Computer Science Engineering CO of All Semesters

Program Outcomes (POs)

At the end of successul completion of program, the graduates will be able to-

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

SEMESTER III

| Sr. No | Code No. | Subject | Credits |
|--------|-------------|-----------------------------------|---------|
| 1. | BSC - CS301 | Applied Mathematics | 4 |
| 2. | PCC-CS302 | Discrete Mathematics & Structures | 4 |
| 3. | PCC-CS303 | Data Structures | 3 |
| 4. | PCC-CS304 | Computer Networks - I | 4 |
| 5. | PCC-CS305 | Microprocessors | 3 |
| 6. | PCC-CS306 | C programming | 3 |
| 7 | HM- CS307 | Soft Skills | 3 |
| | | | 18 |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------|---------------------|---------|
| 1 | III | BSC-CS301 | Applied Mathematics | 4 |

PSOs:

1)Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1)**CS301.1** Describe the statistical data numerically by using Lines of regression and Curve fittings.
- 2)**CS301.2** Solve basic problems in probability theory, including problems involve in the binomial, Poisson, and normal distributions
- 3)**CS301.3** Calculate numerical Integration.
- 4)**CS301.4** Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support, etc.
- 5)**CS301.5** Solve examples on the principle in performing fuzzy number arithmetic cooperation's such as Addition, Multiplication & fuzzy equation.
- 6) **CS301.6** Solve assignment problems by using different techniques of operation research

Syllabus:

| | Teaching Scheme | | | | | Evaluation Scheme | | | | |
|-------------|-----------------|----|---|--------|--------|-------------------|---------------------|------|---------------------|--|
| Course | | | Р | | Scheme | Theo | Theory (Marks) | | TW | |
| Course | L | Т | | Credit | | Max. | Min. for Passing | Max. | Min. for passing | |
| Applied | 03 | 01 | | 04 | CIE | 30 | 40% | 25 | 10 | |
| Mathematics | 05 | | - | 04 | ESE | 70 | 40% | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

| 8. | Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir and Bo Yuan (Prentice Hall of India Private Limited). |
|----|--|
| 9. | Applied Mathematics by Navneet D. Sangle (CengagePublication). |

| problems, Unbalanced 09 assignment problems. Traveling salesmen problem. | |
|--|--|
| General Instructions: | |

1. For the term work of 25 marks, batch wise tutorials are to be conducted.

2. Number of assignments should be at least six (All units should be covered).

Reference Books:

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- 1. Advance Engineering Mathematics by Erwin Kreyszig (WileyIndia).
- 2. Mathematical Methods of Science and Engineering, by Kanti B. Datta(Cengage Learning)
- 3. Advanced Engineering Mathematics, 3e, by Jack Goldberg (OxfordUniversity Press).
- 4. Mathematical methods of Science and Engineering by Kanti B. Datta, CengageLearning Engineering Mathematics by V. Sundaram (VikasPublication).
- 5. Higher Engineering Mathematics, by B. S. Grewal (Khanna PublicationDelhi).
- 6. Higher Engineering Mathematics, by B. V. Ramana (TataMcGraw-Hill).
- 7. Advanced Engineering Mathematics, by H. K. Das (S. ChandPublication).

Code No.

PCC-

CS302

Subject

Discrete Mathematics & Structures

Unit 6: Assignment Problem: Definition, Balanced and unbalanced assignment problem, Hungarian Method., Balanced assignment problems.

Unit 4: Introduction to Fuzzy sets: Crisp set and Fuzzy set, Basic concepts of fuzzy sets, Basic operations on fuzzy sets, Properties of fuzzy sets

Unit 5: Fuzzy Arithmetic:

A + X = B & A X

Random variables, Discrete Probability distribution, Continuous probability distribution, Binomial Distribution, Poisson Distribution, Normal Distribution.

Unit 3: Numerical Integration:

Unit 2: Probability Distribution:

(6) Newton Cotes formulae. Trapezoidal Rule, Simpson's 1/3rd rule. Simpson's 3/8th rule, Weddle's Rule.

method of Least-squares, Fitting of Straight lines. Fitting of exponential curves. Fitting of second degree Parabolic curves.

Unit 1: Correlation, Regression & Curve Fitting:

SECTION I

(6) Introduction, Karl Pearson's Coefficient of Correlation., Lines of regression of bivariate data., Fitting of Curves by

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(6) Fuzzy numbers, Fuzzy cardinality, Arithmetic Operationson Fuzzy numbers, Solutions of Fuzzy equations of type

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Credits

4

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1) **CO302.1** Apply logic concepts in designing a program.
- 2) CO302.2 Illustrate basic set concepts & apply operations onset.
- 3) CO302.2 Minimize the Boolean Function.
- 4) CO302.2 Apply basic concepts of probability to solve real world problem.
- 5) CO302.2 Represent data structures using graph concepts.
- 6) CO302.2 Design abstract machine, detect deadlocks.

Syllabus:

| | | Tea | achin | g Scheme | | Evaluation Scheme | | | | |
|---------------------------|----|-----|-------|----------|--------|-------------------|----------------|------|---------------------|--|
| Course | | | Р | | Scheme | Theor | Theory (Marks) | | TW | |
| Course | L | Т | | Credit | | Max. | Max. | Max. | Min. for Passing | |
| Discrete Mathematics & | 03 | 01 | - | 04 | CIE | 30 | 25 | 25 | 10 | |
| Structures | | | | | ESE | 70 | | | - | |

CIE- Continuous Internal Evaluation

SECTION I

ESE - End Semester Examination

Unit 1: Mathematical Logic:

Statements & Notations, Connectives, Statement Formulas & truth table, Well-formed formulas, Tautologies, Equivalence of formulas, Duality law, Tautological Implications, Functionally complete set of connectives, Other connectives, Normal Forms, Theory of Inference for statement calculus.

Unit 2: Set Theory:

Basic concepts of set theory, Operations on Sets, Ordered pairs & n-tuples, Cartesian product.

Unit 3: Relations & Functions:

Relations. Properties of binary relations. Matrix & Graph Representation of Relation., Partition & covering of Set, Equivalence Relations., Composition of Binary Relation., POSET & Hasse Diagram, Functions, Types of Functions, Composition of functions..

Unit 4: Algebraic Systems:

Algebraic Systems: Examples & general Properties, Semi groups & Monoids, Groups: Definitions & Examples, Subgroup & Homomorphism.

Unit 5: Lattice and Boolean Algebra:

Lattice as partially ordered sets, Lattice as Algebraic Systems., Special Lattices., Boolean Algebra: Definitions & examples, Boolean Functions., Representation & Minimization of Boolean Functions.

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Unit 6: Graph Theory:

Basic concepts of graph theory., Paths, Reachability & Connectedness, Matrix, Representations of Graphs., Storage Representation & Manipulations of Graphs. PERT & Related technologies.

General Instructions:

It should consist of minimum 10 to 12 assignments based on topics of syllabus & Exercise problems mentioned in text books out of which 4 to 5 implementations of above assignments must be using 'C' programming language.

Recommended Books:

- 1. A course in Electrical Engineering Materials, S.P. Seth, P.V. Gupta, Dhanpat Rai & Sons.
- 2. Electrical Engineering Materials, A.J. Dekker, PHI.
- 3. Electrical Engineering Materials, T.T.T.I, Madras.

Text Books:

1. "DiscreteMathematicalStructureswithApplicationtoComputerScience"byJ.P.Tremblay& R. Manohar (MGH International)

Reference Books:

- 1. Discrete Mathematics -Semyour Lipschutz, Marc Lipson (MGH), Schaum's outlines.
- 2. Discrete Mathematics and its Applications Kenneth H. Rosen (AT&T Bell Labs) (mhhe.com/rosen)
- 3. Discrete Mathematical Structures Bernard Kolman, Robert Busby, S. C. Ross and Nadeemur- Rehman (Pearson Education).

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|---------------|-----------------|---------|
| 3 | III | PCC- CS303 | Data Structures | 3 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1) CS303.1 Identify the appropriate data structure for specific application.
- 2) CS303.2 Design and analyze programming problem statements.
- 3) CS303.3 Chose appropriate sorting and searching algorithms.
- 4) CS303.4 Outline the solution to the given software problem with appropriate data structure.

Syllabus:

| | | Т | 'eachi | ing Scher | ne | Evaluation Scheme | | | | | |
|------------|----|----|--------|-----------|--------|-------------------|---------------------|------------------|---------------------|------|---------------------|
| Course | L | | | | Scheme | Theory (Marks) | | Practical(Marks) | | POE | |
| | | Т | Р | Credit | | Max. | Min. for Passing | Max. | Min. for Passing | Max. | Min. for Passing |
| Data | | | | | CIE | 30 | 40% | - | - | - | - |
| Structures | 03 | 00 | 00 | 03 | ESE | 70 | 40% | - | - | - | - |

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(6) Definition, representation, operations, implementation and applications of singly, doubly and circular linked lists.

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Unit 6: Graphs:

Unit 5: Trees

Basic concept of graph theory, storage representation, graph traversal techniques- BFS and DFS, Graph representation using sparse matrix.

Terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, B tree, B+ tree,

TEXT BOOKS:

1. Schaum's Outlines Data Structures – Seymour Lipschutz (MGH)

Reference Books:

- 1. Data Structure using C-A. M. Tanenbaum, Y. Langsam, M. J. Augenstein(PHI)
- 2. Data Structures- A Pseudo code Approach with C Richard F. Gilberg and Behrouz A. Forouzon 2ndEdition

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|---------------|-----------------------|---------|
| 4 | III | PCC- CS304 | Computer Networks – I | 4 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1) CS304.1 Demonstrate concepts of Computer Networks.
- 2) CS304.2 Explain OSI and TCP/IP layered architecture
- 3) **CS304.3** Implement network and data link layer.
- 4) CS304.4 Demonstrate TCP protocol in detail.
- 5) **CS304.5** To analyze the protocol structure using network analyzing tools.
- 6) **CS304.6** Apply the principals of socket programming in the networks.

Unit 1: Basic of Data Structures

Data structure- Definition, Types of data structures, Data Structure Operations, Algorithms: Complexity, Time and Space complexity.

Unit 2: Searching and Sorting Techniques

Linked representation of stack and Queue.

Heaps- Operations and their applications, Heap sort.

Linear search, Binary search, Hashing - Definition, hash functions, Collision, 07 Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Radix sort, Complexity and analysis

Unit 3: Stacks and Oueues

Stack: Definition, operations, Array representation of stack, applications Queue: Definition, operations, Array representation of queue, applications, Circular queue, Priority queue, Deque.

Unit 4: Linked Lists

Unit 1: Introduction to Computer Network: (5) Overview of OSI layer Model and TCP/IP protocol model, Addressing, Underlying technologies for LANs, WANs, and Switched WANs.

Evaluation Scheme

Unit 2: Data Link Layer

Design issues for Data Link Layers, Framing methods, Error control: detection and correction, Flow control, Elementary Data Link protocols, Sliding window Protocols, Go back n, Selective repeat.

Unit 3: Medium Access Control Sub layer:

Static and Dynamic channel allocation, Multiple Access protocols ALHOA, CSMA, Collision Free Protocols, Ethernet: IEEE 802.3, IEEE 802.4, IEEE 802.5 standards, Wireless LANS 802.11 standards

Unit 4: Network Layer:

IPv4 Addresses: Classful Addressing Other Issues, Sub-netting and Super netting, Class less Addressing, Delivery, Forwarding and routing; Routing methods: Shortest path, Link state, Distance Vector routing and broadcast routing, 06 Congestion control algorithms: Principles, Congestion Prevention policies, congestion control in datagram subnet, Load Shedding, Jitter Control.

Unit 5: Internet Protocol:

IP Data gram format, Fragmentation and reassembly models, ARP, RARP, ICMP, IGMP

Unit 6: Transport Layer:

The Transport service primitives, UDP: Process to Process communication, User Datagram Format, Operation and uses of UDP. TCP: TCP Services and Features, TCP segment format, TCP Connections, Flow and error control in TCP, TCP Timers; Berkeley Sockets: Socket Addresses, Elementary Socket system calls byte ordering and address conversion routines, connectionless iterative server, connection oriented concurrent server, TCP and UDP Client serverPrograms.

General Instructions:

1. Minimum 10-12 experiments based on the syllabus and should be implemented by using Socket Programming. The study experiments should consist of some practical work and observations.

TEXT BOOKS:

1. TCP/IP protocol suit 4thEd. - Behrouz A. Forouzen (Tata Mag.Hill)

- 2. Computer Networks Andrew S. Tanenbaum(PHI)
- 3. Unix Network Programming W. Richard Stevens (PHI)

REFERENCEBOOKS:

1. TCP/IP Illustrated, The Protocols, Vol. I - W. Richard Stevens, G. Gabrani (PearsonEducation.)

2. Internetworking with TCP/IP, Vol. I Principles, Protocols, and Architectures – D. E. Comer (PearsonEd.)

3. Internetworking with TCP/IP, Vol. III, Client-Server Programming and Application (2nd Ed.) –D. E. Comer, David L. Stevens (Pearson Ed.)

Syllabus:

| Course | | | | | | Theory (Marks) | | Practical | |
|--------------|--------------|----|--------|--------|------|---------------------|------|------------------|----|
| | L T P Credit | | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for Passing | |
| Computer | | | | | CIE | 30 | 40% | 50 | 20 |
| Networks – I | 03 | 00 | 02 | 04 | ESE | 70 | 40% | - | - |
| | | | | | | | | | |

CIE- Continuous Internal Evaluation ESE - End Semester Examination

Teaching Scheme

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List of Experiments

1. Study and demo of LAN, WAN and various connecting devices and components • List out component and devices required for a std. LAN, WAN

- 2. Study, design and configuration of IEEE 802.3 Ethernet and IEEE 802.11Wireless LANs (Referring RFCs)
- 3. Study of following connectivity test tools with all its options-
- 4. if config, arp, route, trace route
- 5. nmap, netstat, finger
- 6. Implementing Framing methods
- 7. Implementing Elementary data link protocol (Stop & wait protocol)
- 8. Implementation of Error detection (CRC)code
- 9. Implementation of Error detection codes (Hamming)
- 10. Programs to understand IP addressing, classful & class less addressing
- 11. Implementation of sliding window protocol.
- 12. Implement shortest path routing algorithm.
- 13. Programs for connection oriented (TCP) client-server using socket programming
- 14. Programs for connection less (UDP) client-server using socket programming

15. Study of network protocol analyzer (Ethereal or Wire-Shark) and understanding packet formats for UDP, TCP, ARP, ICMP protocols

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|---------------|-----------------|---------|
| 5 | III | PCC- CS305 | Microprocessors | 4 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

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

- 1) CS305.1 Describe the Architecture of 8085 microprocessors and microcontroller.
- 2) CS305.2 Classify the 8086 Assembly Instructions set and use in Assembly language Programs
- 3) **CS305.3** Explain Programming models of 8086 microprocessors
- 4) CS305.4 Classify the 8086 Assembly Instructions set and use in Assembly language Programs
- 5) CS305.5 Understand the higher processor architecture
- 6) CS305.6 Understand the need for other Microprocessors

Syllabus:

| | TEACHING SCHEME | | | | | | | EVALUATION SCHEME | | | |
|-----------------|-----------------|---|----|-------------------|----------|----------|---------------------|-------------------|------------------|--|--|
| | | | | | | | | Practical(Marks) | | | |
| Course | - | | | <i>a</i> n | <i>.</i> | Theory (| Marks) | TW | | | |
| | L | | ТР | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for Passing | | |
| | | | | | CIE | 30 | 40% | 25 | 10 | | |
| Microprocessors | 03 | - | 02 | 04 | ESE | 70 | 40% | 23 | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

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Unit 1: Architecture of 8085

Classification of Instructions, Instruction set of 8085 Introduction to 8051 Micro controllers

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|---------------|---------------|---------|
| 6 | III | PCC- CS306 | C Programming | 5 |

Unit 2: The Microprocessor and its Architecture:

a) Internal Microprocessor Architecture b) Real Mode Addressing Addressing Mode: a) data Addressing Mode b) Program Memory Addressing Mode c) Stack memory Addressing mode.

Unit 3: Data movement Instruction, PUSH and POP, Load Effective Address String Data Transfer Arithmetic Instruction: a) Addition b) Subtraction c) Comparison d) Multiplication e) Division BCD & ASCII Arithmetic, Assembler Details.

Unit 4: Logic & Program Control Instruction:

a) Basic Logic Instruction Shift & Rotate, Jump Group and Procedures Machine Control & Miscellaneous Instructions Basic Interrupt Processing, Hardware Interrupts

Unit 5: 80386Microprocessor:

Introduction to 80386 Microprocessor, The Memory System Special 80386 Registers80386 Memory Management, Virtual 8086 Mode Introduction to Protected Mode memory Addressing, Memory Paging Mechanism

Unit 6: Pentium Pro Microprocessor

Introduction to Pentium Pro Microprocessor, Internal Structure of the Pentium Pro, the Memory System Multiple Core technology.

TEXT BOOKS:

- 1. The INTEL Microprocessors; Architecture, Programming and Interfacing By Barry B Brey (8th Edition)
- 2. Microprocessors and Microcontrollers- N.Senthi Kumar, M, Saravanam and SJeevananthan (Oxford UniversityPress)

REFERENCE BOOKS:

1. Microprocessors Architecture, Programming and Application with 8085 by Ramesh Gaonkar 2 The Microcomputer Systems: the 8086.8088 Family By Yu Chenn A. Gibson (PHI Ltd

List of Experiments:

1. To convert different number from decimal to binary, octal to hexadecimal & vice versa & also study of logic gates.

- 2. Perform hands on experiment using 8085kit.
- 3. Storing and displaying the content stored at different registers and memory location
- 4. Implementation of 8085 programs involving data transfer and arithmetic instruction set.
- 5. Implementation of 8085 programs involving logical and bit manipulation instruction set.
- 6. Implementation of 8086 programs involving branch instruction and machine control instruction set.
- 7. Implementation of DOS debugs utility.
- 8. Use of assembler directive and find the count and the sum of even, odd numbers from the given array.
- 9. Implementation of string data transfer instructions and use of Db directive for declaration of 2-Darray
- 10. Implementation of Dos interrupts to read char from keyboard and display on the screen.
- 11. Implementation of basic logic instruction, shift and rotate instruction and BCD and ACSII arithmetic instructions.
- 12. To study memory management unit of 80386 processor which include address calculation, descriptor and paging mechanisms.

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PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

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

1) CS306.1 Articulate the principles of procedure oriented problem solving and programming.

2) CS306.2 Explain programming fundamentals including statements, control flow and recursion

3) CS306.3 Able to formulate problems and implement algorithms in C

4) CS306.4 Analyze and use data structures to solve the complex problem statements.

5) CS306.5 Demonstrate file operations using file handling concepts through developing applications.

Syllabus:

| | | TEA | CHIN | G SCHEM | IE | EVALUATION SCHEME | | |
|---------------|----|-----|------|---------|------------------|---------------------|------|------------------|
| Course | | Т | Р | Credit | Practical(Marks) | | TW | |
| course | L | | | | Max. | Min. for Passing | Max. | Min. for Passing |
| C Programming | 03 | - | 02 | 05 | 50 | 20 | 25 | 10 |

CIE- Continuous Internal Evaluation

Unit 1: Introduction toC:

Form of a C Program, The Library and Linking, Separate Compilation, Compiling a C Program, C's Memory Map; Expressions – The Basic Data Types, Modifying the Basic Types, Identifies Names, Variables, The Four C Scopes, Type Qualifiers-const, volatile, Storage Class Specifiers; Statements - Selection Statements, Iteration Statements, Jump Statements, Expression Statements, Block Statements.

Unit 2: Console I/O & Basics of Array and Strings.

Console I/O: Reading and Writing Characters, Reading and Writing Strings, Formatted Console I/O, printf(), scanf(), Suppressing Input. Arrays and Strings- Two-Dimensional Arrays, Arrays of Strings, Multidimensional Arrays, Array Initialization, Variable- Length Arrays.

Unit 3: Functions:

The General Form of a Function, Understanding the Scope of a Function, Parameter passing, Passing arrays to functions, Function Arguments, argc and argv-Arguments to main(),The return Statement, What Does main() Return?, Recursion, Function Prototypes, Declaring Variable Length Parameter Lists, The inline Keyword..

Unit 4: Pointers:

What Are Pointers?, Pointer Variables, The Pointer Operators, Pointer Expressions, Pointers and Arrays, Arrays of Pointers, Multiple Indirection, Initializing Pointers, Pointers to Functions and structures, C's Dynamic Allocation Functions, restrict-Qualified Pointers, Problems with Pointers.

Unit 5: Structures, Unions, Enumerations, and type def:

Structures, Arrays of Structures, Passing Structures to Functions, Structure Pointers, Arrays and Structures Within Structures, Unions, Bit-Fields, Enumerations, Using sizeof to Ensure Portability, typedef.

ESE – End Semester Examination

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FileI/O,StandardCvs.UnixFileI/O,StreamsandFiles,FileSystemBasics,fread() 6 and fwrite(), fseek() and Random-Access I/O, fprintf() and fscanf(), The Standard Streams.

TEXT BOOKS:

1. C the Complete Reference by Herbert Schild (Tata McGraw Hill) 4thEdition.

2. The C Programming Language- Brian W. Kernighan, Dennis Ritchie 2ndEdition.

REFERENCE BOOKS:

1. Programming in ANSI C by E.Balaguruswamy.(TataMcGraw Hill)4thEdition.

2. Let Us C By Yashavant P. Kanetkar, 5thEdition.

List of Experiments:

1. Branching Statements.

- 2. Looping.
- 3. Arrays
- 4. Functions.
- 5. Storage Class...
- 6. Structures.

7. Implementation of STACK.

8. Implementation of QUEUE.

9. Implementation of LINKEDLIST

10. Copy Contents of one file to another file.

11. Implementation of GRAPH.

12. Implementation of TREE.

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|---------------|-------------|---------|
| 7 | III | PCC- CS307 | SOFT SKILLS | 5 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

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

1) CS307.1 Effectively communicate through verbal/oral communication and improve the listening skills.

2) CS307.2 Actively participate in group discussion / meetings / interviews and prepare & deliver presentations

3) CS307.3 Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leader ship quality

Syllabus:

| | , | TEA | CHIN | G SCHEM | E | EVALUATION SCHEME | | | |
|-------------|----|-----|------|---------|------------------|---------------------|------|------------------|--|
| Course | | | | Credit | Practical(Marks) | | TW | | |
| course | L | Т | Р | | Max. | Min. for Passing | Max. | Min. for Passing | |
| SOFT SKILLS | 00 | - | 02 | 01 | 25 | 10 | 25 | 10 | |

Unit 1: Understanding Communication Skills

Verbal Communication - Effective Communication - Active listening – Articulation Paraphrasing – Feedback Non- Verbal Communication- Body Language of self and others

Unit 2: Behavioral Skills /Self Development:

SWOT Analysis, Confidence improvement, values, positive attitude, positive thinking and self esteem

Unit 3: Leadership and Team Building:

Culture and Leadership-Salient Features of Corporate Culture, Leadership Styles, Leadership Trends, Team Building- Team Development Stages, Types of Teams, Attributes of a successful team – Barriers involved

Unit 4: Developing Writing skills:

E-mail writing, report writing, resumes writing, practice.

Unit 5: Stress and Time Management:

Stress in Today's Time- Identify the Stress Source, Signs of Stress, Ways to Cope 5 with Stress. Healthier Ways to Combat Stress, Steps to be taken in the Organizations: Open communication, Time Management, Working towards Your Goals, Smart Work, Prioritize your Tasks

Unit 6: Professional Skill

Ethics, Etiquette and Mannerism-All types of Etiquette (at Meetings, Etiquette at Dining. Involuntary Awkward Actions, Public Relations Office (PRO) 's Etiquettes) 6 Technology Etiquette: Phone Etiquette, Email Etiquette, Social Media Etiquette, Video Conferencing Etiquette, and Interview Etiquette. Dressing Etiquettes: for Interview, offices and social functions. Ethical Values: Importance of Work Ethics, Problems in the Absence of Work Ethics.

TEXT BOOKS:

1 Developing Communication Skills by Krishna Mohan and MeeraBanerji;MacMillan India Ltd., Delhi

2. Gajendra Singh Chauhan, Sangeeta Sharma: Soft Skills – An Integrated Approach to Maximize Personality, WILEY INDIA, ISBN:13:9788126556397

3. Essentials of Effective Communication, Ludlow and Panthon; Prentice Hall ofIndia.

REFERENCE BOOKS:

1. Indrajit Bhattacharya, —An Approach to Communication Skills, Delhi, Dhanpat Rai,2008.

2. Seven Spiritual Laws of Success - DeepakChopra

3. Simon Sweeney, —English for Business Communication, Cambridge University Press, ISBN13:978-0521754507.

SEMESTER IV

| Sr. No | Code No. | Subject | Credits |
|--------|------------|--|---------|
| 1. | PCC-CS401 | Automata Theory | 3 |
| 2. | PCC- CS402 | Computer Networks - II | 4 |
| 3. | PCC- CS403 | Computer Organization and Architecture | 3 |
| 4. | PCC-CS404 | Operating Systems - I | 4 |
| 5. | PCC-CS405 | Software Engineering | 3 |
| 6. | PCC-CS406 | Object Oriented Programming | 4 |
| 7. | PW- CS407 | Mini Project | 1 |
| 8. | MC-CS408 | Environmental Studies | 3 |
| | | Total= | 25 |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------|-----------------|---------|
| 1 | IV | PCC-CS401 | Automata Theory | 5 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

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

- 1) **CS401.1** Understand basic concepts of Regular Language and Regular Expressions
- 2) **CS401.2** Select appropriate abstract machine to recognize a given formal language.
- 3) **CS401.3** Generate complex languages by applying Union, Intersection, Complement, Concatenation and Kleene * operations on simple languages
- 4) **CS401.4** Apply parsing concepts for syntax analysis.
- 5) **CS401.5** Be familiar with thinking analytically and intuitively for problem solving situations in related areas of theory in computer science.

Syllabus:

| | | Te | achin | g Scheme | | Evaluation Scheme | | | | | |
|--------------------|----|----|-------|----------|--------|-------------------|---------------------|------------------|---------------------|------|-----------------|
| Course | _ | _ | _ | | | Theory (Marks) | | Practical(Marks) | | POE | |
| | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for Passing | Max. | Min. forPassing |
| Automata Theory | 03 | 00 | 00 | 03 | CIE | 30 | 40% | - | - | - | - |
| | | | | | ESE | 70 | 40% | - | - | - | - |

CIE- Continuous Internal Evaluation

Unit 1: Regular Languages and Finite Automata: (7) Proofs, Recursive Definitions, Regular expressions and regular languages, Finite Automata, unions, intersection & complements of regular languages, Applications

Unit 2: Non determinism and Kleene's Theorem:

Non deterministic finite automata, NFA with null transition, Equivalence of FA's, Kleene's Theorem (Part I & Part II). Minimal Finite Automata

Unit3: Context free Grammars:

Definition, Union, Concatenation and Kleene *'s of CFLs, Derivation trees and ambiguity, Simplified forms and normal forms

Unit 4: Parsing and Push down Automata:

Definition of Pushdown Automata, Deterministic PDA, Equivalence of CFG's& PDA's, Top down parsing, bottom up parsing.

Unit 5: Context free languages:

CFL's and non CFL's, Pumping Lemma, intersections and complements of CFLs

Unit 6 Turing Machines:

Definition, TM as language acceptors, combining Turing Machines, Computing 7 partial function with a TM, Multi-tape TMs, and Universal TM

Text Books:

1) Introduction to Languages & the Theory of Computations - John C. Martin (Tata MGHEdition)

2) Discrete Mathematical Structures with applications to Computer Science – J.P. Trembley & R. Manohar (MGH) **References Books :**

- 1)Introduction to Automata Theory, Languages and computation John E. Hopcraft, Raje
- 2) Motwani, Jeffrey D. Ullman (Pearson Edition)
- 3)Introduction to theory of Computations Michael Sipser (Thomson Books/Cole)
- 4) Theory of Computation Vivek Kulkarni

ESE - End Semester Examination

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| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------------|----------------------|---------|
| 2 | IV | (PCC-CS- 402) | Computer Networks-II | 4 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment. COs:

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

- 1) **CS402.1** program the client server model using sockets
- 2) CS402.2 understand and apply next generation protocol and addressing model
- 3) CS402.3 elaborate the fundamentals of Domain Name Systems
- 4) **CS402.4** apply the concepts of Remote login and FTP in network applications.
- 5) CS402.5 learn fundamentals of web, HTTP and e-mail communication protocols.
- 6) CS402.6 understand multimedia streaming and relevant protocols..

Syllabus:

| | | | Tea | ching Sch | eme | Evaluation Scheme | | | | | |
|-------------|----|---|-----|-----------|--------|-------------------|---------------------|------------------|---------------------|------|---------------------|
| Course | L | | | Credit | Scheme | Theory | y (Marks) | Practical(Marks) | | TW | |
| | | Т | Р | | | Max. | Min. for Passing | Max. | Min. for Passing | Max. | Min. for Passing |
| Computer | 03 | - | 01 | 04 | CIE | 30 | 40% | | | | |
| Networks-II | | | | | ESE | 70 | 40% | 50 | 20 | 25 | 10 |

Unit 1: Client server model & socket interface

The Socket Interface, The Client Server model and Software design, Concurrent processing in client-server software, Algorithms and issues in Client-Server design, Multiprotocol Servers, Multiservice Servers, Concurrency in clients, Unix Internet Super server (inetd).

Unit 2: Next Generation IPv6 and ICMPv6:

IPV6 addresses, packet format, ICMPV6, Transaction from IPV4 to IPV6

Unit 3: BOOTP, DHCP and Domain name system:

Name Space, Domain Name Space, Distribution of name space, and DNS in internet, Resolution, DNS massages, Types of records, Compression examples, and encapsulation. BOOTP, DHCP

Unit 4: Remote Login: TELNET and File TransferFTP, TFTP:

Concept, NVT, Embedding, Options & options/sub-option negotiation, controlling the server, Outof-band signaling, Escape charter, Mode of operation, user interface. FTP: Connections, Communication, Command processing, File transfer, User interface, Anonymous FTP, TFTP...

Unit 5: Web Applications Service Protocols:

HTTP: Architecture, Web Documents, HTTP Transaction, RequestandResponse, 7 HTTP Headers and Examples, Persistent Vs Non-Persistent HTTP, Proxy servers. Electronic Mail: Architecture, User agent, addresses, Delayed delivery, SMTP commands and responses, Mail transfer phases, MIME, POP3

Unit 6: Multimedia In Internet:

Streaming stored audio/video, Streaming live audio/video, Realtimeinteractive 6 audio/video, Real Time Transport Protocol (RTP), Real Time Transport Control Protocol (RTCP), Voice Over IP (VoIP), Session Initiation Protocol (SIP)

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Text Books:

- 1. TCP/IP Protocol Suite by Behrouz A. Forouzan McGraw-Hill Publication, 4thEdition.
- 2. Computer Networks by Andrew STanenbaum

References Books:

- 1. Data Communications and Networking by Behrouz AForouzan
- 2. Internetworking with TCP/IP by Douglas Comer
- 3. Computer Networking: A Top-Down Approach by Jim Kurose

Term work:

It should consist of minimum 8 - 10 experiments based on the following guidelines

- 1. Client program using UDP to connect to well known services (echo, time of the day serviceetc.).
- 2. Implementing concurrent TCP multiserviceclient/server.
- 3. Implementing Iterative UDP client/server.
- 4. Study of following DNS Tools with all its options. nslookup, dig, host, whois.
- 5. Implement trivial file transfer protocol (TFTP).
- 6. Configuration of basic services for FTP, HTTP, Telnet etc. on LinuxPlatform
- 7. Write program to send a mail using SMTP commands and receive a mail using POP3commands.

8. Capturing & Analyzing operation of various application layer protocols using network protocol analyzer. (Wireshark andtcpdump)

9. Study of various streaming multimedia protocols in Internet (Using various audio/video streaming services on theInternet)

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------|--|---------|
| 3 | IV | PCC-CS-403 | Computer Organization and Architecture | 5 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1) **CS-403.1** recapitulate the history of computer system and the basic concepts of computer architecture and organization.
- 2) CS-403.2 understand the concept of I/O organization.
- 3) **CS-403.3** apply the different algorithms to perform arithmetic operations.
- 4) **CS-403.4** articulate the design issues in the development of processor.
- 5) **CS-403.5** conceptualize instruction level parallelism.
- 6) **CS-403.6** understand the concept of memory techniques.

Syllabus:

| | | Tea | aching | Scheme | | Evaluation Scheme | | | |
|--------------|----|-----|--------|--------|--------|-------------------|---------------------|------------------|---------------------|
| Course | | | Р | Credit | | Theory (| (Marks) | Practical(Marks) | |
| Course | L | Т | | | Scheme | Max. | Min. for Passing | Max. | Min. for Passing |
| Computer | 03 | _ | 00 | 05 | CIE | 30 | 12 | - | - |
| Architecture | 05 | | 00 | 03 | ESE | 70 | 28 | - | - |

1. Computer Evolution and Performance

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Evolution of computer – Mechanical Era: Babbage's Difference Engine, Electronic Era: First generation, IAS Computers, Instruction Set and Instruction Execution, Second 5 generation, Input-Output Operation, Programming Language, Third generationand VLSI Era – IC Circuits, Performance Consideration and Measures, Speed up Techniques, Difference between RICS and CISC.

2. Electrical Design of overhead lines

Accessing I/O devices, Direct Memory Access (DMA), Buses: Synchronous Busand Asynchronous Bus, Interface Circuits, Standard IO Interface.

3. Arithmetic

Addition and Subtraction of Signed Numbers, Design of fast Adders, Multiplication of Positive numbers, Signed Operand Multiplication, Fast Multiplication, Integer Division, Floating Point Number Operations: IEEE 754 Floating Point Format, Arithmetic Operations

4. The Processing Unit.

Some fundamental Concepts, Execution of complete Instruction, Multiple bus organization, Hardwired control, Micro programmed Control

5. Pipelining

Basic Concepts: Role of Cache Memory, Pipeline Performance. Data Hazards: Operand Forwarding, Handling Data Hazards in Software and Side Effects and Instruction Hazards: Unconditional Branches and Conditional Branches and Branch Prediction

6. Computer Memory System

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Some Basic Concepts, Types of Memories: ROM and RAM, Semiconductor RAM memory, 6 Cache Memories: Mapping functions, Replacement Algorithms, Example of Mapping Techniques

TEXT AND REFERENCE BOOKS:

1. Computer Architecture and Organization-John P Hayes (MGH) 3rdEdition

2. Computer Organization – Carl Hamacher, ZvonkoVranesic and SafwatZaky . Publisher: Tata McGraw Hill. 5thEdition.

REFERENCE BOOKS

1. Computer Architecture and Organization-John P Hayes (MGH) 3rdEdition

2. Computer Organization – Carl Hamacher, ZvonkoVranesic and SafwatZaky . Publisher: Tata McGraw Hill. 5thEdition.

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|----------------|--------------------|---------|
| 4 | IV | PCC-CS- 404 | Operating System I | 4 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment. **COs:**

At the end of the course the students should be able to:

- 1) CS-404.1 To make the students understand basic concepts of operating system
- 2) solving the problem of electromagnetic field theory
- 3) **CS-404.2** To expose the students to various functions of the Operating system and the usage
- 4) **CS-404.3** To give hands on exposure to Linux commands and system calls.

Syllabus:

| | | Те | aching | Scheme | | Evaluation Scheme | | | | |
|--------------------|----|----|--------|--------|--------|-------------------|---------------------|------|---------------------|--|
| Course | | | Р | | | Theory (I | Marks) | Tw | | |
| Course | L | Т | | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for Passing | |
| Operating System I | | | | | CIE | 30 | 12 | 25 | 10 | |
| operating bystem r | 03 | - | 2 | 04 | MSE | 70 | 28 | | | |

UNIT 1: Overview of OS

Abstract view of an operating system,

Fundamental principles of OS operations, OS interaction with the computer and user programs, Efficiency ,system performance and user service, Batch Processing System, Multiprogramming System, The Time Sharing System, The Real Time Operating System, Distributed operating system, Operation of OS, Operating system with monolithic structure, Virtual machine operating system, Kernel based operating system, Microkernel based operating system

UNIT 2: Processes, Threads and Synchronization

Processes and programs, Implementing processes, Threads, Process synchronization, Race condition, Critical Section, Synchronization approaches, Classic process synchronization problems, Semaphores, Monitors

UNIT 3: Process Scheduling

Scheduling terminology and concepts, Non preemptive scheduling policies, Preemptive scheduling policies, Long, Medium and short term scheduling

UNIT 4: Deadlock

What is deadlock, Deadlock in resource allocation, Handling Deadlocks: Deadlock Detection and Resolution, Deadlock prevention, Deadlock avoidance

Unit 5: . Memory Management

Managing the memory hierarchy, Static and Dynamic Memory Allocation, Heap Management, Contiguous Memory Allocation and Non Contiguous Allocation, Segmentation and Segmentation with paging, Virtual memory basics, Demand paging, Page replacement policies General Instructions:

Unit 6: File systems and I/O systems

Overview of file processing, Files and file operations, Fundamental file organizations and access methods, Layers of the Input Output control system, Overview of I/O system

Text Books:

1. Operating Systems -A Concept Based approach -Dhananjay M Dhamdhere (TMGH).3rdedition.

2. Operating System Concepts – Abraham Silberschatz, Peter B. Galvin & Grege Gagne(Wiley)

Reference Books:

- 1. UNIX Concepts and Applications –Sumitabha Das(TMGH).
- 2. Operating System: Concepts and Design –Milan Milenkovic (TMGH)
- 3. Operating System with case studies in Unix, Netware and Windows NT –Achyut S. Godbole (TMGH).

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|----------------|----------------------|---------|
| 5 | IV | PCC-CS- 405 | Software Engineering | 3 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1) CS-405.1 Comprehend systematic methodologies of SDLC(Software Development Life Cycle)
- 2) **CS-405.2** Discriminate competing and feasible system requirements indicating correct real world problem scope and prepare stepwise system conceptual model using stakeholder analysis and requirement validation.

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- 3) **CS-405.3** Prepare SRS document for a project
- 4) **CS-405.4** Apply software design and development techniques.
- 5) **CS-405.5** Develop a quality software project through effective team-building, planning, scheduling and risk
- 6) **CS-405.6** Understand testing methods at each phase of SDLC

Syllabus:

| | | Tea | ching Sch | eme | | Evaluation Scheme | | | | | |
|----------------------|----|-----|-----------|--------|--------|-------------------|---------------------|------------------|---------------------|--|--|
| Course | | | | | | Theory (| Marks) | Practical(Marks) | | | |
| | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for Passing | | |
| | | | | | CIE | 30 | 12 | 50 | 40% | | |
| Software Engineering | 03 | - | 00 | 00 | ESE | 70 | 28 | | | | |

CIE- Continuous Internal Evaluation

Unit I: The software Problem

Cost, Schedule & Quality, Scale and Change, Software Lectures Processes: Process & Project, Component Software Processes, Software Development process Models, Project Management Process. Unit II: Software Requirements Analysis & specification (5) Value of Good SRS, Requirement Process, Requirements Specification, Other Approaches for Analysis, Validation **Unit III: Software Planning & Scheduling** (5)

ESE - End Semester Examination

Responsibilities of Software Project Manager, Project Planning, Project Scheduling, Project Staffing, People CMM, Risk Management

Unit IV: Design

Design Concepts, Function Oriented Design, Object Oriented Design, Detail Design, Verification, Metrics

Unit V: Coding & Testing

Coding & Code Review, Testing, Unit Testing, Black Box, Testing, White Box Testing, Program Analysis Tools, Integration Testing, System Testing

Unit VI: Software Reliability & Quality Management

Reliability, Software Quality, Software Quality Management System, ISO 9000, SEI capability Maturity Model, Six Sigma, Agile Software Development & Extreme Programming, Agile Project Management Text Books:

1. Software Engineering: A precise Approach – Pankaj Jalote (Wiley India) (Unit1,2,4).

2. Fundamentals of Software Engineering – Rajib Mall (3rd Edition)(PHI) (Unit 5,6).

3. Software Engineering by Jan Sommerville (9th Edition) Pearson (Unit 6, 7 & 6.8).

4. Software Engineering Principles & Practices by Rohit Khurana ITLESL (2nd Edition) Vikas Publishing House Pvt. Ltd. (Unit3).

Reference Books:

1. Software Engineering - Concepts & Practices - Ugrasen Suman (CenageLearning)

2. Software Engineering Fundamentals -Behforooz& Hudson (Oxford: Indian Edition1st)

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-------------|-----------------------------|---------|
| 6 | IV | (PCC-CS406) | Object Oriented Programming | 4 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

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COs:

Syllabus

- 1) Use the characteristics of an object-oriented programming language in a program.
- 2) Use the basic object-oriented design principles in computer problem solving.
- 3) Use the basic principles of software engineering in managing complex software project.
- 4) Program with advanced features of the C++ programming language.
- 5) Program with advanced features of the C++ programming language.

| bynabus. | | | | | | | | | | |
|--------------------------------|----|------|----------|--------|--------|-------------------|---------------------|------|---------------------|--|
| | | Teac | ching Sc | heme | | Evaluation Scheme | | | | |
| Course | | | | | | TW | TW | | Practical(Marks) | |
| | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for Passing | |
| Object Oriented Programming | 02 | - | 04 | 04 | | 50 | | | | |

Unit1. Basics of Object Oriented Programming

The Origins of C++,Features of Object Oriented Programming, relations of Classes & Structures, Classes & Objects, Encapsulation, Data Abstraction, Inheritance, Inline Function, Constructor &Destructor ,function overloading & Operator overloading, Static class member, Static Member Function, Scope resolution Operator, Access members Data member & member Function, Defining member functions, Passing Object to Functions, Nested classes, local classes, Friend functions, Friend class **Unit2. Pointers , Arrays, Dynamic allocation Operator** (3 lectures)

Arrays Of Object, Pointers to Object, THIS pointer, type checking C++ Pointers, Pointers to Derived types, Pointers to Class members

Unit3. Functions & Operator Overloading:

Functions Overloading, Operator Overloading, Types Of Constructors, 4 Destructors, Operator Overloading Using Friend Function, Unary & Binary Operator Overloading(Arithmetic, Comparison Operator Overloading), Assignment Operator Overloading(=,+=)

Unit4. Inheritance & Virtual Function:

Inheritance, Single Inheritance, Types of Derivations, Passing parameters to base ,Multiple Inheritance, Multilevel Inheritance, Hybrid Inheritance ,Hierarchical Inheritance , Virtual function, Calling a Virtual function through a base class reference, Virtual functions are hierarchical, Pure virtual functions, Abstract classes, Early and late binding. Unit5. Templates & Exception handling : (5 lectures)

Function Template ,Class Template, Generic Classes ,Generic Functions, Applying Generic Functions Type Name, export keyword Power of Templates Standard Template Library (STL):-STL Container, STL Algorithm, STL iterator. Exception handling :-Exception handling fundamentals, Catching, Throwing ,& Handling Exception, Exception handling options,

Unit6. I/O System Basics, FileI/0

Streams ,File Pointers & Redirections Streams, C++ stream, C++ Predefined stream classes, Formatted I/O, C++ file I/O, manipulators, fstream and the File classes, File operations, namespaces, std namespaces

TERM WORK:

1. It should consist of minimum 10-12 experiments based on the syllabus and concepts mention Below . Students of different batches should implement different programs based on the following guidelines

2. Student should perform the Practical's on Linux platform

List of Experiments

1. Classes & objects

2. Constructors & destructors

(5 lectures)

(4 lectures)

(4 lectures)

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3. Friend function and Friendclass

4. Inline Function, Static data members & memberfunctions,

5. Array, Array of Objects, Pointer to Object, THIS pointer, Dynamic allocation operators (New & Delete)

- 6. Function overloading, Operator overloading (unary/binary/arithmetic/comparison)
- 7. Inheritance (multilevel, multiple, hybrid, Hierarchical)
- 8. Virtual function and Virtual class, early and latebinding
- 9. Generic function & classes
- 10. STL
- 11. ExceptionHandling
- 12. Filehandling

TEXT BOOKS:

1. The Complete Reference C++ by Herbert Schild(Tata McGraw Hill) 4th Edition andonwards.

2. Object oriented Programming in C++ by Rajesh K.Shukla(Wiley) IndiaEdition

REFERENCE BOOKS:

1 Object-Oriented Programming with C++ by E. Balaguruswamy. (Tata McGraw-Hill) 6th Edition and onwards

2. Object oriented Programming with C++- by SouravSahay (Oxford) 2ndedition

SEMESTER V

| Sr. No | Code No. | Subject | Credits |
|--------|------------|-----------------------------------|---------|
| 1. | PCC-CS501 | Information Security | 4 |
| 2. | PCC-CS502 | System Programming | 4 |
| 3. | PCC-CS503 | Object-Oriented Modeling & Design | 3 |
| 4. | PCC-CS504 | Computer Algorithms | 5 |
| 5. | PCC-CS505 | Computer Graphics & Multimedia | 3 |
| 6. | PCC- CS507 | Java Programming | 5 |
| 7. | HM- CS508 | Business English | 1 |
| | | Total | 25 |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------|----------------------|---------|
| 1 | V | PCC-CS501 | Information Security | 4 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment **COs:**

At the end of the course the students should be able to:

- 1. Understand principles of Crypto-systems.
- 2. Compare and analyze various security services and mechanisms.
- 3. Apply and use the features of PGP, S/MIME, DSA, IPSec, SSL in their profession.
- 4. Take precautions of their personal computing system from possible threats and attacks.

5. Explore newer vulnerabilities and provide the solutions to them.

Syllabus:

| | | 1 | leach | ning Schen | ne | Evaluation Scheme | | | | | | |
|-------------|----|---|-------|------------|--------|-------------------|---------------------|------|---------------------|------------|---------------------|--|
| Course Code | | Т | Р | | | Theory (Marks) | | TW | | POE(Marks) | | |
| And Title | L | | | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing | |
| Information | | | | | CIE | 30 | 12 | | | | | |
| Security | 03 | | 02 | 04 | ESE | 70 | 28 | 50 | 20 | - | - | |

CIE- Continuous Internal Evaluation

UNIT NO 1: Classical Encryption Techniques and DES:

The OSI Security Architecture, Symmetric Cipher Models: Substitution Techniques, Transposition Techniques, Block Cipher Principles, The Data Encryption Standard.

UNIT NO 2: Public-Key Cryptosystems, Key Management and Authentication:

Principles of Public-Key Cryptosystems, The RSA Algorithm, Key Management, Diffie-Hellman Key Exchange, Authentication requirements, Authentication functions, MAC and Hash functions and their requirements.

UNIT NO 3. Digital Signatures and Authentication Applications:

Digital Signature, Digital Signature Standard, Authentication applications - Kerberos, X.509 Authentication service.

UNIT NO 4. Electronic mail and IP security:

Email Security - PGP, S/MIME, IP Security-IP Security Architecture, Authentication Header and Encapsulating Security Payload.

UNIT NO 5. Web and System Security:

Secure Socket Layer and Transport Layer Security, Secure Electronic Transaction, Intruders, Intruder Detection, Password Management, Firewall Design Principles, Trusted Systems.

UNIT NO 6. Non-Cryptographic Protocol Vulnerabilities:

DoS and DDoS, Session Hijacking and Spoofing, Pharming attacks. Software Vulnerabilities - Phishing, Buffer Overflow, Format String attacks, SQL Injection.

Experiment List

1. GCD Using Euclidean algorithm/Computing Multiplicative inverses/ Prime number and modular Arithmetic operations.

- 2. Substitution/Transposition/ Product Cipher and their Analysis
- 3. Single round of DES algorithm/Double DES/ Triple DES and its analysis
- 4. RSA Algorithm to provide Confidentiality and Authentication services or any other Public-Key Algorithm.
- 5. Diffie–Hellman or any other key exchange Algorithm.
- 6. Implementation and use of any authentication functions / algorithm.
- 7. Generation and use of Digital Signature for real world situation.
- 8. Usage of PGP security package and S/MIME features.
- 9. Experimenting with SSL/TLS/E-Commerce Applications and identifying their Vulnerabilities.
- 10. Demo and usage of network traffic analysis tools.
- 11. Experimentation on identifying non-cryptographic Protocol Vulnerabilities and remedies thereon.
- 12. Experimenting on identifying software Vulnerabilities using various tools/techniques and their analysis.
- 13. Any other4 Implementation/Demo/Experimentation based on the topics of syllabus.

Text Books:

- 1. Cryptography and Network Security- William Stallings- Pearson Edition- (Unit I to V)
- 2. Network Security and Cryptography- Bernard Menezes -Cengage Learning- Unit -VI

Reference Books

- 1. Cryptography and network security -Atul Kahate -TMGH
- 2. Cryptography and Network Security -B. A. Forouzan-TMGH

ESE – End Semester Examination

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3. Network Security Know it All -Joshi et. al -Morgan Kaufmann Publisher

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------------|--------------------|---------|
| 2 | V | (PCC - CS502) | System Programming | 3 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

- 1. Student will be able to identify the role of system programs and application programs.
- 2. Student will be able to understand the basics of system programs like editors, compiler, assembler,
- linker, loader, interpreter and debugger.

3. Students able to describe the various concepts of assemblers and macro - processors.

4. Students able to understand the various phases of compiler and

compare its working with assembler.

5. Students understand how linker and loader create an executable program from an object module created by assembler and compiler.

6. Students will be able to create graphical user interfaces for basic programs and learn about terminal input/output through the term ios libraries.

Syllabus:

| | | | Teac | hing Sch | eme | Evaluation Scheme | | | | | | |
|-------------------|----|---|------|----------|--------|-------------------|------------------------|------------|------------------------|------------|------------------------|--|
| Course | | | Р | | | Theory (Marks) | | TW (Marks) | | POE(Marks) | | |
| Code and Title | L | Т | | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing | |
| System | 03 | | 02 | 04 | CIE | 30 | 12 | - | • | | | |
| Programming | | | | | ESE | 70 | 28 | 50 | 20 | 25 | 10 | |

CIE- Continuous Internal Evaluation

UNIT NO 1: Language Processors:

Introduction, Language processing activities, Fundamentals of language processing, Fundamentals of language, Specification, Language Processing Development Tools: LEX and YAC

UNIT NO 2: Assemblers

Elements of assembly language programming, A simple assembly scheme, pass structure of assemblers, Design of a two pass assemble

UNIT NO 3. Macros and Macro Processors::

Macro definition and call, Macro expansion, Nested macro calls, Advanced macro facilities, Design of macro preprocessor: Design Overview, Data structure of Macro pre-processor with and Example

UNIT NO 4. Compilers and Interpreters::

Aspects of compilation, Memory allocation: Static and Dynamic memory allocation, Memory Allocation in block Structure language. Compilation of expressions, Code optimization: Local and Global optimization and Optimization technique, Interpreters.

UNIT NO 5. Linkers:

Introduction, Relocation and linking concepts, Self- relocating programs, linking for overlays, Loaders

ESE - End Semester Examination

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UNIT NO 6. Software tools::

Introduction, Software tools for program development, Editors, Debug Monitors, Programming Environments, and User Interface

Term Work

Minimum of 5 experiments on LEX and 5 case-studies each on Assembler, Complier, Macro Preprocessor, Linker and Loaders

Text Books:

- 1. System Programming and operating systems- D. M. Dhamdhere 2ndEdition (TMGH) All Units
- 2. Lex &Yacc Publisher: -Doug Brown, John Levine, Tony Mason -2nd Edition O'Reilly Media- For Practical

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------------|-------------------------------------|---------|
| 3 | V | (PCC - CS503) | Object Oriented Modeling and Design | 3 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

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

- 1. Ability to analyze and model software systems
- 2. Ability to construct OO view of the system
- 3. Ability to design a Software System using OMT design techniques.
- 4. Ability to design a Software System using UML design techniques.

Syllabus:

| | | Т | 'eachin | g Schem | e | | Evaluation | Scheme | | | |
|--------------------------|----|---|---------|---------|--------|--------|--------------------|------------------|--------------------|------------|--------------------|
| | | | | | | Theory | (Marks) | Practical(Marks) | | POE(Marks) | |
| Course Code And Title | L | Т | Р | Credit | Scheme | Max. | Min.for Passing | Max. | Min.for Passing | Max. | Min.for Passing |
| Object Oriented | | | | | CSE | 30 | 12 | - | - | - | - |
| Modeling and Design | 03 | - | 00 | 03 | ESE | 70 | 28 | - | - | - | - |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

Unit 1: Introduction: Ability to analyze and model software systems

(08)

Object oriented themes, modeling as a design technique. Object Modeling: Object, classes, Link & association, advanced link & Association concepts, generalization & Inheritance, grouping constructs, aggregation, abstract classes, generalization as extension & restriction, multiple inheritance, metadata, candidate key & constraints.

Unit 2: Dynamic & Functional Modeling:

Dynamic modeling: Events & states, operations, nested state diagrams, concurrency, advanced dynamic modeling concepts & simple dynamic model, relation of object dynamic models. Functional Modeling:

(07)

(06)

| | | William Lo | orensen | | | |
|------------|---|--------------------------------------|--|----------------|-----------------------|-----------------------------|
| 2 | The Unified Modeling Language User Guide | Grady Booch, James Rambaugh, Lvar | | Addison Wesley | | Unit 4 to 6 |
| ence Books |]] | racouson | | | | |
| Sr. No. | Title | | Author(s) Name | | Publication & Edition | |
| 1 | Object oriented analysis & design us UML | sing | H. Srimathi, H. Sriram, A. Krishnamoorthy | | | FECH PUBLICATION Edition |
| 2 | Object Oriented analysis& Design | | Andrew High | | | 3 |
| 3 | Practical Object Oriented Design wi | th UML | Mark Priestley | | McGraw-Hill Education | |
| 4 | Threat first Object oriented analysis | Breet Mcla | aughline, Garry | ORF | EILLY | |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|----------------|---------------------|---------|
| 4 | V | PCC - CS504 | Computer Algorithms | 4 |

Police & Devide West

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of this course student will be able to,

design

- 1. Understand and demonstrate algorithm design methods with analysis
- 2. Devise algorithm for given problem statement and analyze its space and time complexity by Using recurrence

functional model, data flow diagrams, specifying operations, constriction, a simple functional model, relation

of functional to object & dynamic model.

Unit 3: Design Methodology:

OMT methodology, Impact of an object-oriented approach, analysis, system design with examples, combining models, Design algorithms, design optimization, implementation of controls, design association & physical packaging.

(03)

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Unit 4: Introducing the UML:

An overview of the UML, Conceptual Model of UML, Architecture of UML Structure modeling Using UML: Classes, Relationship, Diagrams, Class Diagrams.

Unit 5: Behavioral Modeling:

Interactions, Use Cases, Use Case Diagram, Interaction diagrams, Activity diagrams, Events & Signals, State Machines, Process & Threads, Time & Space, State chart diagrams.

Unit 6: Architectural Modeling:

Components, Deployment, Collaboration, Patterns & frameworks, component diagrams, Deployment diagrams. **Text Books**

| Sr. No. | Title | Author(s) Name | Publication & | Units Covered |
|---------|--|---|----------------|---------------|
| | | | Edition | |
| 1 | Object-orientated Modeling & Design: (Unit 1 to 3) | James Rambaugh, Michael Blaha, William Premerlani, Frederick Eddy, William Lorensen | РНІ | Unit 1 to 3 |
| 2 | The Unified Modeling Language User Guide | Grady Booch, James Rambaugh, Lvar Jacobson | Addison Wesley | Unit 4 to 6 |

Refe

relation

3. Categorize the problem to determine polynomial and non-polynomial based on its nature

4. Understand and demonstrate basic concepts of parallel algorithms

Syllabus:

| Course Code | Teaching Scheme | | | | Evaluation Scheme | | | | | | |
|----------------------------|-----------------|-------|----|--------|--------------------------|---------|-------------------------|----------|------------------------|------------|----------------------------|
| And Title | L | Т | Р | Credit | Scheme | T (] | Theory (Marks) TW PO | | POE(M | POE(Marks) | |
| | | | | | | Max | Min .for Passing | Max | Min. for passing | Max | Min. for passi ng |
| Computer | | | | | CSE | 30 | 12 | | | - | - |
| Algorithms | 04 | 01 | 02 | 04 | ESE | 70 | 28 | 25 | 10 | - | - |
| CIE- Continuous Internal E | Evalua | ation | | | | | ESE - End | Semester | Examination | | |

CIE- Continuous Internal Evaluation

SECTION I

Unit 1: Divide and Conquer:

What is algorithm, Algorithm Specification, Recurrence relations, Performance Analysis, Randomized Algorithms. Divide and Conquer: The general method, Binary search, Finding the maximum and minimum, Merge sort, Quick sort, DC Selection Algorithm, analysis of Divide and Conquer algorithms.

Unit 2: The Greedy Method:

The general method, Knapsack problem, Job sequencing with deadlines, minimum-cost spanning trees - Prim's and Kruskal's Algorithms, Optimal storage on tapes, Optimal merge Patterns, Single source shortest paths.

Unit 3: Dynamic Programming:

The general method, Multistage graphs, All pair shortest paths, 0/1 knapsack, Reliability design, Traveling Sales person problem.

Unit 4: Basic Traversal and Search Techniques and Backtracking: (13)

Techniques for Binary Trees, Game Tree; Techniques for Graphs – Breadth First Search & Traversal, Depth First

Search & Traversal, AND/OR graphs; Connected components and Spanning Trees; Bi-connected components and

depth first search. Backtracking - The general method, 8-queen problem, sum of subsets, Knapsack Problem,

Hamiltonian Cycle, and Graph Coloring.

Unit 5: NP Hard and NP Complete Problems:

Basic Concepts, Introduction to NP Hard Graph Problems

Unit6: Introduction to Parallel Algorithm:

Computational Model and Fundamental Techniques and Algorithms - PRAM, MESH and HYPERCUBE.

Text Books

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---------|--------------------------|--------------------------------|-----------------------|---------------|
| 1 | Fundamentals of Computer | Ellis Horowitz, Satraj Sahani, | Universities Press, | All Units |
| | Algorithms | Saguthevar Rajasejaran | Second Edition | |

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| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------------|----------------------------------|---------|
| 5 | V | (OEC - CS505) | Computer Graphics and Multimedia | 4 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment. COs:

At the end of the course the students should be able to:

- 1. Express basic ideas of computer graphics and different display devices.
- 2. Understand & apply various transformation, projection and rendering techniques on graphical objects.
- 3. Identify & apply the intensity of light on graphical objects using different illumination models.

4. Understand multimedia system & use of Multimedia Authoring & Compression techniques on graphical objects.

| | Teaching Scheme | | | | Evaluation Scheme | | | | | | |
|---|-----------------|---|----|--------|-------------------|----------------|---------------------|------------------|---------------------|------------|---------------------|
| ~ | | | | | | Theory (Marks) | | Practical(Marks) | | POE(Marks) | |
| Course Code and Title | | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max | Min. for passing |
| Computer Graphics | | | | | CSE | 30 | 12 | | | | |
| and Multimedia | 03 | | 00 | 03 | ESE | 70 | 28 | | | | |

CIE- Continuous Internal Evaluation

 $ESE-End\ Semester\ Examination$

SECTION I

Unit –I Basic of Computer Graphics

Basic of Computer Graphics, Applications of computer graphics, Display devices: Random and Raster scan systems, Input devices, Scan Conversion techniques: RLE, Frame Buffer, Graphics software and standards.

Unit –II Transformations

Basic 2D & 3D transformations - Translation, Scaling, Rotation, Reflection, Shearing, Multiple Transformations, Rotation about an axis parallel to a coordinate axis, Rotation about an arbitrary axis in space, Affine and Perspective Geometry, Orthographic projections and Axonometric projections.

Unit –III Illumination models and surface rendering methods

Light sources, Basic illumination models, Displaying light intensities, Polygon Rendering methods, Ray tracing methods, Radiosity lighting..

Unit –IV Introduction to Multimedia

Multimedia: Historical perspective, multimedia data and multimedia systems, a multimedia system today, Analog and Digital Signals, Analog-to-Digital Conversion, Media Representation and Media Formats - Digital Images, Digital Video, Digital Audio

Unit –V Multimedia Authoring & Compression

Examples of Multimedia, Requirements for Multimedia Authoring Tools, Intramedia Processing, Intermedia Processing, Media Compression - The Need for Graphics Compression, Graphics compression in relation to other media compression, Mesh

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compression using connectivity encoding.

Unit –VI Computer Animation

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Introduction: Types, Key frame animation, Procedural animation, Construction of an animation sequence, Motion control methods, VFX, SFX, Introduction to Morphing, Wrapping techniques, Defining virtual & Augmented reality.

General Instructions:

Term Work- Minimum 8 to 10 MATLAB based experiments based on above

syllabus should be performed.

Text books:

- 1. Procedural elements for Computer Graphics David F. Rogers (MGH International) (For Units 1)
- Mathematical elements for Computer Graphics David F. Rogers, J. Alan Adams (MGH Int.) (Unit 2)
- 3. Computer Graphics C Version second edition Donald D. Hearn, M. Pauline Baker (Pearson) (Unit 3)
- 4. Multimedia systems: Algorithms, Standards & Industry Practice-Parag Havaldar & Gerard Medioni, Cengage Learning (Unit 4, 5)
- 5. Computer Graphics- Rajesh Maurya (WILEY India) (Unit 6)
- 6. Virtual & Augmented reality Paul Mealy (Kindle Edition) (Unit 6).

| No | Sem | Code No. | Subject | Credits |
|----|-----|------------|------------------|---------|
| 6 | V | PCC -CS507 | Java Programming | 5 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

- 1. Students will be able to articulate the principle of object-oriented problem solving & programming.
- 2. Students will be able to illustrate code reusability, security and abstraction using inheritance, package and interface.
- 3. Students will be able to develop reliable and user-friendly applications using exception handling and file handling.
- 4. Students will be able to create desktop apps using SWING and event handling and also illustrate multithreading concepts.
- 5. Students will be able to use JDBC & collection framework.
- 6. Students will be able to apply network programming concept & develop web applications using servlet and jsp.

Syllabus:

| | Teaching Scheme | | | | Evaluation Scheme | | | | | | |
|-------------------------|-----------------|---|---|--------|-------------------|------|------------------------|-------|------------------------|------------|------------------------|
| Course | | | | | | Theo | ry (Marks) | Pract | ical(Marks) | POE(Marks) | |
| Course Code andTitle | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| Iava | 03 | | 2 | | CSE | - | - | | | | |
| Programming | 03 | 1 | 2 | 5 | ESE | - | - | 50 | 20 | 50 | 20 |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

(5)

(7)

Unit 1: Fundamental Programming in Java:

The Java Buzzwords, The Java Programming Environment- JVM, JIT Compiler, Byte Code Concept, Hotspot, A Simple Java Program, Source File Declaration Rules, Comments, Data Types, Variables, Operators, Strings, Input and Output, Control Flow, Big Numbers, Arrays-Jagged Array. Objects and Classes: Object-Oriented Programming Concepts, Declaring Classes, Declaring Member Variables, Defining Methods, Constructor, Passing Information to a Method or a Constructor, Creating and using objects, Controlling Access to Class Members, Static Fields and Methods, this keyword, Object Cloning, Class Design Hints,

Unit 2: Inheritance, Interface and Packaging

Inheritance: Definition, Super classes, and Subclasses, Overriding and Hiding Methods, Polymorphism, Inheritance Hierarchies, Super keyword, Final Classes and Methods, Abstract Classes and Methods, casting, Design Hints for Inheritance, Nested classes & Inner Classes, finalization and garbage collection. Interfaces: Defining an Interface, Implementing an Interface, Using an Interface as a Type, Evolving Interfaces, and Default Methods. Packages: Class importing, Creating a Package, Naming a Package, Using Package Members, Managing Source and Class Files. Developing and deploying (executable) Jar File

Unit 3: Exception and I/O Streams:

Exception: Definition, Dealing with Errors, The Classification of Exceptions, Declaring Checked Exceptions, Throw an Exception, Creating Exception Classes, Catching Exceptions, Catching Multiple Exceptions, Re-throwing and Chaining Exceptions, finally clause, Advantages of Exceptions, Tips for Using Exceptions. I/O Streams: Byte Stream – Input Stream, Output Stream, Data Input Stream, Data Output Stream, File Input Stream, File Output Stream, Character Streams, Buffered Stream, Scanner, ,Random File Access File.

Unit 4: Graphical User Interfaces using Swing and Multithreading

Introduction to the Swing, Swing features, Swing Top Level Containers-Creating a Frame, Positioning a Frame, Displaying Information in a Panel, The Model-View-Controller Design Pattern, The JComponent Class. Layout Management: Introduction to Layout Management, APIs for Border Layout, Flow Layout, Grid Layout. Event Handling: Basics of Event Handling, The AWT Event Hierarchy, Semantic and Low- Level Events in the AWT, LowLevel Event Types User Interface Components: Text Input, Choice Components, Menus, Dialog

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(6)

Boxes Setting the Look and Feel of UI, Introduction to JApplet Multithreading: Processes and Threads, Runnable Interface and Thread Class, Thread Objects, Defining and Starting a Thread, Pausing Execution with Sleep, Interrupts, Thread States, Thread Properties, Joins, Synchronization **Unit 5: Collection and Database Programming** (7)

Collections: Collection Interfaces, Concrete Collections- List, Queue, Set, Map, the Collections Framework Database Programming: The Design of JDBC, The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Metadata, Row Sets, Transactions

Unit 6: Networking and Web:

Networking: Overview of Networking, Networking Basics, Working with URLs, Creating a URL, Parsing a URL, Reading Directly from a URL, Connecting to a URL, Reading from and Writing to a URL Connection, Sockets, Reading from and Writing to a Socket, Writing the Server Side of a Socket, Datagram, Writing a Datagram Client and Server. Servlet and JSP: Introduction to Servlet, The servlet Lifecycle, Retrieving Information and Sending Information, Database Connectivity using servlet, Introduction to JSP, Writing Scriplets, The jsp Lifecycle, Retrieving Information and Sending Information, Database Connectivity using jsp

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General Instructions:

1. Minimum number of tutorials should be 15 covering all topics.

Text Books:

| Sr. | Title | Author(s) Name | Publication & | Units Covered |
|-----|--|--------------------------------|--------------------------------------|-------------------|
| No. | | | Edition | |
| 1 | Core Java- Volume I Fundamentals | Cay Horstmann and Gary Cornell | Pearson, Eight edition | Unit 1 to Unit 4 |
| 2 | Core Java- Volume II Advanced Features | Cay Horstmann and Gary Cornell | Pearson, Eight edition | Unit 5 and Unit 6 |
| 3 | Java Servlet Programming | Jason Hunter | O'Reilly Publication, 2nd Edition | Unit 6 |
| 4 | Core-Servlet and Java Server Pages Volume – 1 | Marty Hall, Larry Brown | Pearson Education | Unit 6 |

Reference Books:

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---------|-------------------------|------------------------|-----------------------|---------------|
| 1 | JAVA-The Complete | Herbert Schildt | McGraw Hill, Oracle | Ninth edition |
| | Reference | | Press | |
| 2 | Head First Java | Eric Freeman Elisabeth | O'Reilly Publication | 3 rd edition |
| | | Robson Bert Bates | | |
| | | Kathy Sierra | | |
| 3 | Head First Servlets and | Bryan Basham, Kathy | O'Reilly Publication | 2nd Edition |
| | JSP | Sierra, Bert Bates | | |

| No | Sem | Code No. | Subject | Credits |
|----|-----|------------|------------------|---------|
| 6 | V | HM - CS508 | Business English | 1 |

PSOs:

3) Tackle real life problems & provide more affordable & economic solution.

4) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

1. Learn to communicate with others in practical, business oriented situations

2. Learn to express themselves in English with greater fluency, accuracy and confidence

3. Learn to handle themselves in English in a variety of business contexts, from negotiating, to using the telephone, to making presentations, to socialising.

4. Enhance the skills of listening, speaking, pronunciation skills, as well as business vocabulary

5. Acquire the communicative competencies crucial for appropriate workplace behavior

Syllabus:

| | Teaching Scheme | | | | Evaluation Scheme | | | | | | |
|------------------|-----------------|-----|---|--------|-------------------|------|------------------------|------|---------------------|------------|------------------------|
| Course | | | | | | Theo | ry (Marks) | TW(N | (larks) | POE(Marks) | |
| Code and Title | L | L T | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| | 00 | | 0 | | CSE | - | - | | | | |
| Business English | 00 | 1 | v | 2 | ESE | - | - | 25 | 12 | 25 | 12 |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

Unit 1: Getting acquainted with professional culture

• First day at work • Induction program • Company hierarchy • Behavior pruning

Unit 2: Vocabulary building and Reading comprehension:

• Reading techniques and comprehension skills • Synonyms and antonyms • One-word substitution • Prefixes and Suffixes • Idioms and phrases • Homonyms and homographs • Irregular verbs like (write, wrote, written) • Situational vocabulary

Unit 3: Effective vocal Communication:

• Effective Meetings • Video Conferencing • Effective Telephonic Communication • Breaking Bad news

Unit 4: Effective written Communication:

• Business letters • Resume Writing • E-mail writing • Report writing • Minutes of meeting • Memo

writing

Unit 5: Public speaking and Presentation Skills:

• Preparing and conducting presentation • Body language • Overcoming stage fear • Best practices •

interviewing and being interviewed

Unit 6: Miscellaneous:

• Group Discussion • Handling Complains • Negotiation Skills • Business Etiquettes

List Of Experiments:

- 1. Case study of organizational hierarchy
- 2. Match the following on antonyms & synonyms
- 3. Irregular verb list (like choose, chose, chosen)
- 4. Word building by using prefixes suffixes (eg. ir-regular, im-possible)
- 5. Minutes of Meeting writing
- 6. Report writing (any report)
- 7. Comprehension/paragraph writing
- 8. Business letter / resume writing / email writing
- 9. PPT presentation on any non-technical topic. PPT handout should be attached
- 10. Do's & Dont's of group discussion & Business etiquettes Text Books:

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|------------|-----------|----------------|--------------------------|---------------|
| 1 | Technical | Ashraf Rizvi | Tata McGraw Hill, | 1, 2, 3, 4, 6 |

| | Communication | | 2005 | |
|---|---|--------------------|---|---------------|
| 2 | Effective Business Communication | M. V Rodriques | Concept Publishing Company Pvt. Ltd. 2013 | 1, 2, 3, 4, 6 |
| 3 | English for Technical Communication | K. R. Laxminarayan | SCITECH 2nd Edition 2014 | 2, 4, 3 |
| 4 | Technical English | Dr. M. Hemamalini | Wiley, 2014 | 2, 3, 4, 5 |
| 5 | Business English | T. Thomson | Heinle & Heinle 2004 | 1, 3, 5, 6 |
| 6 | Business Communication; The Real World and Your Career | Senguin J | South-Western 1999 | 1, 3, 4, 6 |

SEMESTER VI

| Sr. No | Code No. | Subject | | Credits |
|--------|-----------|------------------------------|-------|---------|
| 1. | PCC-CS601 | Compiler Construction | | 4 |
| 2. | PCC-CS602 | Operating System-II | | 5 |
| 3. | PCC-CS603 | Database Engineering | | 5 |
| 4. | PCC-CS604 | Machine Learning | | 4 |
| 5. | PCC-CS606 | Cyber Security | | 3 |
| 6. | PCC-CS607 | C# Programming | | 3 |
| 7. | PCC-CS608 | Domain Specific Mini Project | | 1 |
| | | | Total | 25 |

| Sr. No | Sem | Code No. | Subj ect | Credits |
|--------|-----|-----------|-----------------------|---------|
| 1 | VI | PCC-CS601 | Compiler Construction | 4 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

Course Outcomes:

- 1. Recall the compiler phases and compiler construction tools like LEX and YACC.
- 2. To design and implement Lexical Analyser for a simple language.
- 3. To design and implement Syntax analyser for a simple expression.
- 4. To apply Syntax directed translations and Syntax Directed definitions to generate intermediate code.
- 5. To identify appropriate code optimizing transformation for the given code.
- 6. To explain concept of code generation.

Syllabus:

| | Teaching Scheme | | | | | Evaluation Scheme | | | | | |
|------------------|-----------------|---|----|--------|--------|-------------------|---------------------|------|---------------------|------|---------------------|
| Course | | | | | | Theor | y (Marks) | TW(N | larks) | POE | (Marks) |
| Code andTitle | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| Compiler | | | | | CSE | 30 | 12 | | | | |
| Construction | 03 | | 01 | 04 | ESE | 70 | 28 | 25 | 10 | - | - |

Role of a Lexical analyzer, input buffering, specification and recognition of tokens, finite automata implications, designing a lexical analyzer generator.

Unit 3: Syntax Analysis:

Role of Parser, Writing grammars for context free environments, Top-down parsing, Recursive descent and predictive parsers (LL), Bottom-Up parsing, Operator precedence parsing, LR, SLR and LALR parsers

Unit4: Syntax Directed Translation and Intermediate Code Generation:

Syntax directed definitions, construction of syntax tree, S-attributed definitions, L-attributed definitions, Intermediate languages, assignment statements, back patching.

Unit 5: Code Optimization:

Principle sources of optimization, optimization of Basic Blocks, loops in flow graphs, Peephole optimization

Unit 6: Code Generation:

Issues in design of a code generator and target machine, Run time storage management, Basic blocks and flow graphs, Next use information and simple code generator, Issues of register allocation, code generation from Dags.

Text Books

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---------|-------------------------|--------------------------|-----------------------|---------------|
| 1 | Compilers - Principles, | A. V. Aho, R .Shethi and | Pearson Education | ALL Units |
| * | Techniques and Tools | J. D. Ullman | | |

Reference Books:

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---------|-----------------------|--|-----------------------|-----------------------|
| 1 | Compiler construction | D.M. Dhamdare | Mc-Millan | - |
| 2 | LEX & YACC | Dong Brown, John Levine, Tony Mason | O'Reilly 2nd Edition | Refer for Practical's |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-------------|----------------------|---------|
| 2 | VI | PCC - CS602 | Operating System -II | 5 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1. To understand UNIX kernel, its architectural components like file subsystem, process control subsystem, memory management.
- 2. To understand a concrete way (UNIX i-nodes) of organizing a file system on a physical storage medium.
- 3. To maintain UNIX directories, files, manage processes, manipulate data with proper use of pipes and file redirection, UNIX filters.
- 4. To implement and handle various UNIX system calls.

CIE- Continuous Internal Evaluation

Unit 1: Introduction

Compilers, Phases of a compiler, Compiler construction tools, cousins of the compiler

Unit 2: Lexical Analysis:

ESE - End Semester Examination

(5 Hrs)

(6 Hrs)

(7 Hrs)

(5 Hrs)

(6 Hrs)

(7 Hrs)

5. To explain the principles of paging, virtual memory (VM) and describe the data structures and

components (both hardware and software) that are necessary to implement it.

6. To perform shell programming involving decision control, looping and control flow statements on UNIX based machines. **Syllabus:**

| Teaching Scheme | | | | Evaluation Scheme | | | | | | | |
|-------------------|----|---|----|-------------------|--------|---------|---------------------|------|---------------------|------|---------------------|
| Course | | | | | | Theorem | ry (Marks) | TW(N | /larks) | POE | E(Marks) |
| Code and Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| Operating System | | | | | CIE | 30 | 12 | | | - | - |
| -11 | 04 | | 01 | 05 | ESE | 70 | 28 | 25 | 12 | - | - |

CIE- Continuous Internal Evaluation

Unit I: Introduction and buffer cache:

General Overview of the System - History, System Structure, User Perspective, Operating System Services, Assumptions About Hardware, Architecture of the UNIX OS, Introduction to System Concepts, Kernel Data Structure, System Administration. Buffer Cache: - Buffer Headers, Structure of the Buffer Pool, Scenarios for Retrieval of a Buffer, Reading and Writing Disk Blocks, Advantages and Disadvantages of Buffer Cache

ESE – End Semester Examination

Unit II: Internal Representation of Files:

I-nodes, Structure of the Regular File, Directories, Conversion of a Pathname to I-node, Super

Block, I-node Assignment to a New File, Allocation of Disk Blocks, Other File Types..

Unit III: System Calls for File System:

Open, Read, Write, File and Record Locking, Adjusting the Position of FILE I/O-LSEEK, Close, File Creation, Creation of Special Files, Change Directory and Change Root, Change Owner and Change Mode, Stat and FStat, Pipes, Dup, Mounting and Un-mounting File Systems, Link, Unlink, File System Abstractions, File System Maintenance.

Unit IV: The Structure of Processes:

Process States and Transitions, Layout of System Memory, The Context of a Process, Saving Context of a Process, Manipulation of the Process Address Space.

Unit V: Process Control and Scheduling:

Process Control: - Process Creation, Signals, Process Termination, Awaiting Process Termination,

Invoking Other Programs, The User ID of a Process, The Shell, System Boot and the Init Process. Process

Scheduling: - Process Scheduling, System Calls for Time, Clock.

Unit VI: Memory management and I/O Subsystem:

Swapping, Demand Paging, A Hybrid System with Demand Paging and Swapping. Driver Interfaces, Disk Drivers, Terminal Drivers, Streams.

General Instructions:

1) Minimum number of assignments should be 10-12 covering all topics.

Text Books

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|------------|--------------------|-----------------|-----------------------|---------------|
| 1 | The design of Unix | Maurice J. Bach | PHI | ALL Units |
| | Operating System | | | |

Reference Books:

| Sr. No. | Title | Author(s) Name | Publication & Edition |
|---------|--------------|----------------|-----------------------|
| 1 | Linux System | Robert Love | SPD, O' REILLY |
| | Programming | | |

(8Hrs)

(8Hrs)

(6Hrs)

(8 Hrs)

(8 Hrs)

(10 Hrs)

| 2 | Unix concepts & | Sumitabha Das | Tata McGrow Hill, 3rd Edition | | |
|---|-----------------|---------------|-------------------------------|--|--|
| | administration | | | | |

List of Experiment:

- 1) Demonstration of how the Linux Kernel implements and Manages files.
- 2) Implement User Buffer I/O using 'C' program.
- 3) Study & Implement file management using low level file access system calls.
- 4) Implementation of various operations on Files (Create, Open, Read, Write, Append, Fstat, Dup etc.,)
- 5) Implementation of various system call (OPEN, READ, WRITE) by reader & writer process.
- 6) Study & Implementation of pipe () system call.
- 7) Demonstration of UNIX Process Management from process creation to process termination.
- 8) Study & Implementation of signal () system call.
- 9) Study and demonstration of different Memory Management Techniques.
- 10) Study and Implement Time, Sleep and Clock Management.
- 11) Client Server communication using IPC mechanism: Unnamed pipe, Named pipe.
- 12) Implementation of Shell Scripts.
- 13) Implementation of system call for UNIX/Linux.
- 14) Study of boot loader like "Grub"
- 15) Study of compilation of Linux kernel

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------|----------------------|---------|
| 3 | VI | PCC-EE313 | Database Engineering | 5 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs

At the end of the course the students should be able to:

- 1. Understand fundamentals of database management systems.
- 2. Represent logical design of database using E-R Diagram.
- 3. Analyze & construct good database design.
- 4. Apply SQL queries to design & manage the database.
- 5. Understand transactions, concurrency control and apply to database system.

6. Understand failures in database and appropriate recovery techniques.

Syllabus:

| | Teaching Scheme | | | | | Evaluation Scheme | | | | | |
|-----------------|-----------------|----|----|--------|--------|-------------------|---------------------|------------------|---------------------|------------|---------------------|
| ~ | | | | | | Theory (Marks) | | Practical(Marks) | | POE(Marks) | |
| Course Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| Databasa | | | | | CIE | 30 | 12 | | | | |
| Engineering | 04 | 00 | 01 | 05 | ESE | 70 | 28 | 50 | 20 | 25 | 10 |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

SECTION -I

Unit 1: INTRODUCTION TO DATABASES

Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Database Users & Administrators, Structure of Relational Databases, Database Schema, Keys, Schema Diagrams,

Relational Query Languages, Relational Operations

(08 Hrs)

COs:

Unit 2: E-R MODEL AND DATABASE DESIGN [E-R Model: Text Book 1]

[Normalization: Text Book 2]

E-R Model: The Entity-Relationship Model, Mapping Constraints, Keys, Entity-Relationship Diagrams, Reduction to Relational Schemas, Extended ER features-Specialization, Generalization, Aggregation. Normalization: Data Redundancies & Update Anomalies, Functional Dependencies. Canonical Cover, The Process of Normalization, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Fourth Normal Form, Fifth Normal Form.

Unit 3: STRUCTURED OUERY LANGUAGE (SOL) [Text Book 1]

Physical storage media, File Organization, Organization of records in File, Data Dictionary Storage, Database Buffer, Basic Concepts indexing & hashing, Ordered Indices, B+ Tree Index files, Multiple-Key Access, Static Hashing, Dynamic Hashing. (8)

Unit 4: DATA STORAGE & INDEXING [Text Book 1]

Physical storage media, File Organization, Organization of records in File, Data Dictionary Storage, Database Buffer, Basic Concepts indexing & hashing, Ordered Indices, B+ Tree Index files, Multiple-Key Access, Static Hashing, Dynamic Hashing.

Unit 5: TRANSACTION MANAGEMENT [Text Book 1]

Transaction Concept, A Simple Transaction Model, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Lock-Based Protocols, Timestamp-Based Protocols, ValidationBased Protocols.

Unit 6: RECOVERY SYSTEM [Text Book 1]

Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Failure with Loss of Nonvolatile Storage, Remote Backup Systems.

Term work:

1)Minimum 12 -14 Experiments based on the following topics.

Text Books

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---------|---|--|---|---------------|
| 1 | Database System Concepts | A. Silberschatz, H.F. Korth, S. Sudarshan | 6 th Edition, McGraw Hill Education. | 1,3,4,5,6 |
| 2 | Database Systems - A practical approach to Design, Implementation and Management | Thomos Connolly, Carolyn Begg | 3rd Edition, Pearson Education | 2 |

Reference Books:

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---------|--------------------|---------------------|----------------------------|---------------|
| 1 | Database Systems – | Rob & Coronel | 5th Edition Thomson Course | 3 |
| | Design, | | Technology | |
| | Implementation and | | | |
| | Management | | | |
| 2 | Fundamentals of | Ramez Elmasri, | 4 th Edition, Pearson | 2 |
| | Database Systems | Shamkant B. Navathe | Education | |
| | Ramez Elmasri, | | | |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|----------|------------------|---------|
| 4 | VI | PCC - | Machine Learning | 5 |
| | | CS604 | | |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

(10 Hrs)

(8Hrs)

(5 Hrs)

(9 Hrs)

- 1. Explain Machine Learning concepts.
- 2. Analyze the Machine Learning model.
- 3. Design solution using Machine Learning techniques.

4. To tackle real world problems in domain of data mining, information retrieval, computer vision, linguistics and bioinformatics, etc.

Syllabus:

| | Teaching Scheme | | | | | | Evaluation Scheme | | | | |
|-------------------------------------|-----------------|---|----|--------|--------|---------|---------------------|---------|---------------------|----|---------------------|
| Course Code and | L | Т | Р | Credit | Scheme | T (N | heory Aarks) | Pra | ctical(Mar ks) | TW | (Marks) |
| l'itle | | | | | | Max | Min. for Passing | Max | Max Min for passing | | Min. for passing |
| Machina Learning | | | | | CIE | 30 | 12 | | | 25 | 10 |
| | 03 | | 01 | 04 | ESE | 70 | 28 | | | | |
| CIE- Continuous Internal Evaluation | | | | | | | ESE – End S | emester | Examination | | |

CIE- Continuous Internal Evaluation

Unit 1: Introduction to Machine Learning:

Introduction to Probability and Statistics, Machine Learning: Definition, Terminology, Types of learning, Machine Learning Problem categories, Machine learning architecture, process, Lifecycle, Performance measures, tools and framework, data visualization ..

Unit 2: Regression:

Simple regression – hypothesis, cost function, parameter learning with gradient descent, learning rate, Gradient Descent for linear regression, examples, simple regression in matrix form. Multivariate Linear Regression - Multiple features, hypothesis functions, Gradient Descent for multiple variables, Feature scaling, polynomial regression

Unit 3: Classification-logistic regression & Naïve Bayes : (7 Hrs)

Logistic Regression - Definition, Hypothesis representation, decision boundary, cost function, Gradient Descent for Logistic Regression. Multiclass Classification, Regularization - Over fitting &Under fitting, cost function, Regularized Linear Regression, Regularized Logistic Regression, Conditional probability and Naïve Bayes Classifier. Instance-based classifier - K- Nearest Neighbor Classifier, Bayesian Network, Hidden Markov Model.

Unit 4: Classification- Decision trees and Support Vector Machine:

Decision trees: definition, terminology, the need, advantages, and limitations. Constructing and understanding Decision trees, common problems with Decision trees, Decision tree algorithms, random forest, examples. Support Vector Machine: What is SVM, Kernel Trick, Cost Function, Decision Trees vs. Support Vector Machine.

Unit 5: Unsupervised learning :

Clustering, K Means clustering, Hierarchical clustering, Association Rule mining.

Unit 6: Neural Network & Recommendation System

Neural Networks- Neuron representation and model, Hypothesis for neuron, cost function, solution of a problem using single neuron. Gradient descent for a neuron. Neural network, Multiclass classification with neural network. Learning

(6 Hrs)

(6 Hrs)

(6 Hrs)

(4Hrs)

(7 Hrs)

in neural network-back propagation algorithm Recommendation System: Popularity based recommender engines, Content based recommendation engines, Classification based recommendation engine, Collaborative filtering. General Instructions:

1. It should consist of minimum 10-12 assignments based on the above topics..

List of Experiments

Minimum 10 experiments /simulations based on above curriculum should be performed.

Recommended Books:

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---------|------------------------|----------------------|------------------------------|---------------|
| 1 | Machine Learning with | Abhishek Vijayvargia | BPB Publications | ALL Units |
| | Python- an approach to | | | |
| | applied ML | | | |
| 2 | Practical Machine | Sunila Gollapudi | Packt Publishing Ltd | 1,2 |
| | Learning | | | |
| 3 | Machine Learning | Tom M. Mitchell | McGraw Hill Education; First | 1,2,3,4,5 |
| | | | Edition | |

Reference Books:

| Sr. | Title | Author(s) Name | Publication & Edition | Units Covered |
|-----|---------------------------------------|------------------|-----------------------|---------------|
| No. | | | | |
| 1 | Machine Learning for dummies | John Paul Muller | Willey Publication | - |
| 2 | Introduction to Machine Learning | EthemAlpaydin | PHI 2nd Edition-2013 | 1,2 |
| 3 | http://neuralnetworksanddeeplearning. | 6 | | |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|----------|----------------|---------|
| 5 | VI | OEC - | Cyber Security | 3 |
| | | C3000 | | |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1. Explain the cyber security concepts.
- 2. Describe the cyber security vulnerabilities and prevention techniques.
- 3. Explain the different rules and regulations under I.T. ACT.
- 4. Explain the concepts of digital forensics & incident management

Syllabus:

| Teaching Scheme | | | | | | Evaluation Scheme | | | | | | |
|-----------------|----------------|----|---|----|--------|-------------------|---------------|----------|------------------|----------|------------|----------|
| | | | | | | | Theory(Marks) | | Practical(Marks) | | POE(Marks) | |
| | Course Code | | | | | | | Min. for | | Min. for | | Min. for |
| | and Title | L | Т | P | Credit | Scheme | Max. | Passing | Max. | passing | Max. | passing |
| | Cyber Security | | | | | CIE | 30 | 12 | - | - | - | - |
| | | 03 | | 00 | 0 | ESE | 70 | 28 | 25 | - | - | |
| | | | | | | | | | | | | |

Unit 1: Computer and Network Security

Introduction to Computer Security - Introduction, How Seriously Should You Take Threats to Network Security?, Identifying Types of Threats, Basic Security Terminology, Concepts and Approaches, Online Security Resources Networks and the Internet : Introduction, Network Basics, How the Internet Works, Basic Network Utilities, Advanced Network **Communications Topics** (6Hrs)

Unit 2: Cyber Frauds, DoS, Viruses:

Cyber Stalking, Fraud, and Abuse: Introduction, How Internet Fraud Works, Identity Theft, Cyber Stalking, Protecting Yourself Against Cyber Crime. Denial of Service Attacks: Introduction, DoS, Illustrating an Attack, Malware: Introduction, Viruses, Trojan Horses, The Buffer-Overflow Attack. The Sassier Virus/Buffer Overflow, Spyware, Other Forms of Malware, Detecting and Eliminating Viruses and Spyware

Unit 3: Techniques Used by Hackers:

Introduction, Basic Terminology, The Reconnaissance Phase, Actual Attacks, Malware Creation, Penetration Testing

Unit 4: Computer Security Technology:

Introduction, Virus Scanners, Firewalls, Antispyware, IDS, Digital Certificates, SSL/TLS, Virtual Private

Networks, Wi-Fi Security

Unit 5: I.T. ACT:

Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, I.T. Act

Unit 6: Introduction to Forensics:

Introduction, General Guidelines, Finding Evidence on the PC, Finding Evidence in System Logs, Getting Back Deleted Files, Operating System Utilities, Operating System Utilities, Mobile Forensics: Cell Phone Concepts

Recommended Books:

1. Jason Luttgens, Matthew Pepe, Kevin Mandia, Incident Response & Computer Forensics, McGraw-Hill Osborne Media, 3 rd edition, 2014.

2. Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Real Digital Forensics: Computer Security and Incident Response, Paperback – Import, 2005.

3. John Sammons, the Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics Paperback, February 24, 2012.

4. Hacking Exposed: Network Security Secrets & Solutions, Stuart McClure, Joel Scambray and George, Kurtz, McGraw-Hill, 2005.

5. Ethical Hacking, Thomas Mathew, OSB Publisher, 2003.

7. Dave Shackleford, Virtualization Security: Protecting Virtualized Environments, John Wiley & Sons, 2012.

8. BRAGG, Network Security: The Complete Reference, McGraw Hill Professional, 2012

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------------|----------------|---------|
| 5 | VI | (PCC - CS607) | C# Programming | 3 |
| DCO | | | | |

PSOs:

COs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

(6Hrs)

(6Hrs)

(6Hrs)

(**6Hrs**)

(6Hrs)

ESE - End Semester Examination

1. Students will be able to develop correct, well-documented programs using the C# programming language.

2. Students will be able to learn to develop object-oriented programs using C# classes and objects

3. Students will be able to learn to use Windows Forms and WPF to create GUI-based programs

4. Students will be able to build networking and multithreading based programs using C#

5. Students will be able to design web applications using ASP.NET using ASP.NET controls in web applications.

6. Students will be able to debug and deploy ASP.NET web applications and create database driven ASP.NET

web applications.

Syllabus:

| Teaching Sch | | | | eme | eme | | Evaluation Scheme | | | | |
|--------------------------|----|---|----|--------|--------|-------|---------------------|---------|---------------------|------|---------------------|
| | | | | | | Theor | y(Marks) | Practic | al(Marks) | TW(M | larks) |
| Course Code and Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| C# | | | | | CIE | - | - | 50 | 20 | 25 | 10 |
| Programming | 02 | | 01 | 03 | ESE | - | - | | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

Unit 1: .Net architecture and C# Basics:

.Net Architecture: The Relationship of C# to .NET, The Common Language Runtime, A Closer Look at Intermediate Language, Assemblies, .NET Framework Classes, Namespaces, C# basics: Predefined data types, The Main () Method, More on Compiling C# Files, Console I/O, Using Comments# Programming Guidelines, Dynamic variables, DLL creation & calling. Unit 2: Object oriented programming in C# : (4Hrs)

Classes and Structs, Class Members, Anonymous Types, Structs, Partial Classes, Static Classes, The Object Class, Extension Methods, Inheritance: Types of Inheritance, Implementation Inheritance, Modifiers, Interfaces

Unit 3: Arrays, Operators and casts and strings:

Arrays: Simple Arrays, Multidimensional Arrays, Jagged Arrays, Array Class, Array and Collection Interfaces, Enumerations Operators and casts: Operators, Type Safety, Comparing Objects for Equality, Operator Overloading, User-Defined Casts, String: System. String, Building Strings, String Builder Members, Format Strings, Regular Expressions.

Unit 4: Windows Form & Database with ADO.NET:

Introduction to GUI application & components –add data control programmatically, Link data to control, process all control, track the visible forms, Find all MDI child forms, Save configuration setting for form, Force list box to scroll items, Restrict text box, Use of auto complete combo-box, Sort a list view, Database with ADO.NET-Overview of Ado.NET, Data components in Visual Studio .NET.

Unit 5Threading and Networking:

Threading: Overview, Asynchronous Delegates, the Thread Class and Thread Pools, Threading Issues, Synchronization, and Timers. Networking: Networking-Obtain information about Local network, Detect changes in network, Download data over HTTP or FTP, Download a File & Process using Stream, Respond to HTTP request from your application.

Unit 6: Introduction to ASP.NET 4.5

ONE ASP.NET: Introducing One ASP.NET, Simplifying a Complex Ecosystem, How Do You Benefit? ASP.NET web form structure: Application Location Options, The ASP.NET Page Structure Options, ASP.NET 4.5 Page Directives, ASP.NET Page Events, Dealing with Post backs, Cross-Page Posting, ASP.NET Application Folders, Compilation, Build Providers, Global.aspx

Term Work

1. It should consist of 10 to 12 experiments based on the above syllabus covering following list of assignments

(3Hrs)

(4Hrs)

(4Hrs)

(4Hrs)

(5Hrs)

2. 50% of the experiment should be console based & 40 % experiment should be windows form application. and 10% should be web-based application

Practical List:

1. Language Introduction (Includes console-based application, creation of DLL, running a program without IDE) calling a method from another program.

- 2. OOPS concepts in C#-Class, Implementation Inheritance, Extension methods (Use any application).
- 3. Develop DLL file and use it in application program. (Use Any application)
- 4. Implementation of Interface Inheritance (Use Any Application).
- 5. Implementation of Multidimensional & Jagged array (Use Any application).
- 6. Use of properties in any application.
- 7. Implementation of Operator overloading (Any application).
- 8. String manipulation using String & String builder(Any application)
- 9. Develop program to use Regex. Matches method and Regular Expression pattern matching.
- 10. Design a Windows Form based application for different controls.(Any application)
- 11. Design a Windows Form based MDI application with different controls.(Any application)
- 12. Design a Windows Form based application for field validation.(Any application)

13. Design a any Windows Form based application with Database connectivity with all field validation.(Any application)

14. Develop a Win1dows Form application that performs SELECT, INSERT, UPDAE & DELETE queries and also displays the List of Books available in a Library System by fetching the details from a database. The C# application must also contain the filter capability.

15. Implement console-based networking application to obtain information of network & detect changes in network.

- 16. Design a Windows form application to download file & process it using stream.
- 17. Simple ASP.NET web application deployment in IIS server
- 18. Design simple login and registration page using client-side validation controls in ASP.NET

19. Do the server-side validation by using database connectivity for above problem and display all the records of database when successfully logged in using ASP.NET.

| 162 | I DOOKS | | | |
|---------|---|---|-----------------------|--|
| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
| 1 | Professional C# 2012 & .Net 4.5 | Christian Nagel, Bill, Evjen, Jay Glynn, Morgan Skinner, Karli Watson | Wrox Publication | 1 to 2 and unit 3 (threading) |
| 2 | A Programmer's Guide to ADO.Net in C# | Mahaesh Chand | Apress Publication | Unit 3 Windows app and ADO.NET |
| 3 | Visual C# 2010 Recipes- A Problem-Solution Approach | Allen Jones, Adam Freeman, Matthew MacDonald, Rakesh Rajan | Apress Publication | Unit 3 Windows app and ADO.Net and Unit 4 networking |
| 4 | Professional ASP.NET 4.5 in C# and VB | John Wiley & Sons Inc. | WROX publication | Unit 4 ASP part and Unit 5 and 6 |

Text Books

Recommended Books:

| Sr. No. | Title | Author(s) Name | Publication & Edition |
|---------|-------------------|----------------|-----------------------|
| 1 | ASP.NET 4.5-Black | Kogent | Dreamtech Publication |
| | book | | |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|---------------|------------------------------|---------|
| 5 | VI | PW - CS608 | Domain Specific Mini-project | 1 |
| 200 | | | | |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

1. Identify specific problem statement from a selected domain.

2. Analyze the problem and prepare SRS and design document.

3. Write code and carry out testing.

4. Write a report covering details of the project and give presentation on a project. **Syllabus:**

| Teaching Scheme | | | | | Evaluation Scheme | | | | | | |
|-----------------|----|---|----|--------|-------------------|-------|----------|---------|-----------|------|----------|
| | | | | | | Theor | y(Marks) | Practic | al(Marks) | TW(M | larks) |
| Course Code | | | | | | | Min. for | | Min. for | | Min. for |
| and Title | L | Т | Р | Credit | Scheme | Max. | Passing | Max. | passing | Max. | passing |
| Domain | | | | | CIE | - | - | 50 | 20 | 25 | 10 |
| project | 00 | | 01 | 01 | ESE | - | - | | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

Contents

The students should form group of 4 to 5 students and every group is supposed to choose a specific domain (preferably from Smart India Hackathon problem statement) to do the mini project. Further the group should identify the relevant problem in the selected domain and propose the solution, which can be implemented as a mini-project using suitable technology. The mini-project work should be evaluated by a team of teachers appointed by the department. The evaluation and marking should include Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) during which the group should give presentation and demonstration of their work done. Care should be taken to avoid out-sourcing of the work

SEMESTER VII

| Sr. No | Code No. | Subject | Credits |
|--------|-----------|--------------------------------|---------|
| 1. | PCC-CS701 | Advanced Computer Architecture | 05 |
| 2. | PCC-CS702 | Cloud Computing | 04 |
| 3. | PCC-CS703 | Advanced Database Systems | 04 |
| 4. | PCC-CS704 | Elective-I | 04 |
| 5. | PCC-CS705 | Web Technologies | 05 |
| 6. | PCC-CS706 | Web Technologies | 02 |
| 7. | SI-CS707 | Internship | 01 |
| | | Total | 25 |

| r. No | Sem | Code No. | Subject | Credits |
|-------|-----|-----------|--------------------------------|---------|
| 1 | VII | PCC-CS701 | Advanced Computer Architecture | 05 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1. Demonstrate concepts of parallelism in hardware/software.
- 2. Discuss memory organization and mapping techniques.
- 3. Describe architectural features of advanced processors.
- 4. Interpret performance of different pipelined processors.
- 5. Explain data flow in arithmetic algorithms.
- 6. Development of software to solve computationally intensive problems.

Syllabus:

| Teaching Scheme | | | | | me | Evaluation Scheme | | | | | |
|--------------------------|----|----|---|--------|--------|-------------------|---------------------|------|---------------------|------|---------------------|
| Course Code | | | | | | Theo | ry (Marks) | TW(I | Marks) | POI | E(Marks) |
| And Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| Advanced | | | | | CIE | 30 | 12 | 25 | 10 | - | - |
| Computer Architecture | 04 | 01 | | 05 | ESE | 70 | 28 | | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

ISE: In Semester Evaluation MSE: Mid Semester Evaluation ESE: End Semester Evaluation

SECTION-I

Unit No I: The Concept of Computer Architecture and Fundamentals of Quantitative Design and Analysis: (7 Hrs)

| a) Parallel Processing Mechani | isms |
|--------------------------------|------|
|--------------------------------|------|

Unit No II: Principles of Pipeline:

- b) Parallel Computer Structures: Pipeline Computers
- c) Array Processors
- d) Multiprocessor Systems
- e) Architectural classification Schemes: Multiplicity of
- Instruction-Data Streams
- f) Trends in power and energy in Integrated Circuits
- g) Trends in Cost
- h) Dependability
- a) Principles of linear pipeline b) Classification of Pipelined Processors c) Interleaved memory organization d) Hazard detection and resolution e) Basic compiler Techniques for Exposing ILP (5 Hrs)

Unit No III: Memory Hierarchy Design :

a) Introduction b) Ten Advanced optimizations of cache performance

Unit No IV: Data Level Parallelism in Vector, SIMD and GPU Architecture:

a) Vector Processing requirement: Characteristics of vector processing b) Multiple vector Task dispatching c) Pipelined vector processing methods d) Associative Array Processing: Associative Memory Organization e) Associative processors (PEPE and STARAN) f) Data Level Parallel in Vector :Introduction g) Vector Architecture

Unit No V: Data Level Parallelism in SIMD and GPU Architecture:

a) SIMD ARRAY PROCESSORS: SIMD Computer organization b) Masking and Data Routing Mechanism c) SIMD Instruction set extension for Multimedia d) Graphics Processing Units : Programming the GPU e) NVIDA GPU Computational structures f) NVIDA GPU Instruction set Architecture g) Conditional Branching in GPU h) NVIDA GPU Memory Structure

Unit No VI: Multiprocessor Architecture :

a) Introduction b) Multiprocessor Architecture: Issus and Approach c) Challenges of parallel processing d) Centralized shared memory Architecture: Multiprocessors Cache coherence e) Basic schemes for enforcing coherence f) Snooping Coherence

(7 Hrs)

(6Hrs)

(7Hrs)

(5 Hrs)

Protocols g) Distributed shared memory and directory based coherence h) Directory Based cache coherence protocol :The basics

Text Books:

| Sr. No. | Title | Author(s) Name | Publication & Edition | Units Covered |
|---------|---|---|-----------------------|---|
| 1 | Computer architecture and Parallel Processing | Kai Hwang and Faye A Brig | Tata McGraw Hill | Unit No 01: a) 1.2.2 b) 1.3.1 c)1.3.2 d)1.3.3 e) 1.4.1 Unit No:02 : a)3.1.1 b)3.1.2 c)3.1.4 d)3.3.4 Unit No:04 : a) 3.41 b)3.4.2 c)3.4.3 d)5.4 e)5.4.2 Unit No:05 a)5.1.1 b)5.1.2 |
| 2 | Computer Architecture: A Quantitative Approach | John L. Hennessy and Davd A. Patterson | Morgan Kaufmann | Unit No 01: f)1.5 g)1.6 h) 1.7 Unit No 02 : f) 3.2 Unit No 03: a)2.1 b)2.2 Unit No:04 : f)4.1 g)4.2 Unit No:05 : c) 4.3 d)4.4 e)4.4 f)4.4 Unit No:06 : Chapter 5 |

Reference Books:

| | Title | Author(s) Name | Publication & Edition |
|---|---|---|--------------------------|
| 1 | Advanced computer Architecture | DezsoSima, Terence Fountain & Peter Kacsuk | Pearson Education |
| 2 | Parallel Programming Techniques & Applications using Networked Workstations &Parallel Computers | Barry Wilkinson & Michael Allen | Pearson Education |
| 3 | Advanced Computer Architecture | Kai Hwang & NareshJotwani | McGraw Hill Publications |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------------|-----------------|---------|
| 2 | VII | (PCC – CS702) | Cloud Computing | 04 |

PSOs:

1) Tackle real life problems & provide more affordable & economic solution.

2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment. **COs:**

1. Describe the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing.

2. Explain the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.

3. Collaboratively research on the state of the art (and open problems)in cloud computing.

4. Identify problems, and explain, analyze, and evaluate various cloud computing solutions.

5. Choose the appropriate technologies, algorithms, and approaches for the related issues.

6. Display new ideas and innovations in cloud computing.

Syllabus:

| | Teaching Scheme | | | | | Evaluation Scheme | | | | | |
|--------------------------|-----------------|----|----|------------|--------|-------------------|---------------------|------|---------------------|------|---------------------|
| a a i | | | | | | Theo | ry (Marks) | TW(| Marks) | PO | DE(Marks) |
| Course Code And Title | L | Т | Р | Credi t | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| | | | | | CIE | 30 | 12 | 25 | 10 | - | - |
| Cloud Computing | 03 | 00 | 01 | 04 | ESE | 70 | 28 | - | - | | |

CIE- Continuous Internal Evaluation

Unit I: Overview of computing paradigm:

Recent trends in Computing - Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing. Evolution of cloud computing - Business driver for adopting cloud computing. Introduction to Cloud Computing: Cloud Computing - Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers. Properties, Characteristics & 5 Disadvantages - Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing. Role of Open Standards.

Unit II: Cloud Computing Architecture:

Cloud computing stack - Comparison with traditional computing architecture (client/server), Services provided

at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role

of Web services. Service Models (XaaS) - Infrastructure as a Service (IaaS), Platform as a Service (PaaS),

Software as a Service (SaaS). Deployment Models, Public cloud, Privatecloud, Hybrid cloud, Community cloud

Unit III: Virtualization:

Introduction and benefits, Implementation Levels of Virtualization, Virtualization at the OS Level,

Virtualization Structure, Virtualization Mechanism, Open-Source Virtualization Technology,

XenVirtualization Architecture, Binary Translation with Full Virtualization, Paravirtualization,

Virtualization of CPU, Memory and I/O Devices

Unit IV: Infrastructure as a Service (IaaS):

Introduction to IaaS - IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine (VM). Resource Virtualization - Server, Storage, Network, Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage incloud computing (storage as a service). Renting, EC2 Compute Unit, Platform and Storage, pricing, customers. Platform as a Service (PaaS): Introduction to PaaS - What is PaaS, Service Oriented Architecture (SOA). Cloud Platform and Management - computation, storage Software as a Service (SaaS): Introduction to SaaS, Web services, Web 2.0, Web OS, Case Study on SaaS (07 Hours)

Unit V: Service Management in Cloud Computing:

Service Level Agreements (SLAs), Billing& Accounting, Comparing Scaling Hardware: Traditional vs.

(6 Hours)

(06 Hours)

(06 Hours)

(6 Hours)

ESE - End Semester Examination

Cloud, Economics of scaling: Benefitting enormously, Managing Data - Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing Cloud Security: Infrastructure Security - Network level security, Host level security, Application-level security. Data security and Storage - Data privacy and security Issues, Jurisdictional issues raised by Data location: Identity & Access Management, Access Control, Trust, Reputation, Risk, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business consideration

Unit VI: Case study on Open Source and Commercial Clouds

Amazon EC2, Google Compute Engine, Microsoft Azure, Cloud foundry, OpenStackOne visit to commercial electric vehicle showroom in the local area

Experiment List

1. Working and Implementation of Infrastructure as a service.

- 2. Working and Implementation of Software as a service.
- 3. Working and Implementation of Platform as a services.
- 4. Practical Implementation of Storage as a Service.
- 5. Installing a private cloud.
- 6. Installing OS on a Virtual Machine Monitor.
- 7. Offline migration of virtual OS.
- 8. Live migration of virtual OS.
- 9. Study and implementation of infrastructure as Service using Open Stack.
- 10. Assignment to install and configure Google App Engine.
- 11. Hands on virtualization using Xen Server.
- 12. Hands on containerisation using Docker.
- 13. Deployment and Configuration options in Amazon (AWS).
- 14. Deployment and Configuration options in Google Cloud.
- 15. Deployment and Configuration options in Microsoft Azure.
- 16. Building a 'HelloWorld' app for the cloud.
- 17. Deploying the 'HelloWorld' app for the cloud.
- 18. Case study on Amazon EC2 to learn about Amazon EC2, Amazon Elastic Compute

Cloud is a central part of Amazon.com's cloud computing platform, Amazon Web Services.

How EC2 allows users torrent virtual computers on which to run their own computer applications.

Text Books

| | Title | Author(s) Name | Publication & Edition | Units Covered |
|---|-----------------------|---------------------------|-----------------------|---------------------|
| 1 | Cloud Computing for | Judith Hurwitz, R. Bloor, | WileyIndia Edition | Unit - I, II, IV, V |
| | Dummies | M.Kanfman, F.Halper | | |
| 2 | Cloud Computing Black | Jayaswal, Kallakurchi, | DreamtechPress | Unit-III |
| | Book | Houde, Shah | | |
| 3 | Cloud Security | Ronald Krutz and Russell | Wiley-India | Unit-V |
| | | Dean Vines | | |
| 4 | Enterprise Cloud | GautamShroff | Cambridge | Unit -VI |
| | Computing | | | |

Text Books

| | Title | Author(s) Name | Publication & Edition |
|---|-----------------------------|-------------------------------------|-----------------------|
| 1 | Google Apps | Scott Granneman | Pearson |
| 2 | Cloud Security & Privacy | Tim Mather, S.Kumaraswammy, S.Latif | SPD, O'REILLY |
| 3 | Cloud Computing: A | Anthony T.Velte, et.al | McGraw Hill |

(**05Hours**) –

| | Practical Approach | | |
|---|--|---|-------------|
| 4 | Cloud Computing: Principles and Paradigm | Rajkumar Buyya, James Broberg, Andrzej Goscinski | Wiley India |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------------|---------------------------|---------|
| 3 | VII | (PCC- CS703) | Advanced Database Systems | 04 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs

At the end of the course the students should be able to:

- 1. Understand and identify issues arising from parallel and distributed processing of data.
- 2. Select appropriate database and construct solution to real world problems of storing large data.
- 3. Compare and Contrast NoSQL databases with each other and Relational Database Systems.
- 4. Make use of SQL cursors, triggers, stored procedures, and procedural SQL to write complex

SQL scripts.

4. Learn database administration tasks and security measures

Syllabus:

| | Teaching Scheme | | | | | Evaluation Scheme | | | | | |
|--------------------------|-----------------|----|---|--------|--------|-------------------|---------------------|-----------|---------------------|------------|---------------------|
| | | | | | | Theory (Marks) | | TW(Marks) | | POE(Marks) | |
| Course Code And Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| Advanced | | | | | CIE | 30 | 12 | 25 | 10 | 50 | 20 |
| Database Systems | 03 | 01 | | 04 | ESE | 70 | 28 | | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

Unit I Parallel and Distributed Databases

Database System Architectures: Centralized and Client – Server Architectures, Server System Architectures, Parallel Systems, Parallel Database Architectures, Parallel Databases --I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism, Design of Parallel Systems, Distributed Systems, Distributed Database Concepts, 8 Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control, Distributed Query Processing, Case Studies Distributed Databases in Oracle.

Unit II : Advanced SQL

Relational Set Operators, SQL Join Operators, Subqueries and Correlated Queries, SQL Functions, Oracle Sequences, Synonyms, Database Links, Updatable Views, Procedural SQL, Triggers, Stored Procedures, PL/SQL Processing with Cursors, PL/SQL Stored Functions, Embedded SQL, Dynamic SQL. Case study-Postgrey SQL.

Unit III : NoSQL Database Management

NOSQL: Definition and Introduction, Features and Types of NOSQL databases, Sorted Ordered Column-Oriented Stores, Key/Value Stores, Document Databases, Graph Databases. NOSQL: Getting Initial Hands-On Experience, Storing and Accessing Data, Storing Data in and Accessing Data from MongoDB, Querying MongoDB, Interfacing and Interacting with NOSQL, Case Study CouchDB,

(9 hrs)

(7 hrs)

(8 hrs)

Section -II

UNIT IV

Database Administration and Security

The Need for and Role of a Database in an Organization, The Evolution of the Database Administration Function, The Database Environment's Human Component Security, Database Administration Tools: The Data Dictionary, CASE Tools, developinga Data Administration Strategy, The DBA at Work: Using Oracle for Database Administration.

UNIT V: Business Intelligence and Data Warehouses

The Need for Data Analysis, Business Intelligence, Business Intelligence Architecture, Decision Support Data,

The Data Warehouse, Online Analytical Processing, Star Schemas, Implementing a Warehouse, Data Mining,

SQL Extensions for OLAP, Materialized Views, Case Study FireBase-Google.

UNIT VI: Data analysis and exploration

Mathematical models for decision making, data mining, data preparation, data exploration. Data mining tasks - association rules.

List of Experiments:

Minimum 10-12 experiments based on Hardware and five experiments based onSimulations and at

least three experiments based on Interfacing.

Textbook

| | Title | Author(s) Name | Publication & Edition | Units Covered |
|---|---|----------------------|------------------------------|---------------|
| 1 | Database System | Silberschatz, Korth, | MGH, 6th Edition | Unit 1 |
| | Concepts | Sudarshan | (International edition) 2010 | |
| 2 | Database Systems, Design, Implementation and Management | Coronel-Morris- Rob | | Unit No.2, 4 |
| 3 | Professional NOSQL | Shashank Tiwari | John Wiley & Sons, Inc. 2011 | Unit No.3 |
| 4 | Business Intelligence - Data Mining and optimization for Decision Making | Carlo Vercellis | Wiley Publications. | Unit No.5, 6 |

References:

| r | | | |
|---|---------------------------|---------------------------|-----------------------|
| | Title | Author(s) Name | Publication & Edition |
| 1 | Database Management | Raghu Ramkrishnan, | MGH, [4e], 2015 |
| | System | Johannes Gehrke, | |
| 2 | Fundamentals of Database | R. Elmasri S. B. Navathe, | Addison Wesley, 2015 |
| | Systems | | |
| 3 | NoSQL Distilled: A brief | Pramod J. Sadalage and | Addison Wesley, 2012. |
| | guide to merging world of | Marin Fowler | |
| | Polyglot persistence, | | |
| 4 | Advanced Database | Rini Chakrabarti - | |
| | Management System | Shilbhadra Dasgupta | |
| 5 | Database Systems: A | Thomas Connolly, Carolyn | 6th Edition,2012 |
| | Practical Approach to | Begg | |
| | Design, Implementation | | |
| | and Management, | | |

(8 hrs)

(7 hrs)

(8 hrs)

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------|--|---------|
| 4 | VII | PCE-CS704 | Software Testing and Quality Assurance | 04 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs

- 1. Understand fundamental component of software life cycle
- 2. Apply and use the modern software testing tools
- 3. Compare and analyze the web and desktop application testing
- 4. Explore newer software project assessment methods

| | Teaching Scheme | | | | | Evaluation Scheme | | | | | |
|------------------|-----------------|---|---|--------|--------|-------------------|---------------------|------|---------------------|------|---------------------|
| Course Code | | | | | | Theo | ry (Marks) | TW(| Marks) | PO | OE(Marks) |
| And Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| | | | | | | | 1 ubbing | | pussing | | pussing |
| | | | | | CIE | 30 | 12 | ~~ | 10 | - | - |
| Software Testing | 03 | 1 | 0 | 04 | ESE | 70 | | 25 | 10 | - | - |
| and Quality | | | | | | | 28 | | | - | |
| Assurance | | | | | | | | | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

SECTION-I

Unit 1:- Introduction

Some Software Failures, Testing Process, Some Terminologies, Limitations of Testing, The V Shaped software life cycle model

Unit 2:- Software Verification:

Verification Methods, SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit Creating test cases from SRS and Use cases: Use Case Diagram and Use Cases, Generation of test cases from use cases, Guidelines for generating validity checks, 8 strategies for data validity, Database testing

Unit 3:- Regression Testing:

What is regression testing?, Regression Test cases selection, Reducing the number of test cases,

Risk analysis, Code coverage prioritization techniques Object oriented testing: What is Object

orientation?, What is object oriented testing?, Path testing, State based testing, Class testing.

Unit 4:- Software Testing Tools:

Selecting and Installing Software Testing tools, Automation and Testing Tools, Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools,

Unit 5:- Testing Process :

Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing.

(8Hrs)

(7Hrs)

(6Hrs)

(5Hrs)

(4Hrs)

Unit 6:- Testing Web applications

(6Hrs)

What is web testing? functional testing, UI testing, Usability testing, configurations and compatibility testing, security testing, performance testing, database testing, post deployment testing, web metrics. Automated Test data generation: Automated Test Data generation, Approaches to test data generation, Test data generation tools

Term-work:

Minimum of 10 Tutorials to be done from the list given below.

Text Books

| Sr No | Tile | Author | Publications | Units |
|-------|---|-------------------------|---|----------------------|
| | | | | Covered |
| 1 | Software testing: | Paul.M. Yogesh Singh | Cambridge University Press, First Edition | Unit- I,II,III,VI |
| 2 | Effective Methods for Software Testing (Chapter 4, 6, 7, 8, 9, 10) | William E. Perry, | Third edition, Wiley India, 2009 | Unit –IV,V |
| 3 | Software Testing – Principles and Practices (Chapter 12) | Naresh Chauhan, | Oxford University Press, 2010 | Unit –IV |

Reference Book

| Sr.No | Title | Author(s) Name | Publication & Edition |
|-------|----------------------------------|------------------------------------|-----------------------------------|
| 1 | Foundations of Software testing: | Aditya P. Mathur, | Pearson, Second Edition |
| 2 | Software Testing: | Ron Patton, | Pearson (SAMS), Second Edition |
| 3 | Software Quality, Mordechai | Ben Menachem, Garry S. Marliss, | BS Publications |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------------|------------------|---------|
| 5 | VII | (PCC- CS705) | WEB TECHNOLOGIES | 05 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment. **Cos**

At the end of the course the students should be able to:

- 1. Apply knowledge of client side scripting.
- 2. Develop web application using PHP.
- 3. Design web application using MVC and Angular JS.
- 4. Demonstrate use of server side technologies.
- 5. Explore newer tools for web development

Unit No. 01 Front End Web Designing HTML and CSS:

HTML Design Patterns: HTML Structure, XHTML, DOCTYPE, Header Elements, Conditional Style Sheet, Structural Block Elements, Terminal Block Elements, Multipurpose Block Elements, Inline Elements, Class and ID Attributes, HTML Whitespaces CSS Selector and Inheritance: Type, Class and ID Selector, Position and Group Selectors, Attribute Selectors, Pseudo-element Selectors, Pseudo-class Selectors, Subclass Selector, Inheritance, Visual Inheritance, and Bootstrap (07 Hrs)

Unit No. 02 Javascript Basics:

Introduction to javascript, Basic program of javascript, variables, functions, conditions, loops and repetition, Function, Arrays – DOM, Built-in Objects, Regular Expression, Exceptions, Event handling In Javascript, Validating HTML form data using javascript, Validation- AJAX – Jquery

Unit No. 03 Angular Node JS::

Angular - Web Application architecture, MVC and MVVM design pattern, Angular architecture, Angular building blocks, Forms implementation, Filters, Services, Consuming REST Web Services, Modules: Built-in and custom, Directives: Built-in and custom, Routing and Navigation, Animations, Testing Angular application. Node, NodeJsarchitecture, Modules: Built-in and custom, Event loop, Asynchronous application, Events, Listeners, Timers, and Callbacks in Node.js. Testing node application. Introduction to Mongo DB- Accessing MongoDB from Node.js.

Unit No. 04 PHP basic:

PHP Basics: Embedding PHP code in Your Web Pages, Commenting Your Code, Outputting Data to the Browser, PHP supported Data Types, Identifiers, Variables, Constants, Expressions, String Interpolation, and Control Structures Functions: Invoking a Function, Creating a Function, Function Libraries Array: What is Array?, Creating an array, outputting an Array, Merging, slicing, splicing and Dissecting Arrays, Other useful Array, Functions

Unit No. 05 PHP session management (state management)::

Session Handlers: What Is Session Handling, Configuration Directives, Working with Sessions, Practical Session-Handling Examples, Creating Custom Session Handlers, PHP cookies, Uploading Files with PHP

Unit No.06 PHP Database and small app using Laravel and Code to generate: (7Hrs)

Installation Prerequisites, Using the MySqli Extension, Interacting with the Database, Executing Database

Transactions.system.

List of Experiments:

1. Create html pages for website like login, registration and about us pages.

- 2. Apply and design the created HTML pages using CSS
- 3. Write a program demonstrating javascript functions and different validations.
- 4. Write a program to read and write HTML contents with JQuery.
- 5. Create a simple Testing Angular application.
- 6. Write a program demonstrating NodeJs application.
- 7. Write a program to handle the error in NodeJs..

Syllabus:

| | Teaching Scheme | | | | | Evaluation Scheme | | | | | | |
|--------------------------|-----------------|---|----|------------|--------|-------------------|---------------------|------|---------------------|------|---------------------|--|
| | | | | | | Theory | Theory (Marks) | | TW(Marks) | | POE(Marks) | |
| Course Code And Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing | |
| | | | | | CIE | 30 | - | 50 | 20 | 50 | 20 | |
| WEB | 0.0 | | | 0 . | ESE | 70 | | - | - | - | - | |
| TECHNOLOGIES | 03 | | 02 | 05 | | | | | | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

(05 Hrs)

(06 Hrs)

(05 Hrs)

(06 Hrs)

8. Write a study experiment for Installing Apache and PHP on Linux, Configuring PHP at Build Time on Linux. Or Installation of XAMPP.

- 9. Hello world Program-Embedded HTML with PHP.
- 10. Program based on PHP variables, Expression, arrays, control structure.
- 11. Experiment Based on OOP and Advance OOP PHP
- 12. Form validation using PHP using regular expressions
- 13. Upload various types of file from client side to server with validation
- 14. Write a program to create and handle a session, cookie in PHP
- 15. Insert user entered data in form to MySQL database using PHP
- 16. Update user's data stored in MySQL database using PHP
- 17. Write a program to manage session in PHP having login facility in any web application
- 18. Write a program to show stored cookies, update, retrieve and delete from browser.

Text books and References:

| | Title | Author(s) Name | Publication & Edition | Units Covered |
|---|--|--|-----------------------|---------------|
| 1 | Pro HTML5 and CSS3 Design Patterns | Michael Bowers, DionysiosSynodinos and Victor Sumner | Apress edition | (Unit I & II) |
| 2 | Beginning PHP and MySQL: From Novice to Professional | W. Jason Gilmore | Fourth Edition | Unit IV to VI |
| 3 | MEAN Web Development | Amos Q. Haviv | PACKT PUBLISHING LT | Unit III |

| G N | Sem | Code No. | Subject | Credits |
|--------|-----|------------|-----------|---------|
| Sr. No | | | | |
| 6 | VII | (PW-CS706) | Project-I | 02 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

Cos

At the end of the course the students should be able to:

1. 1. Explain the need of a software project for the society

2. Identify requirement analysis like functional and technical requirements for the project

3. Come up with design documents for the project consisting of Architecture, Dataflow diagram,

Class Diagram, Algorithmic descriptions of various modules, collaboration diagram, ER Diagrams,

Database Design Documents, Sequence Diagram, Use Case Diagram

4. Able to demonstrate analysis and design.

5. Prepare the technical report consisting of Requirement specification, Analysis and Design of Project

Contents The project work is to be carried out in two semesters of Final Year Computer Science and Engineering. The project should be undertaken preferably by group of 4-5 students who will jointly work and implement the project in the two semesters. In Semester VII, the group will select a project with the approval of the Guide (staff member) and submit the Name of the project with a synopsis of the proposed work of not more than 02 to 08 pages before second week of August in the academic year. The group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work at the end of semester –VIII as a part of the term work submission in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an

internal and external examiner

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|----------|----------|---------|
| 6 | VII | SI-CS707 | SI-CS707 | 01 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment. **Cos**

At the end of the course the students should be able to:

- 1. Have an exposure to industrial practices and to work in teams
- 2. Communicate effectively
- 3. Understand the impact of engineering solutions in a global, economic, environmental, and societal context
- 4. Develop the ability to engage in research and to involve in life-long learning
- 5. Comprehend contemporary issues
- 6. Engage in establishing his/her digital footprint

Duration: Minimum 4 Weeks

Details:

Four weeks of work at industry site.

Supervised by an expert at the industry.

Term Work

- 1. Mode of Evaluation: Internship Report, Presentation and Project Review.
- 2. Collect the Internship Completion Letter given by authorized industry.
- 3. Assess the work based on progress report (signed by industry expert).

SEMESTER VIII

| Sr. No | Code No. | Subject | Credits |
|--------|------------|---------------------------------|---------|
| 1. | PCC-CS801 | Big Data Analytics | 05 |
| 2. | PCC-CS802 | Deep Learning | 04 |
| 3. | PCE- CS803 | Ad-Hoc Wireless Sensor Networks | 04 |
| 4. | PCE-CS804 | Blockchain Technologies | 04 |
| 5. | PCC-CS805 | Mobile Application Development | 05 |
| 6. | PW- CS806 | Project – II | 02 |
| 7. | HM-CS807 | Professional Skills | 01 |
| | | Total | 25 |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------------|--------------------|---------|
| 1 | VII | (PCC - CS801 | Big Data Analytics | 05 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1. Analyze several key technologies used in manipulating, storing, and analyzing big data.
- 2. Acquire clear understanding of R & Hadoop.
- 3. Acquire clear understanding of Integrating R & Hadoop and Acquire clear understanding of
- Hadoop Streaming and its importance.
- 4. Manage Big Data and analyze Big Data.
- 5. Apply tools and techniques to analyze Big Data

Syllabus:

| | Teaching Scheme | | | | | Evaluation Scheme | | | | | | |
|-------------------------|-----------------|---|---|--------|--------|-------------------|---------------------|------|---------------------|------|---------------------|--|
| Course Code And | | | | | | Theor | Theory (Marks) | | TW (Marks) | | POE(Marks) | |
| Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing | |
| | | | | | CIE | 30 | 12 | 25 | 10 | 50 | 20 | |
| . Big Data Analytics | 04 | | 1 | 05 | ESE | 70 | 28 | | | - | - | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CIE- Continuous Internal Evaluation

ESE - End Semester Examination

Section -I

Unit-01 INTRODUCTION TO BIG DATA :

Big Data and its Importance – Four V's of Big Data – Drivers for Big Data –Introduction to Big Data Analytics – Big Data Analytics applications, Architecture Components, Massively Parallel Processing (MPP) Platforms, Unstructured Data Analytics and Reporting, Big Data and Single View of Customer/Product, Data Privacy Protection, Real-Time Adaptive Analytics and Decision Engines.

Unit-02 INTRODUCTION TO R & HADOOP

Getting Ready to Use R and Hadoop, Installing R, Installing R Studio, Understanding the features of R language, Installing Hadoop, Understanding Hadoop features, Learning the HDFS and MapReduce architecture, Writing Hadoop MapReduce Programs, Introducing Hadoop MapReduce, Understanding the Hadoop MapReduce fundamentals, Writing a Hadoop MapReduce example, Learning the different ways to write Hadoop MapReduce in R, Hadoop Ecosystem, Hadoop YARN, Hbase, Hive, Pig and Pig latin, Sqoop, ZooKeeper, Flume, Oozie.

Unit-03 INTEGRATION OF R & HADOOP :

Integrating R and Hadoop, Introducing RHIPE, Understanding the architecture of RHIPE, Understanding RHIPE samples, Understanding the RHIPE function reference, Introducing RHadoop, Understanding the architecture of RHadoop, Understanding RHadoop examples, Understanding the RHadoop function reference. HADOOP STREAMING WITH R Using Hadoop Streaming with R - Introduction, Understanding the basics of Hadoop Streaming, Understanding how to run Hadoop streaming with R, Understanding a MapReduce application, Exploring the Hadoop Streaming R package

Unit-04 DATA ANALYTICS WITH R AND HADOOP :

(8 hrs)

(8hrs)

(8hrs)

(08hrs)

Understanding the data analytics project life cycle – Introduction, Identifying the problem, Designing data requirement, Preprocessing data, Performing analytics over data, Visualizing data, Understanding data analytics problems, Exploring web pages categorization Case Studies: Computing the frequency of stock market change, Predicting the sale price of blue book for bulldozers.

Unit -05 SPARK FOR BIG DATA ANALYTICS :

(08 hrs)

The advent of Spark, Limitations of Hadoop, Overcoming the limitations of Hadoop, Theoretical concepts in Spark: Resilient distributed datasets, Directed acyclic graphs, SparkContext, Spark DataFrames, Actions and transformations, Spark deployment options, Spark APIs, Core components in Spark: Spark Core, Spark SQL, Spark Streaming, GraphX, MLlib, The architecture of Spark

Unit-06 UNDERSTANDING BIG DATA ANALYSIS WITH MACHINE LEARNING : (08 hrs)

Introduction to machine learning, Types of machine-learning algorithms, Supervised machine learning algorithms, Unsupervised machine learning algorithm, Recommendation algorithms, Steps to generate recommendations in R, Generating recommendations with R and Hadoop.

| | Title | Author(s) Name | Publication & Edition | Units Covered |
|---|---|-------------------|-----------------------|------------------------|
| 1 | Big Data Analytics: Disruptive Technologies for Changing the Game | Arvind Sathi | IBM Corporation, 2012 | Unit - I |
| 2 | Big Data Analytics with R and Hadoop | Vignesh Prajapati | Packt Publishing 2013 | Unit - II, III, IV, VI |
| 3 | Practical Big Data Analytics | Nataraj Dasgupta | Packt Publishing 2018 | Unit - V |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------------|---------------|---------|
| 2 | VII | PCC - CS802) | Deep Learning | 04 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.
 1) .

COs:

At the end of the course the students should be able to:

- 1. Describe basic concepts of artificial intelligence and deep learning.
- 2. Develop different deep learning models for given tasks.
- 3. Devise the correct parameters and hyper-parameters of developed model for getting

improved results.

Syllabus:

| | | , | Feac | hing Schei | me | Evaluation Scheme | | | | | |
|--------------------------|---|---|-------------|------------|--------|-------------------|---------------------|-----------|---------------------|------------|---------------------|
| Course Code And Title | | | | | Scheme | Theory (Marks) | | TW(Marks) | | POE(Marks) | |
| | L | Т | Р | Credit | | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| Deep | | | | | CIE | 30 | 12 | 25 | 10 | - | - |

| | Learning | 03 | 01 | | 04 | ESE | 70 | 28 | - | - | - | - |
|--|----------|----|----|--|----|-----|----|----|---|---|---|---|
| | | | | | | | | | | | | |
| ~ | | | | | | | | | | | | |
| CIE- Continuous Internal Evaluation ESE – End Semester Examination | | | | | | | | | | | | |

SECTION-I

Unit No I: Neural Network and Deep Learning

Introduction to AI, ML and Deep Learning, A brief history, Need of Deep Learning, Basics of neural network, Data representation for neural network, Gradient based optimization, anatomy of neural network.

Unit No II: Introduction to Tensorflow, Keras and hyperparameters Tensorflow:: (07 Hrs) Introduction, Downloading and installation of Tensorflow, The computation graph, Modelling cyclic dependencies, Building and running visualization, Computing graph and distribution, Simple math operation and distribution, Tensors, Rank of tensors, Tensor math, Numpy and tensors, Tensorflow example, Keras: Introduction, Models, Layers, Pre 7 processing, Deep Learning case studies, Hyperparameters: Learning rate, No of iterations, hidden layers, hidden units, choice of activation function, momentum, mini batch size, Overfitting and underfitting, regularization

Unit No III: Convolutional Neural Networks:

The convolutional operation, The max pooling operation, Training a convnet from scratch on a small dataset, Using pre-trained convnet, Visualizing what convnet learn

Unit No IV: Sequence Models

One hot encoding, Using word embeddings, A recurrent layer in Keras, Understanding the LSTM and GRU layers, Example of LSTM in Keras, Advanced use of Recurrent Neural Network

Unit No V: Advanced Deep Learning Best Practices

Going beyond the sequential model: The Keras functional API, Inspecting and monitoring deeplearning models using Keras callbacks and Tensor Board, Getting the most out of your models

Unit No VI: Generative Deep Learning

Text generation with LSTM, Deep Dream, Neural Style Transfer, Generating images with variational auto encoders, Introduction to generative adversarial network.

Text Books:

| Sr.no | Title | Author(s) Name | Publication & Edition |
|-------|--------------------|------------------|-----------------------|
| 1 | Deep Learning with | Francois Chollet | |
| | Python | | |

Reference Books:

| Sr.no | Title | Author(s) Name | Publication & Edition |
|-------|---------------|--|-----------------------|
| 1 | Deep Learning | by Ian Good fellow, Yoshua Bengio, Aaron Courville | MIT Press Book |

(06 Hrs)

(06 Hrs)

(05 Hrs)

(5Hrs)

(7Hrs)

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-------------|---------------------------------|---------|
| 3 | VII | PCE- CS803) | Ad-Hoc Wireless Sensor Networks | 04 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1) Describe issues and design goals in Ad Hoc wireless networks
- 2) Explain and classify various routing protocols in Ad Hoc wireless networks
- 3) Describe design issues and classify transport layer protocols and security protocols in Ad Hoc wireless Networks

4) Describe challenges and routing protocols in sensor networks

5) Explain sensor networks infrastructure management and sensor tasking and control techniques

| | Teaching Scheme | | | | Evaluation Scheme | | | | | | |
|------------------------------------|-----------------|---|---|--------|-------------------|----------------|---------------------|------------------|---------------------|------------|---------------------|
| Course Code And | | | | | | Theory (Marks) | | Practical(Marks) | | POE(Marks) | |
| Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| A 1 TY XY' 1 | | | | | CIE | 30 | 12 | 25 | 10 | - | - |
| Ad-Hoc Wireless Sensor Networks | 3 | | 1 | 4 | ESE | 70 | 28 | | | | |
| | 5 | | 1 | + | | | | | | | |

CIE- Continuous Internal Evaluation

Unit-I Introduction:

Need of Ever-Increasing Performance, Building Parallel Systems, Need to Write Parallel Programs, Concurrent, Parallel, Distributed, Typographical Conventions, Cluster Computing - architecture, Classifications, Grid Computing - Architecture, Applications

Unit-II Parallel Hardware and Parallel Software

Modifications to the von Neumann Model, Parallel Software, Input and Output, Performance, Parallel Program

Design, Writing and Running Parallel Programs.

Unit-III Distributed-Memory Programming with MPI:

Compilation and execution, MPI programs, SPMD programs, The Trapezoidal Rule in MPI, Dealing with I/O, Tree-structured communication, MPI Reduce, Collective vs. point-to-point communications, MPI Allreduce, Broadcast, Data distributions, MPI Derived Datatypes, Performance Evaluation of MPI Programs

Unit-IV Shared-Memory Programming with Pthreads:

Processes, Threads, and Pthreads, Hello World, Matrix-Vector Multiplication, Critical Sections, Busy-Waiting, Mutexes, Producer-Consumer Synchronization and Semaphores, Barriers and Condition Variables

Unit-V Shared-Memory Programming with OpenMP

Compiling and running OpenMP programs, The program, The Trapezoidal Rule, Scope of Variables,

The Reduction Clause, The parallel forDirective, More About Loops in OpenMP: Sorting, Scheduling

Loops.

(5Hrs)

(6Hrs)

(6 Hrs)

(6Hrs)

ESE – End Semester Examination

(6Hrs)

Two n-Body Solvers, Recursive depth-first search, Nonrecursive depth-first search, Data structures for the serial implementations, Performance of the serial implementations, Parallelizing tree search, A static parallelization of tree search using Pthreads, A dynamic parallelization of tree search using Pthreads, Evaluating the pthreads tree-search programs **Term Work:**

Term Work should consist of 10 assignments based on the following list. At least one assignment must be from each unit **Text Books:**

| Sr.No | Title | Author(s) Name | Publication & Edition | Units Covered |
|-------|--|--|---|--------------------------|
| 1 | An Introduction to Parallel Programming | Peter S. Pacheco | Elsevier, 2011 | 1 to 6 |
| 2 | Introduction to Grid Computing | Bart Jacob, Michael Brown, Kentaro Fukui, NiharTrivedi | International Business Machines Corporation 2005 | Grid Computing Unit 1 |
| 3 | High Performance Cluster Computing: Architectures and Systems, Volume 1 | R. Buyya | Pearson Education, 2008 | Cluster Computing Unit 1 |

Reference Books

| Sr.No | Title | Author(s) Name | Publication & Edition |
|-------|---|--------------------|-----------------------|
| 1 | Parallel computing theory and practice | Michel J. Quinn | ТМН |
| | Computer Architecture & Parallel Processing | Kai Hwang & Briggs | McGraw Hill |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------|------------------------|---------|
| 4 | VII | PCE-CS804 | Block chain Technology | 04 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of this course student should be able to

- 1. Explain design principles of Bitcoin and Ethereum.
- 2. Explain Nakamoto consensus.
- 3. Explain the Simplified Payment Verification protocol.
- 4. List and describe differences between proof-of-work and proof-of-stake consensus.
- 5. Interact with a blockchain system by sending and reading transactions.
- 6. Design, build, and deploy a distributed applicationCO414.5 Analyze compensated devices for voltage control

Syllabus:

| Sr.no Title | Author(s) Name | Publication & Edition |
|-------------|----------------|-----------------------|
|-------------|----------------|-----------------------|

| | Teaching Schellie | | | | Evaluation Scheme | | | | | | |
|-------------------------|-------------------|----|---|--------|-------------------|----------------|---------------------|------|---------------------|------------|---------------------|
| Course Code And | | | | | | Theory (Marks) | | TW(N | larks) | POE(Marks) | |
| Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing |
| | | | | | CIE | 30 | 12 | 25 | 10 | | - |
| Block chain | | | | | ESE | 70 | 28 | - | - | - | - |
| chain Technolo gy | 03 | 01 | | 04 | | | | | | | |

CIE- Continuous Internal Evaluation

Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. Cryptography: Hash function, Digital Signature -ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.

Unit II- Blockchain

Unit I - Introduction:

Introduction, Advantage over conventional distributed database, Blockchain Network, MiningMechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Privateand Public blockchain

Unit III- Distributed Consensus::

Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, SybilAttack, Energy utilization and alternate ...

Unit IV Cryptocurrency:

History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum -Construction, DAO, Smart Contract, HOST, Vulnerability, Attacks, Sidechain, Namecoin

Unit V- Cryptocurrency Regulation::

Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy. Unit VI- Cryptocurrency Applications:: (5Hrs)

Internet of Things, Medical Record Management System, Domain Name Serviceand future of

Blockchainseries capacitor compensated lines, static reactive compensating systems (Static VAR)

Texts Books:

ReferenceBooks:

| Sr.no | Title | Author(s) Name | Publication & Edition | Units Covered |
|-------|-----------------|--------------------------|----------------------------------|---------------|
| 1 | Bitcoin and | Arvind Narayanan, Joseph | Princeton University Press (July | |
| | Cryptocurrency | Bonneau, Edward Felten, | 19, 2016). | |
| | Technologies: A | Andrew Miller and Steven | | |
| | Comprehensive | Goldfeder, | | |
| | Introduction | | | |

(6Hrs)

ESE - End Semester Examination

(6Hrs)

(8 Hrs)

(8 Hrs)

(7 Hrs)

| 1 | 'Blockchain Technology: | S. Shukla, M. Dhawan, S. | Oxford University Press, 2019. |
|---|-------------------------|--------------------------|--------------------------------|
| | Cryptocurrency and | Sharma, S. Venkatesan | |
| | Applications | | |
| 2 | Blockchain: The | Josh Thompson | Create Space Independent |
| | Blockchain for | | Publishing Platform, 201 |
| | Beginnings, Guild to | | |
| | Blockchain Technology | | |
| | and Blockchain | | |
| | Programming | | |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|-----------|--------------------------------|---------|
| 5 | VII | PCC-CS805 | Mobile application development | 05 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1. To Install and configure Android application development tools.
- 2. To Design and develop user Interfaces for the Android platform.
- 3. To Design and develop database based android application.
- 4. To Apply Java programming concepts to Android app development

| | Teaching Scheme | | | | | Evaluation Scheme | | | | | | |
|-----------------|-----------------|---|---|--------|------------|-------------------|---------------------|-----------|---------------------|------------|---------------------|--|
| Course Code And | | | | | dit Scheme | Theory (Marks) | | TW(Marks) | | POE(Marks) | | |
| Title | L | Т | Р | Credit | | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing | |
| | | | | | CIE | - | - | 50 | 20 | 50 | 20 | |
| application | 2 | | | ~ | ESE | - | - | | | | | |
| development | 3 | 2 | | 5 | | | | | | | | |

IE- Continuous Internal Evaluation

 $ESE-End\ Semester\ Examination$

Unit I: Android Overview::

Overview of Android, History, Android Versions, Android OS stack: Linux kernel, Native Libraries/DVM, Application Framework, Applications, Activity, Activity lifecycle, Fragments, Activity Back Stack, Process and Threads. Android Development Environment Introduction to Android SDK, Android Emulator, Creating a Project, Project Directory Structure, DDMS, Logging in Android (Logcat), Android Manifest File, Permissions..

Unit II: Intents and Layouts::

XML, Android View Hierarchies, Linear Layouts, Relative Layout, Table Layout, Frame Layout Sliding, Using Padding and Margins with Layouts. What Is Intent? Android Intent Messaging via Intent Objects, Types of Intents, Using Intents with Activities, Sending Intents (Telephony, SMS), Broadcast Receivers

Unit III: Input Controls, Input Events, Dialogs:

(8hr)

(4hr)

At the end of the course the students should be able to:

Buttons, Text Fields, Checkboxes, Radio Buttons, Toggle Buttons, Spinners, Event Listeners, Event Handlers, Touch Mode, Handling Focus, Dialogs: Alerts, Popups, Toasts

Unit-IV: Menus, Notification and ActionBar:

Menus, Options menu, Context menu, Popup menu, Handling menu click events, creating a Notification, Notification actions, Notification priority, Managing Notifications, Removing notifications

Unit-V: Android Database and App Market:

Installing SQLite plugin, DbHelper, The Database Schema and Its Creation, Four Major Operations, Cursors, Example, publish app to the Android Market.

Unit-VI Using Common Android APIs

Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs.

Texts and references:

| Sr.no | Title | Author(s) Name | Publication & Edition |
|-------|---|-----------------------------------|---------------------------|
| 1 | Beginning Android application development by | Wei-Mag Lee | |
| 2 | Learning Android by Marko Gargenta Publisher | W. Jason Gilmore | O'Reilly Media |
| 3 | Android Apps for Absolute Beginners | Wallace Jackson | SECOND EDITION |
| 4 | T1., "Android Wireless Application Development" | Lauren Darcey and Shane Conder | Pearson Education,2nd ed. |

Reference Book.

| Sr.no | Title | Author(s) Name | Publication & Edition |
|-------|-------------------------|-------------------------|-----------------------|
| 1 | Application | Reto Meier | Wiley India |
| | Development | | |
| 2 | Android in Action | W.FrankAbleson, | Third Edition |
| | | RobiSen, Chris King, C. | |
| | | Enrique Ortiz | |
| 3 | The Android Developer's | James Steele | |
| | Cook book "Building | | |
| | Applications with the | | |
| | Android SDK" | | |
| 4 | Beginning Android | Mark L Murphy | Wiley India Pvt Ltd. |

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------|------------|---------|
| 5 | VII | (PW-CS806) | Project-II | 02 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

2

COs:

(**4hr**)

(4hr)

(4hr)

- 1. Design and develop usable User Interface
- 2. Analyze and apply emerging technologies in development of a project
- 3. Test the modules in Project
- 4. Demonstrate working of project

| | | Т | each | ing Schem | ie | Evaluation Scheme | | | | | | | | |
|-----------------|---|---|------|-----------|--------|-------------------|---------------------|-----------|---------------------|------------|---------------------|----|----|----|
| Course Code And | | | | | | Theory (Marks) | | TW(Marks) | | POE(Marks) | | | | |
| Title | L | Т | Р | Credit | Scheme | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passing | | | |
| | | | | | | | | CIE | - | - | 50 | 20 | 50 | 20 |
| Project-II | 0 | 0 | | | ESE | I | - | | | | | | | |
| | 0 | 0 | 2 | 2 | | | | | | | | | | |

IE- Continuous Internal Evaluation

ESE - End Semester Examination

Contents

The group will continue to work on the project selected during the semester VII and submit the completed

Project work to the department at the end of semester VIII as mentioned below.

- 1. The workable project.
- 2. The project report in the bound journal complete in all respect with the following : -
- i. Problem specifications
- ii. System definition requirement analysis.
- iii. System design dataflow diagrams, database design
- $iv. \ System \ implementation-algorithm, \ code \ documentation$
- v. Test results and test report.

vi. In case of object oriented approach – appropriate process be followed.

CIE will be jointly assessed by a panel of teachers appointed by head of the Institution. SEE examination will

be conducted by internal and external examiners

Note:

1. Project work should be continually evaluated based on the contributions of the group members,

originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.

2. Two mid-term evaluations should be done, which includes presentations and demos of the work done.

3. Care should be taken to avoid copying and outsourcing of the project work

| Sr. No | Sem | Code No. | Subject | Credits |
|--------|-----|------------|---------------------|---------|
| 5 | VII | (HM-CS807) | Professional Skills | 01 |

PSOs:

- 1) Tackle real life problems & provide more affordable & economic solution.
- 2) Able to take up higher studies, research & development & entrepreneurship in modern computer Environment.

COs:

At the end of the course the students should be able to:

- 1. Recognize own strengths and opportunities.
- 2. Apply the life skills to different situations.
- 3. Speak fluently in academic and social contexts.
- 4. Develop Critical thinking and innovative skills.

| | | Т | 'each | ing Schen | ie | Evaluation Scheme | | | | | | |
|-----------------|---|---|-------|-----------|--------|-------------------|---------------------|-----------|---------------------|------------|-----------------------|--|
| Course Code And | | | | Credit | Scheme | Theory (Marks) | | TW(Marks) | | POE(Marks) | | |
| Title | L | Т | Р | | | Max. | Min. for Passing | Max. | Min. for passing | Max. | Min. for passin | |
| | | | | | CIE | - | - | 50 | 20 | | | |
| Skills | 0 | 1 | 0 | | ESE | - | - | | | | | |
| | 0 | 1 | 0 | 1 | | | | | | | | |

IE- Continuous Internal Evaluation

ESE - End Semester Examination

I. E-Learning Course

Students are supposed to complete e-learning course from any online platforms like MOOCS/NPTEL/Swayam/Coursera/Udemy etc. related to Project work or advanced technologies. Duration of the Course should be minimum 4 weeks.

At the end of course students are advised to attend the exam and get the certificate for the same.

II. Professional Skills: Career Skills

- 1. Resume Skills
- 2. Interview Skills / Online Interview
- 3. Group Discussion Skills
- 4. Exploring Career Opportunities

III. Professional Skills: Team Skills

- 1. Presentation Skills
- 2. Trust and Collaboration
- 3. Brainstorming
- 4. Social and Cultural Etiquettes
- 5. Internal Communication
- 6. Social Media Profile Building

IV. Leadership and Management Skills

- 1. Leadership Skills
- 2. Managerial Skills
- 3. Time Management
- 4. Entrepreneurial Skills
- 5. Innovative Leadership and Design Thinking
- 6. Ethics and Integrity

V. Introduction to Critical Life skills

Leadership, teamwork, dealing with ambiguity, managing stress, motivating people, creativity, result orientation; Understanding Life Skills: Movie based learning, Self-awareness- identity, body awareness, stress management; building self-confidence; Importance of listening skills, Difference between listening and hearing, Types of listening.

Text Books

1. Lewis Lansford and Peter Astley. Oxford English for Careers: Engineering 1: Student's Book. 2013. USA: Oxford University Press.

2. Jaimie Scanlon. Q: Skills for Success 1 Listening & Speaking. 2015. [Second Revised Edition]. Oxford: Oxford University Press.

Reference Books:

1. Sanjay Kumar and Puspalata. Communication Skills. 2015. [Second Edition] Print. New Delhi: Oxford University Press.

2. John Seely. Oxford Guide to Effective Writing and Speaking. 2013. [Third Edition].New Delhi: Oxford University Press.

3. Meenakshi Raman. Communication Skills. 2011. [Second Edition]. New Delhi: Oxford University Press.

4. Terry O"Brien. Effective Speaking Skills. 2011. New Delhi: Rupa Publishers.

5. BarunMitra. Effective Technical Communication: AGuide for Scientists and Engineers. 2015. New Delhi: Oxford University Press.

6. English vocabulary in use - Alan Mc'carthy and O'dell

7. APAART: Speak Well 1 (English Language and Communication)

8. APAART: Speak Well 2 (Soft Skills)

9. Business Communication - Dr.Saroj Hiremath