Text Books

1. Ian Sommerville : Software Engineering, Seventh Edition, Pearson Education.
2. R.S. Pressman : Software Engineering: A Practitioner's Approach, Sixth Edition, Tata McGraw-Hill.
3. William E. Perry : Effective Methods for Software Testing, Second Edition, John Wiley & Sons.
4. Paul C. Jorgensen : Software Testing: A Craftsman's Approach, Third Edition, Auerbach Publications, Taylor and Francis Group, 2010.

References:

1. Yogesh Singh : Software Testing, Cambridge University Press.
2. S.L. Pfleeger, J.M. Atlee : Software Engineering: Theory and Practice, Second Edition, Pearson Education.
3. K.K. Aggarwal, Yogesh Singh : Software Engineering, Second Edition, New Age International.
4. PankajJalote : An Integrated Approach to Software Engineering, Second Edition, Narosa.
5. Nina S Godbole : Software Quality Assurance – Principles and Practice, Narosa.
6. Boris Beizer : Software Testing Techniques, Second Edition, Dreamtech.
7. Dorothy Graham : Foundations of Software Testing, Cengage Learning.
8. S. Limaye : Software Testing, McGraw-Hill.
9. MilindLimaye : Software Quality Assurance, McGraw-Hill.
10. A. C. Gillies : Software Quality: Theory & Practice, Cengage Learning.
11. R. Shende : Software Automation Testing Tools for Beginners, Shroff Publishers.
12. D. Galin : Software Quality Assurance, Pearson Education.
13. A. P. Mathur : Foundations of Software Testing, Pearson Education.

Paper Title: SOFTWARE TESTING AND QUALITY ASSURANCE (Practical)

*Paper Code:*CSE763

Credits : 2

Max. Marks:

50(Internal)L T P: 0 0 3

Note: This practical will enable students use and design software quality assurance and testing tools.

1. Study of different quality assurance and software testing tools.
2. Use of black box testing techniques to test programs.
3. Use of white box testing techniques to test programs.
4. Use of Object Oriented Testing Techniques to test programs.
5. Use of a software testing tool.
6. Use of a quality assurance tool.
7. Testing a web based system.
8. Design and Implementation of a quality assurance / software testing tool.

Paper Title: INFORMATION SECURITY

Paper Code:CSE714
Credits: 4

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P : 3 1 0

*Note:*Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: Upon completion of this course, participants will have gained knowledge of information security concepts and the following: Understanding of Information Security (InfoSec) principles and approaches

- Understanding of the basic components of InfoSec
- Understanding of basic InfoSec applications
- Ability to remain current with InfoSec literature
- Ability to progress to independent work in the field

SECTION – A

Basic Encryption and Decryption:

(6)

Attackers and Types of threats, challenges for information security, Encryption Techniques, Classical Cryptographic Algorithms: Monoalphabetic Substitutions such as the Caesar Cipher, Cryptanalysis of Monoalphabetic ciphers, Polyalphabetic Ciphers such as Vigenere, Vernam Cipher.

Stream, Block, Symmetric Key and Asymmetric Key Ciphers:

(7)

Rotor based system and shift register based systems. Block cipher: principles, modes of operations. The Data encryption Standard (DES), Analyzing and Strengthening of DES, Introduction to Advance Encryption Standard (AES), Concept and Characteristics of Public Key Encryption system, Rivets – Shamir-Adlman (RSA) Encryption, Digital Signature Algorithms and authentication protocols, The Digital Signature Standard (DSA).

Number theory and basic Algebra:

(5)

Modular Arithmetic, Euclidean algorithm, Random number generation

KeyManagement Protocols:

(6)

Solving Key Distribution Problem, Diffie-Hellman Algorithm, Key Exchange with Public Key Cryptography.

SECTION – B

Message Authentication and Hash Functions

(5)

Authentication Requirements, Authentication Functions, Message Authentication codes, Hash Functions, Hash Algorithms (MD-5 and SHA-1), Key Management Algorithms.

- Security:** (5)
Kerberos, IP security: Architecture, Authentication Header, Encapsulating Security Payload, Digital Signatures and Digital Signature Standards
- Web Security:** (6)
Web security consideration, secure socket Layer protocol, Transport Layer Security Secure Electronic Transaction Protocol
- Firewalls:** (5)
Firewall Design principles, Characteristics, Types of Firewall, trusted systems, Virtual Private Networks.

Text Book:

1. William Stallings : Network Security Essentials, Applications and Standards Pearson Education.

References:

1. William Stallings : Cryptography and Network Security Principles and practice. 2/e, Pearson Education.
2. Bishop, Matt : Introduction to Computer Security. Addison-Wesley, Pearson Education, Inc. ISBN: 0-321-24744-2. (2005)
3. Michael. E. Whitman and Herbert J. Mattord : Principles of Information Security
4. AtulKahate : Cryptography & Network Security, TMH, 2nd Edition

Paper Title: Business Intelligence

Paper Code: CSE715

Max. Marks (Final Exam): 50

Time: 3 Hours

Credits : 4

Max. Marks (Sessional Exam): 50

Total Lectures: 45

L T P: 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: To impart knowledge of data warehousing and data mining for Business Processes. To Understand the role of Business Intelligence.

SECTION – A

Introduction to Business Intelligence: 8

Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities

Basics of Data Integration (Extraction Transformation Loading) 8

Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL, Introduction to data quality, data profiling concepts and applications.

Introduction to Multi-Dimensional Data Modeling, 8

Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS

SECTION – B

Basics of Enterprise Reporting 6

Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, and overall architecture.

Data Mining Functionalities: 15

Association rules mining, Mining Association rules from single level, multilevel transaction databases, Classification and prediction, Decision tree induction, Bayesian classification, k-nearest neighbor classification, Cluster analysis, Types of data in clustering, categorization of clustering methods

Text Book:

1. R N Prasad, SeemaAcharya : Fundamentals of Business Analytics, Wiley India, First

- : Edition, 2011
2. J.Han and M. Kamber : Data Mining: Concepts and Techniques By Morgan Kaufman publishers, Harcourt India pvt. Ltd. Latest Edition
- References:**
1. David Loshin : Business Intelligence: The Savvy Manager's Guide., Latest Edition By Knowledge Enterprise.
 2. Larissa Terpeluk Moss, ShakuAtre : Business Intelligence roadmap by Addison Weseley
 3. CindiHowson : Successful Business Intelligence: Secrets to making Killer BI Applications by Tata McGraw Hill
 4. Mike Biere : Business intelligence for the enterprise by Addison Weseley, August 2010

Paper Title: MOBILE COMPUTING

Paper Code:CSE716
Credits : 4

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P : 3 1 0

Note:Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: To impart knowledge of mobile and wireless computing systems and techniques.

SECTION – A

Mobility:

Issues, challenges, and benefits; Review of mobile and cellular communication technology; Review of distributed/network operating systems, ubiquitous computing. **6**

Global System for Mobile Communication (GSM) System Overview:

GSM Architecture, Mobility Management, Network Signaling, GPRS **4**

Mobile IP Networks:

Physical mobility, challenges, limits and connectivity, mobile IP and cellular IP in mobile computing. **4**

Mobile Transport Layer:

Transport layer issues in wireless, Indirect TCP, Snoop TCP, Mobile TCP **6**

SECTION – B

Wireless LANs:

Introduction to IEEE 802.11, Bluetooth technologies and standards. **5**

Mobile Adhoc Networks:

Hidden and exposed terminal problems; Routing protocols: DSDV, DSR, AODV. **7**

Mobile Devices and OS:

Various types of Devices, Operating System: PalmOS, WindowsCE, Windows Mobile. **7**

Application Development:

WWW programming model, Development Environment for MobileDevices. **6**

1. Jochen Schiller
2. U. Hansman and L. Merck.

Text Books:

- : Mobile Communication, Pearson Education.
- : Principles of Mobile Computing”, 2nd Ed., Springer

1. A. S. Tanenbaum.
2. D. Milojcic, F. Dougliis.
3. Raj Kamal

References:

- : Computer Networks, 4th Ed., Pearson Education.
- : Mobility Processes, Computers and Agents”, Addison Wesley
- : Mobile Coomputing, Oxford University Press

**SYLLABUS FOR
BACHELOR OF ENGINEERING (COMPUTER SC. & ENGG.)
EIGHTH SEMESTER**

Paper Title: ADVANCED DATABASE SYSTEMS

Paper Code:CSE811
Credits : 4

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total
Lectures:45L T P
: 3 1 0

Note: Examiner will set eight questions covering four questions from each section. Candidates will be required to attempt five questions, selecting at least two from each section.

Objectives: This course offers a good understanding of advanced database concepts and technologies. It prepares the student to be in a position to use and design databases for a variety of applications.

SECTION – A

Introduction to Database Systems:

Database System Concepts and Architecture, Data Models, Data Independence, SQL: DDL, DML, (06)
DCL, Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF.

Query Processing and Optimization:

Query Processing, Syntax Analyzer, Query Decomposition, Query Optimization, Heuristic Query (06)
Optimization, Cost Estimation, Cost Functions for Select, Join, Query Evaluation Plans.

Transaction Processing and Concurrency Control:

Transaction Processing Concepts, Concurrency Control Techniques: Two-phase Locking, (05)
Timestamp Ordering, Multiversion, Validation, Multiple Granularity Locking.

Object Oriented and Object Relational Databases:

Object Oriented Concepts, Object Oriented Data Model, Object Definition Language, Object Query (05)
Language, Object Relational Systems, SQL3, ORDBMS Design.

SECTION – B

Distributed Databases:

Distributed Database Concepts, Advantages and Disadvantages, Types of Distributed Database (06)
Systems, Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design, Five Level Schema Architecture, Query Processing, Concurrency Control and Recovery in Distributed Databases.

Backup and Recovery:

Types of Database Failures, Types of Database Recovery, Recovery Techniques: Deferred Update, (05)
Immediate Update, Shadow Paging, Checkpoints, Buffer Management.

Introduction to Data Warehousing and Data Mining:

Introduction to OLAP, OLTP, Data Warehouse, Data Marts, Data Mining, Data Mining Process. (05)

Commercial Databases:

Commercial Database Products, Familiarity with IBM DB2 Universal Database, Oracle, Microsoft (07)
SQL Server, MySQL, their features.

Text Book:

1. RamezElmasri, ShamkantNavathe : Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2007.

References:

1. Raghu Ramakrishnan, Johannes Gehrke : Database Management Systems, Tata McGraw-Hill.
2. C.J. Date : An Introduction to Database Systems, Eighth Edition, Pearson Education.
3. Alexis Leon, Mathews Leon : Database Management Systems, Leon Press.
4. Abraham Silberschatz, Henry F. Korth, S. Sudarshan : Database System Concepts, Tata McGraw-Hill.
5. S. K. Singh : Database Systems Concepts, Design and Applications, Pearson Education.

Paper Title: DIGITAL IMAGE PROCESSING

Paper Code: CSE812

Max. Marks (Final Exam): 50

Time: 3 Hours

Credits : 4

Max. Marks (Sessional Exam): 50

Total Lectures:

45 L T P : 3 1 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: To introduce the various image processing techniques and their applications in different domains. To get students acquainted with computer vision.

SECTION – A

Introduction to Image Processing:

Digital Image representation, Sampling & Quantization, Steps in image Processing, Image acquisition, color image representation, (6)

Image Transformation & Filtering:

Intensity transform functions, histogram processing, Spatial filtering, fourier transforms and its properties, frequency domain filters, , color models, Pseudo coloring, color transforms, Basics of Wavelet Transforms. (12)

Image Restoration:

Image degradation and restoration process, Noise Models, Noise Filters, degradation function, Inverse Filtering ,Homomorphic Filtering (7)

SECTION – B

Image Compression:

Coding redundancy, Interpixel redundancy, Psychovisual redundancy, Huffman Coding, Arithmetic coding, Lossy compression techniques, JPEG Compression (8)

Image Segmentation & Representation:

Point, Line and Edge Detection, Thresholding, Edge and Boundary linking, Hough transforms, egion Based Segmentation, Boundary representation, Boundary Descriptors, Regional Descriptors (12)

Text Books:

1. Gonzalez and Woods : Digital Image Processing , Addison Wesley 1992.
2. Boyle and Thomas : Computer Vision 2nd Edition, Blackwell Science 1995
3. Pakhira Malay K : Digital Image Processing and Pattern Recognition, PHI

References:

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|---|--------------------------|---|--|
| 1 | Trucco&Verri | : | Introductory Techniques for 3-D Computer Vision, Prentice Hall, Latest Edition |
| 2 | Jayaraman and Veerakumar | : | Digital Image Processing, McGraw Hill |
| 3 | Low | : | Introductory Computer Vision and Image Processing, McGraw-Hill 1991, ISBN 0-07-707403-3 |
| 4 | Jain, Kasturi and Schunk | : | Machine Vision, McGraw-Hill. 1995 ISBN 0070320187. |
| 5 | Sonka, Hlavac, Boyle | : | Digital Image –Processing and Computer Vision First ed. ISBN 978813150557, Cengage Learning,2011 |

Paper Title: DIGITAL IMAGE PROCESSING (Practical)

Paper Code:CSE862

Credits : 2

MM (Internal): 50

L T P ; 0 0 3

Note: Students are required to complete all the practical by implementing them in any of the programming language such as Java, C/C++, C#, MATLAB

1. Reading and displaying images in different formats using different color models.
2. Converting color images into monochrome images, Image color enhancements using pseudo coloring techniques.
3. Images enhancements using grey level transformations and spatial and frequency domain filters
5. Image Noise removal and inverse filtering of images
6. Point, Line, Edge and Boundary Detections in images
7. Histogram Matching and specification on images
8. Boundary Linking, Representation and Description techniques on images
9. Thresholding& Magnification of Images
10. Image Morphological Operations
11. Object Recognition Techniques

Paper Title: NETWORK PROGRAMMING

Paper Code:CSE813
Credits : 4

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures:
45 L T P : 3 1 0

Note:Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: To familiarize students with advanced concepts of networks, network programming in UNIX environment.

SECTION – A

- 1.OSI model, client server model, TCP/IP protocols, Introduction to Unix; Process, groups, job control and non-job control shells, reliable and unreliable signals, shell Programming. **6**
2. Inter process communication in Unix, pipes, half duplex and full duplex pipes, FIFOs, properties of pipes and FIFOs, POSIX message queues, system V message queues, semaphores, shared memory, mmap function and its use, RPC, authentication, timeout and retransmission, call semantics, XDR. **10**
3. Communication Protocol – Introduction, TCP, IP, XNS, SNA, NetBIOS, OSI protocols, comparisons. **5**

SECTION – B

4. Introduction to Berkeley sockets, socket addressing, TCP and UDP socket functions, sockets and Unix signals, socket implementation, client and server examples for TCP and UDP and their behavior under abnormal conditions. **10**
5. Socket options, IPv4, IPv6, TCP, I/O multiplexing, Unix I/O models, select and poll functions **5**
6. System V Transport Layer, interface – Introduction Transport End Point address, TLI. **5**
7. Overview of Ping – Routines, FTP, Remote Login **4**

Text Book:

1. W. R., Stevens, B. Fenner and A. M., Rudoff : Unix Network Programming, Vol. I, 3rd Ed., Pearson Education

References:

1. W. R., Stevens : Unix Network Programming, Vol. II, 2nd Ed., Pearson Education
2. W. R., Stevens : Advanced Programming in Unix Environment, Pearson Education

Paper Title: NETWORK PROGRAMMING (Practical)

Paper Code:CSE863
Credits : 2

Sessional Marks: 50
L T P : 0 0 3

Note: Students will learn to implement programs in UNIX.

1. To study and implement various network commands like telnet, ftp, etc.

2. To study various system calls.
3. Programs related to interprocess communication
4. Programs related to message queues
5. Programs related to pipes
6. Programs related to file handling
7. Programs related to process control
8. Programs using Socket Programming

Paper Title: VISUAL PROGRAMMING

Paper Code:CSE814
Credits : 4

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total
Lectures:45L T P
: 3 1 0

Note:Examiner will set eight questions covering four questions from each section. Candidates will be required to attempt five questions, selecting at least two from each section.

Objectives: This course offers a good understanding of Visual Programming concepts and prepares students to be in a position to write GUI applications.

SECTION – A

Introduction:

Introduction to Programming: Variables, Functions, Visual Programming, Object Oriented (08)
Concepts: Abstraction, Inheritance, Polymorphism, Classes, Collections, Debugging.

Graphical User Interface Concepts - I:

Windows Forms, Control Properties and Layout, Using Common Dialogs, Event Handling: Mouse (05)
and Keyboard, Labels, Textboxes, Buttons, GroupBoxes, Panels, CheckBoxes and RadioButtons,
PictureBoxes, ToolTips.

Graphical User Interface Concepts - II:

Menus, Controls: MonthCalendar,DateTimePicker,LinkLabel,ListBox,CheckedListBox, (04)
ComboBox, TreeView, ListView,DataGridView, Gridview, TabControl, Multiple Document Interface
(MDI) Windows.

Multithreading and Exception Handling:

Thread States, Lifecycle of a Thread, Thread Priorities and Scheduling, Creating and Executing (05)
Threads, Thread Synchronization and Class Monitor, Exception Handling.

SECTION – B

Graphics and Multimedia:

Drawing Classes and the Coordinate System, Graphics Contexts and Graphics Objects, Color and (05)
Font Control, Drawing Lines, Rectangles, Ovals, Arcs, Loading, Displaying and Scaling Images,
Animating a Series of Images.

File Processing and Streams:

Data Hierarchy, Files and Streams, Classes File and Directory, Reading and Writing Sequential (05)
Access Files, Serialization.

Data Access:

Data Access Techniques, XML, LINQ, SQL, ADO.NET Object Model, LINQ to SQL, ADO.NET (08)
and LINQ, LINQ to XML.

Additional Techniques:

XML Documentation, Networking, Security, Web Services, Introduction to GDI+. (05)

Text Book:

1. Deitel : Visual C# 2005 How to Program, Second Edition, Deitel.

References:

1. Karli Watson, Christian Nagel, Jacob Hammer, et al. : Beginning Microsoft Visual C# 2008, Wrox.
2. Christian Nagel, Bill Evjen, Jay Glynn, Morgan Skinner, Karli Watson : Professional C# 2008, Wrox.

Paper Title: VISUAL PROGRAMMING (Practical)

Paper Code:CSE864

Credits : 2

M M: 50(Internal)

L T P : 0 0 3

Note: The practical will enable students to write visual applications in .NET environment.

1. Writing basic C# programs demonstrating the concepts of functions, arrays, classes, inheritance, polymorphism etc.
2. Writing graphical programs demonstrating the concepts of event handling, Labels, Textboxes, Buttons, GroupBoxes, Panels, CheckBoxes and RadioButtons, PictureBoxes, ToolTips.
3. Writing MDI Applications and demonstration of controls like: MonthCalendar, DateTimePicker, LinkLabel, ListBox, CheckedListBox, ComboBox, TreeView, ListView, TabControl.
4. Writing programs demonstrating the concepts of Multithreading and Exception Handling.
5. Writing programs demonstrating Graphics and Multimedia concepts.
6. Writing programs for reading and writing text files.
7. Writing programs demonstrating Database Access, Networking and Security.
8. Writing Web Services.

Paper Title: JAVA TECHNOLOGIES

Paper Code:CSE815

Credits : 4

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures:
45L T P : 3 1 0

*Note:*Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: Objective This course will provide the in-depth knowledge of Java and J2EE technology.

SECTION – A

Java Methods, Classes and Inheritance:

Introduction; classes; methods; constructors; overloading methods; arrays; recursion; passing arrays and objects to methods; Inheritance; method overriding; abstract classes; using final; packages; interfaces. **8**

I/O, Applets and Graphics:

I/O basics; stream classes; byte and character streams; reading and writing files; Applet fundamentals; Applet class; Applet initialization and termination; event handling; keyboard and mouse events; AWT class; Layout managers; panels; canvases; Frame windows; drawing lines, rectangles, ellipses. **8**

Exceptional Handling and Multithreaded Programming:

Exception handling fundamentals; exception types; uncaught exceptions; try and catch; creating exception classes; throwing exceptions; Java thread model; thread priorities; creating a thread; inter-thread communication; thread synchronization; suspending, resuming and stopping threads; **8**

SECTION – B**Overview of J2EE and working with JDBC:**

What is J2EE, component based architecture of J2EE: Web, Business and Application component, commonly used classes and interfaces of java.sql package, connecting java application to a database, prepared statements. **7**

Servlets and JSP:

Java Servlets, compilation, deployment, and testing a servlet, session management, request dispatching, Java Server Pages, deploying and testing a JSP, using java beans in JSP. **7**

Enterprise Java Beans(EJB):

Architecture of EJB, creating a stateless-session EJB, statefull-session bean, Life Cycle of session beans, Entity beans, life cycle of entity beans. **7**

Text Book:

- | | | |
|----------------------------------|---|---|
| 1. Deitel and Deitel | : | Java: How to Program, 6 th Edition, Pearson Education. |
| 2. Herbert Schildt | : | The Complete Reference Java2, TMH |
| 3. James Edward Keogh, Jim Keogh | : | J2EE: The complete Reference, McGraw-Hill |

References:

- | | | |
|----------------|---|--|
| 1. Author Name | : | Book Title, Edition, Publisher (Justified) |
| 2. Author Name | : | Book Title, Edition, Publisher (Justified) |

Paper Title: JAVA TECHNOLOGIES (PRACTICAL)**Paper Code:**CSE865**Credits : 2****Max.Marks(Sessional):50****L T P : 0 0 3***Note:* Students have to perform the following experiments

1. Implementation of classes, inheritance, overloading.
2. Implantation of packages and interfaces
3. Implantation of threads.
4. Implementation of Applets, mouse events, and keyboard events.
5. Connecting to Database using JDBC.
6. Deployment of Servlets, JSP and EJB.

Paper Title: SOFT COMPUTING

Paper Code: CSE816

Credits : 3

Max. Marks (Final Exam): 50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures:

45L T P : 3 0 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: To get basic knowledge of different soft computing techniques. Different problem solving techniques and their implementations and applications are explained. Intelligent systems and learning techniques are introduced.

SECTION – A

INTRODUCTION

Introduction to Artificial Intelligence: Agents Behavior and Environments, Structure of Agents, introduction to Soft Computing and its application (4)

NEURAL NETWORK

Basic concepts and characteristics, artificial neuron model and terminology, neural network architectures- McCulloch- Pits, Hebb's Learning, linear separability (6)

Supervised Learning: Perceptron, ADALINE and MADALINE networks, back-propagation network (BPN), BPN architecture, training algorithm, parameters and selection (7)

Unsupervised Learning: Maxnet, Mexican Hat Net, Hamming Network, Kohonen's self organizing networks, Introduction to ART networks. (6)

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SECTION-II

FUZZY LOGIC

(8)
Crisp sets, fuzzy sets, membership function, basic fuzzy set operations, fuzzy set properties, crisp relations, fuzzy relations, operation on fuzzy relations, fuzzy systems, crisp logic, predicate logic, fuzzy logic, fuzzy rule based system and de-fuzzification methods, reasoning with fuzzy logic. Fuzzy If-Then Rule Base – Inference Engine, Fuzzy decision making, Application of fuzzy systems.

GENETIC ALGORITHM AND GENETIC MODELLING

(9)
Basic concepts, biological background, survival of the fittest, working principle, encoding techniques, fitness function, reproduction including Roulette-wheel selection, boltzman selection, tournament selection, rank selection and steady state selection, Operators: Crossover techniques, mutation, inversion, deletion, duplication, Convergence.

Associative Memory Networks: introduction, Auto-associative and Hetro-Associative Networks, BAM networks, Hopfield networks Application of ANN to classification, pattern matching etc.
Neuro-Fuzzy techniques

Introduction to following Techniques:

Simulated Annealing, Swarn Optimization, Ant Colony Optimization

(5)

Text Books

S. Rajasekaran, G.A. VijayalakshmiPai

: Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications, 15th Edition, PHI Learning.

S.N Sivanandam, SN Deepa

: Principles of Soft Computing, Wiley India, 2nd Edition

James Freeman A. and David Skapura

References

: Neural Networks - Algorithms, Applications & Programming Techniques, Addison Wesley

Yegnanarayana B

: Artificial Neural Networks, Prentice Hall of India Private Ltd., New Delhi

Goldberg, David E.

: Genetic algorithms in search, optimization and machine learning, Latest Edition, Addison Wesley

EMBEDDED SYSTEMS

Paper Code:CSE817

Credits : 3

Max. Marks (Final Exam): 50
Max. Marks (Sessional Exam): 50

Time: 3 Hours
Total Lectures: 45
L T P: 3 0 0

Note:Total of *Eight* questions may be set covering the whole syllabus taking *four* from Part A & *four* from Part B. Candidates will be required to **attempt any five questions taking at least two from each Part.**

Objectives: To get the basic knowledge of all the peripheral device controllers and to work on PIC Microcontroller.

SECTION – A

Introduction Review of Embedded Hardware

Memory – Microprocessors – Buses – Direct Memory Access – Interrupts – Built ins on the Microprocessor. (10)
Conventions used on Schematic, Microprocessor Architecture – Interrupt Basic – Shared Data Problems – Interrupt Latency.

PIC Micro controller & Interfacing

Introduction, CPU Architecture, Register file structure, Instruction Set, Programs, Timers and Interrupts – Interrupt Service Routine – features of Interrupts – Interrupt vector & Priority, Timing Generation & Measurements, Compare mode, Capture mode, Event counter, PWM, Frequency Measurement – Interfacing Methods, I/O Interface, SPI, LCD interfacing, Seven segment interfacing, I²C Bus, DAC, Serial EEPROM, ADC, UART. (15)

SECTION – B

Software Development & Tools: Software architectures, Round – Robin, Round-Robin with Interrupts, Function Queue Scheduling architecture, Introduction to assembler – Compiler –n Cross compilers and Integrated Development Environment IDE, Linker/ Locators, Simulators, Getting Embedded software into target System Debugging Strategies,. (8)

Introduction to Real Time Operating Systems: Task And Task States, Tasks and Data, Semaphores and shared data. (5)

Operating System Services: Message queues, Mailboxes and Pipes, Timer Function, Events, Memory Management, Interrupt Routines in an RTOS Environment, Basic Design Using RTOS. (7)

Text Book:

1. David E. Simon : An Embedded Software Primer, Pearson Education, Latest Edition.

References:

1. John B. Peatman : PIC Microcontroller, Pearson Education, Latest Edition
2. D. D. Gajski, F. Vahid, S. Narayan, J. Gong : Specification and Design of Embedded Systems, Prentice Hall.
3. Steve Heath : Embedded systems design, Newnes, 1997.
4. F. Balarin, Chiodo : Hardware Software Co-design of Embedded Systems, et al., Kluwer Academic Publishers, May 1997

Paper Title: Building Enterprise Applications

Paper Code: CSE 818

Credits : 3

Max. Marks (Final Exam): 50

Max. Marks (Sessional Exam): 50

Time: 3 Hours

Total Lectures: 45

L T P: 3 0 0

Note: Examiner shall set eight questions covering four questions from each section. Candidate will be required to attempt five questions, selecting at least two from each section.

Objectives: To exposes the students to the essentials of building enterprise applications. The Core Modules of this elective includes designing and developing high quality enterprise applications and other task related to it.

SECTION – A

Introduction to Enterprise application

8

Introduction to enterprise applications and their types, software engineering methodologies, life cycle of raising an enterprise application, introduction to skills required to build an enterprise application, key determinants of successful enterprise applications, and measuring the success of enterprise applications

Incepting enterprise application and business process modeling

8

Inception of enterprise applications, enterprise analysis, business modeling, requirements elicitation, use case modeling, prototyping, non functional requirements, requirements validation, planning and estimation

Enterprise Architecture and designing enterprise application

8

Concept of architecture, views and viewpoints, enterprise architecture, logical architecture, technical architecture - design, different technical layers, best practices, data architecture and design – relational, XML, and other structured data representations, Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design

SECTION – B

Constructing enterprise application

11

Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis – code profiling and code coverage

Testing and rolling out enterprise application

10

Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application

Text Book:

- | | | | |
|----|---|---|---|
| 1. | Anubhav Pradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, Veerakumar Esakimuthu
Brett McLaughlin | : | Raising Enterprise Applications, Wiley India, First Edition, 2012 |
| 2. | | : | Building Java Enterprise Applications, O' Reilly Media , Latest Edition |

References:

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|----|---|---|--|
| 1. | Soren Lauesen | : | Software Requirements: Styles & Techniques., Latest Edition By Addison-Wesley Professional |
| 2. | Brian Berenbach, Daniel J. Paulish, Juergen Kazmeier, Arnold Rudorfer | : | Software Systems Requirements Engineering: In Practice by McGraw-Hill/Osborne Media, 2009 |
| 3. | Dean Leffingwell, Don Widrig | : | Managing Software Requirements: A Use Case Approach, First Edition by Pearson 2003 |
| 4. | Vasudev Verma | : | Software Architecture: A Case Based Approach by Pearson 2009 |
| 5. | Srinivasan Desikan, Gopalaswamy Ramesh | : | SOFTWARE TESTING Principles and Practices, First Edition by Perason 2006 |