Master of Technology (CSE)

02 YEARS SYLLABUS

Choice Based Credit System (CBCS)

Department of Computer Science

Master of Technology

FOUR Semesters Program

Master of Technology (CSE)

Semester I

Category	Paper Code	Paper Name	Contact Hours/Week			
			L	T	P	Credit
DSE		Mathematical Foundations of Computer Science	4	0	0	4
CC		Object Oriented Analysis and Design	3	1	4	4
CC		Computer Network and Distributed Systems	5	1	0	6
CC		Operating Systems and System Programming	5	1	0	6
CC		Advanced Data Structures	3	1	4	6
SEC		Mentor Seminar – I	2	0	0	**2**
			22	4	8	**28**
			Total Hours= 34			

Semester II

Category	Paper Code	Paper Name	Contact Hours/Week			
			L	T	P	Credit
CC		Data Mining & Warehousing	5	1	0	6
CC		Compiler Design	5	1	0	6
AECC		Cloud Computing	5	1	0	6
AECC		Machine Learning	3	1	4	6
		Seminar on Project (Project Proposal Presentation)	0	0	6	**3**
			18	4	10	**27**
			Total Hours= 32			

Semester III

Category	Paper Code	Paper Name	Contact Hours/Week			
			L	T	P	Credit
CC		Elective Papers I	5	1	0	6
CC		Elective Papers II	5	1	0	6
		Project – Part -1	0	0	16	8
			10	2	16	**20**
			Total Hours= 28			

Semester IV

Category	Paper Code	Paper Name	Contact Hours/Week			
			L	T	P	Credit
CC		Project Completion means the candidate is expected to make some original contribution.	0	0	30	15
			0	0	30	**15**
			Total Hours= 30			
Total Credits						**90**

Elective Papers I:

PGCSE301A: *Image Processing*,
PGCSE301B: *Soft Computing,*
PGCSE301C: Neural Network & Neuro Fuzzy Computing,
PGCSE301D: Pattern Recognition & Machine Learning,
PGCSE301E: Big data

Elective Papers I I:

PGCSE302A: *Advanced Search & Optimization Techniques,*
PGCSE302B: Digital Signal Processing,
PGCSE302C: Programmable Hardware & Reconfigurable Computing,
PGCSE302D: Mobile Computing
PGCSE302E: Cryptography and Network Security

COURSE INFORMATION SHEET

Course title: Mathematical Foundations of Computer Science

Module I: Linear Algebra
Introduction: Matrices and solving set of linear equations, Vector space, Subspace, Linear combination of vectors, Linear dependence and independence of vectors, Bases and dimensions. (8L)

Module II:
Inner product spaces, Orthogonal vectors and dual vectors, Eigen values and Eigen vectors, Linear programming. (8L)

Module III: Probability and Statistics
Frequency distribution and measures of central tendency, mean, median mode, quartiles, measures of dispersions and skewness, standard deviation, mean deviation, coefficient of variation, moments.

Module IV:
Probability: definition, Distribution: discrete and continuous, Chi-square test, t-test. (8L)

Module V: Graph Theory (8L)
Introduction: Graphs and its types, Representation of graphs: Adjacency matrix, Incidence matrix, Adjacency list, Planar graph, Kuratowski's Graphs, Clique and maximum Clique finding algorithms. (8L)

Books:
1. K. Haffman, and R. Kunze, "Linear Algebra", 2nd Edition, Pearson, 2015.
2. G. Williams, "Linear Algebra with Applications", 4th Edition, John & Bartlett.
3. W. Navidi, "Statistics for Engineers and Scientists", 2nd Edition, TMH, 2008.
4. J.K. Goyal, and J. N. Sharma, "Mathematical Statistics", Krishna Prakashan, 2017.
5. Narasingh Deo, "Graph Theory with Applications to engineering and Computer Science", Prentice Hall of India, 2001.(R1)
6. Douglas B. West, "Introduction to Graph theory", Pearson Education, 2002.(R2)

Course title: Object Oriented Analysis and Design

Module 1 (9L) Introduction to OOAD – Unified Process – UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.
Module 2 (9L) DESIGN PATTERNS
GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller – Design Patterns – creational – factory method – structural – Bridge – Adapter – behavioral – Strategy – observer.

Module 3 (9L) CASE STUDY 9
Case study – the Next Gen POS system, Inception -Use case Modeling – Relating Use cases – include, extend and generalization – Elaboration – Domain Models – Finding conceptual classes and

description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition.

Module 4 (9L) APPLYING DESIGN PATTERNS
System sequence diagrams – Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement – UML class diagrams – UML interaction diagrams – Applying GoF design patterns.

Module 5 (9L) CODING AND TESTING
Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing.

References:

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.
REFERENCES:
2. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2010.
3. Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.
4. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.
5. Paul C. Jorgensen, "Software Testing: - A Craftsman‟s Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.

Course title: Computer Networks & Distributed Systems

Module I:
Introduction: Overview of computer networks, seven-layer architecture, TCP/IP suite of protocols, MAC protocols for high-speed LAN, MAN, and wireless LANs, (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet, etc.), Fast access technologies (For example, ADSL, Cable Modem).

Module II:
IPv6: Why IPv6, basic protocol, extensions and options, support for QoS, neighbor discovery, auto-configuration, routing. Application Programming Interface for IPv6. 6bone. Mobility in networks. Mobile IP. Security related issues. IP Multicasting. Multicast routing protocols, address assignments, session discovery, etc.

Module III:
TCP extensions for high-speed networks, transaction-oriented applications. Network security at various layers. Authentication header, Key distribution protocols. Digital signatures, digital certificates. distributed system taxonomy, service models, naming and binding remote procedure calls (RPC), object brokers, distributed file system design distributed file system case studies: NFS, AFS, clock synchronization, distributed

transactions, mutual exclusion, election algorithms distributed shared memory and memory consistency models, distributed deadlocks

Books:

1. W. R. Stevens. TCP/IP Illustrated, Volume 1: The protocols, PEARSON Education.
2. G. R. Wright. TCP/IP Illustrated, Volume 2: The Implementation, PEARSON Education.
3. W. R. Stevens. TCP/IP Illustrated, Volume 3: TCP for Transactions, HTTP, NNTP, and the Unix Domain Protocols, PEARSON Education.
4. R. Handel, M. N. Huber, and S. Schroeder. ATM Networks: Concepts, Protocols, Applications, and PEARSON Education.
5. W. Stallings. Cryptography and Network Security: Principles and Practice, 2nd Edition, PEARSON Education. C. E. Perkins, B.
6. Woolf, and S. R. Alpert. Mobile IP: Design Principles and Practices, PEARSON Education. Peter Loshin. IPv6 Clearly Explained, Morgan Kauffman, 1999.
7. M. Gonsalves and K. Niles. IPv6 Networks, McGraw Hill, 1998.
8. Andrew S. Tanenbaum and Marteen van Steen, “Distributed Systems: Principles and Paradigms (2nd Edition)”, PEARSON
9. Education S. Tanenbaum, “Distributed Operating Systems”, PEARSON Education
10. Kenneth P. Birman, “Reliable Distributed Systems: Technologies, Web Services, and Applications”, Springer

Course title: Operating Systems and System Programming

Module I:
User Level Specification of OS. Fundamental Concepts of Multi programmed OS, Basic Concepts and Techniques for Implementation of Multi programmed OS. Processes and the Kernel, Micro kernel Architecture of OS. Multiprocessor, Multimedia, and Real-Time OS. POSIX Standards. Management and Control of Processes. Basic Concept of Threads, Types of Threads, Models of Thread Implementations. Traditional and Real-Time Signals. Clocks, Timers and Callouts.

Module II:
Thread Scheduling for Unix, Windows, and Real-Time OS, Real-Time Scheduling. Inter process /Inter thread Synchronization and Communication, Mutual Exclusion/Critical Section Problem, Semaphores, Monitors, Mailbox Deadlocks. Concepts and Implementation of Virtual Memory (32-bit and 64-bit), Physical Memory Management.

Module III:
File Organization, File System Interface and Virtual File Systems, Implementation of File Systems. I/O Software: Interrupt Service Routines and Device Drivers. Protection and Security. Case Study of Unix, Windows, and Real-Time OS.

Books:

1. Andrew S. Tanenbaum, “Modern Operating Systems”, Second Edition, Pearson
2. Education, Inc., 2001.
3. Uresh Vahalia, “UNIX Internals: The New Frontiers”, PEARSON Education.

4. J. Mauro and R. McDougall, “Solaris Internals: Core Kernel Architecture”, Sun
5. Microsystems Press, 2001.
6. Daniel P. Bovet and Marco Cesati, “Understanding the Linux kernel”, O'Reilly &
7. Associates, Inc., 1998.
8. Stallings, “Operating Systems: Internals and Design Principles 5th ed”, PHI
9. Sinha, “Distributed Operating System: Concepts and Design”, PHI

Course title: Advanced Data Structures

Module I:
Dictionaries: Definition, Dictionary Abstract Data Type, Implementation of Dictionaries. Hashing: Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.

Module II:
Skip Lists: Need for Randomizing Data Structures and Algorithms, Search and Update Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists

Module III:
Trees: Binary Search Trees, AVL Trees, Red Black Trees, 2-3 Trees, B-Trees, Splay Trees

Module IV:
Heaps: Balanced Search Trees as Heaps, Array-Based Heaps, Heap-Ordered Trees and Half- Ordered Trees, Leftist Heaps, Skew Heaps, Binomial Heaps, Changing Keys in Heaps, Fibonacci Heaps, Heaps of Optimal Complexity, Double-Ended Heap Structures and Multidimensional Heaps, Heap-Related Structures with Constant-Time Updates.

Module V:
Text Processing: Sting Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem.

Books:

1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++,” 2nd Edition, Pearson, 2004.
2. Peter Brass, “Advanced Data Structures,” Cambridge University Press, 1stEdition.
3. M T Goodrich, & Roberto Tamassia, “Al

PAPER NAME: Data Mining & Warehousing

Module 1(9L): DATA WAREHOUSING, BUSINESS ANALYSIS AND ON-LINE ANALYTICAL PROCESSING (OLAP): Basic Concepts – Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors – Multidimensional Data Model – Data Warehouse Schemas for Decision Support, Concept Hierarchies -Characteristics of OLAP Systems – Typical OLAP Operations, OLAP and OLTP.

Module 2(9L): DATA MINING – INTRODUCTION:
Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

Module 3(9L): DATA MINING – FREQUENT PATTERN ANALYSIS:
Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns

Module 4(9L): CLASSIFICATION AND CLUSTERING:
Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines –– Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy. Clustering Techniques – Cluster analysis-Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods.

Module 5(9L): WEKA TOOL:
Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports database – Introduction to WEKA, The Explorer – Getting started, Exploring the explorer, Learning algorithms, Clustering algorithms, Association–rule learners.

References:

1. Jiawei Han and Micheline Kamber, —Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.

2. Alex Berson and Stephen J.Smith, —Data Warehousing, Data Mining & OLAP‖, Tata McGraw – Hill Edition, 35th Reprint 2016.
3. K.P. Soman, Shyam Diwakar and V. Ajay, —Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.
4. Ian H.Witten and Eibe Frank, —Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.

PAPER NAME: Operating Systems and System Programming

Module-1 (3L): Introduction-Evolution of operating systems. Types of operating systems. Different views of the operating system, operating system concepts and structure.

Module-2 (3L): Processes: The Process concept, systems programmer's view of processes. The operating system services for process management. Scheduling algorithms. Performance evaluation.

Module-3 (6L): Memory Management: Memory management without swapping or paging, swapping, virtual memory, page replacement algorithms, modeling paging algorithms, design issues for paging systems, segmentation.

Module-4 (6L): Inter-process Communication and synchronization, The need for interprocess synchronization, mutual exclusion, semaphores, hardware sport for mutual exclusion. queuing implementation of semaphores, classical problems in concurrent programming, critical region and conditional critical region, monitors, messages, deadlocks.

Module-5 (4L): File Systems: File systems, directories, file system implementation, security protection mechanisms.

Module-6 (3L): Input/Output: Principles of I/O Hardware: I/O devices, device controllers, direct memory access.

Module-7(4L): Disks: Disk hardware, scheduling algorithms, Error handling, trac-at-a-time caching, RAM Disks. Clocks: Clock hardware, memory mapped terminals, I/O software. Terminals: Terminal hardware, memory mapped terminals, I/O software.

Module-8 (4L): Processes and Processors in Distributed Systems: Threads, system models, processor allocation, scheduling. Distributed File Systems: Design, implementation, trends.

Module-9 (6L): Assemblers: Elements of Assembly Language Programming, Design of the Assembler, Assembler Design Criteria, Types of Assemblers, Two-Pass Assemblers, One-Pass Assemblers, Single pass Assembler for Intel x86, Algorithm of Single Pass Assembler, Multi-Pass Assemblers.

Module-10 (6L): Compilers: Causes of Large Semantic Gap, Binding and Binding Times, Data Structure used in Compiling, Scope Rules, Memory Allocation, Compilation of Expression, Compilation of Control Structure, Code Optimization

References:

1. Deitel. H.M .. "An Introduction to Operating Systems". Addison Wesley Publishing Company 1984. Milenkovic, M., "Operating Systems· Concepts and Design". McGraw Hill International Edition Computer Science series 1992.

2. Peterson, J.L .. Abraham Silberschatz. "Operating System Concepts". Addison Wesley Publishing Company 1989.

3. Tanenbaum, A.S., "Modem Operating Systems", Prentice Hall of India Pvt. Ltd. 1995.

PAPER NAME: Object Oriented Analysis and Design

Module 1 (9L) Introduction to OOAD – Unified Process – UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.
Module 2 (9L) DESIGN PATTERNS
GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High

Cohesion – Controller – Design Patterns – creational – factory method – structural – Bridge – Adapter – behavioral – Strategy – observer.

Module 3 (9L) CASE STUDY 9
Case study – the Next Gen POS system, Inception -Use case Modeling – Relating Use cases – include, extend and generalization – Elaboration – Domain Models – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition.

Module 4 (9L) APPLYING DESIGN PATTERNS
System sequence diagrams – Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement – UML class diagrams – UML interaction diagrams – Applying GoF design patterns.

Module 5 (9L) CODING AND TESTING
Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing.

References:

1. Craig Larman, “Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development”, Third Edition, Pearson Education, 2005.
REFERENCES:
6. Simon Bennett, Steve Mc Robb and Ray Farmer, “Object Oriented Systems Analysis and Design Using UML”, Fourth Edition, Mc-Graw Hill Education, 2010.
7. Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, “Design patterns: Elements of Reusable Object-Oriented Software”, Addison-Wesley, 1995.
8. Martin Fowler, “UML Distilled: A Brief Guide to the Standard Object Modeling Language”, Third edition, Addison Wesley, 2003.
9. Paul C. Jorgensen, “Software Testing: - A Craftsman‟s Approach”, Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.

Course title: Cloud Computing

Module I:

Introduction: Online Social Networks and Applications, Cloud introduction and overview, Different clouds, Risks, Novel applications of cloud computing.

(8L)

Module II:

Requirements, Introduction Cloud computing architecture, On Demand Computing Virtualization at the infrastructure level, Security in Cloud computing environments, CPU Virtualization, A discussion on Hypervisors Storage Virtualization Cloud Computing Defined, The SPI Framework for Cloud Computing, The Traditional Software Model, The Cloud Services Delivery Model, Key Drivers to Adopting the Cloud, The Impact of Cloud Computing on Users, Governance in the Cloud, Barriers to Cloud Computing Adoption in the Enterprise.

(8L)

Module III:

Infrastructure Security, Infrastructure Security: The Network Level, The Host Level, The Application Level, Data Security and Storage, Aspects of Data Security, Data Security Mitigation Provider Data and Its Security Identity and Access Management Trust Boundaries and IAM, IAM Challenges, Relevant IAM Standards and Protocols for Cloud Services, IAM Practices in the Cloud, Cloud Authorization Management.

(8L)

Module IV:

Security Management Standards, Security Management in the Cloud, Availability Management: SaaS, PaaS, IaaS, Privacy Issues: Privacy Issues, Data Life Cycle, Key Privacy Concerns in the Cloud, Protecting Privacy, Changes to Privacy Risk Management and Compliance in Relation to Cloud Computing, Legal and Regulatory Implications, U.S. Laws and Regulations, International Laws and Regulations.

(8 L)

Module V:

Internal Policy Compliance, Governance, Risk, and Compliance (GRC), Regulatory/External Compliance, Cloud Security Alliance, Auditing the Cloud for Compliance, Security-as-a- Cloud, Recent developments in hybrid cloud and cloud security.

(8L)

Text Books:

1. John Rhoton, “Cloud Computing Explained: Implementation Handbook for Enterprises”, Publication Date: November 2, 2009.
2. Tim Mather, “Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance (Theory in Practice)”, ISBN-10: 0596802765, O'Reilly Media, September 2009.

PAPER NAME: Compiler Design

Module 1(10L): INTRODUCTION TO COMPILERS:
Translators-Compilation and Interpretation-Language processors -The Phases of Compiler-Errors Encountered in Different Phases-The Grouping of Phases-Compiler Programming Language basics.
Module 2(8L): LEXICAL ANALYSIS:
Need and Role of Lexical Analyzer-Lexical Errors-Expressing Tokens by Regular Expressions- Converting Regular Expression to DFA- Minimization of DFA-Language for Specifying Lexical Analyzers-LEX-Design of Lexical Analyzer for a sample Language.
Module 3(10L): SYNTAX ANALYSIS:
Need and Role of the Parser-Context Free Grammars -Top Down Parsing -General Strategies- Recursive Descent Parser Predictive Parser-LL(1) Parser-Shift Reduce Parser-LR Parser-LR (0)Item- Construction of SLR Parsing Table -Introduction to LALR Parser – Error Handling and Recovery in Syntax Analyzer-YACC-Design of a syntax Analyzer for a Sample Language .
Module 4(12L): SYNTAX DIRECTED TRANSLATION & RUN TIME ENVIRONMENT:
Syntax directed Definitions-Construction of Syntax Tree-Bottom-up Evaluation of S-Attribute Definitions-Design of predictive translator – Type Systems-Specification of a simple type checker- Equivalence of Type Expressions-Type Conversions.

RUN-TIME ENVIRONMENT: Source Language Issues-Storage Organization-Storage Allocation- Parameter Passing-Symbol Tables-Dynamic Storage Allocation-Storage Allocation in FORTAN.
Module 5(9L): CODE OPTIMIZATION AND CODE GENERATION:
Principal Sources of Optimization-DAG- Optimization of Basic Blocks-Global Data Flow Analysis- Efficient Data Flow Algorithms-Issues in Design of a Code Generator – A Simple Code Generator Algorithm.

References:

1. Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence-based Approach", Morgan Kaufmann Publishers, 2002.
1. Steven S. Muchnick, "Advanced Compiler Design and Implementation, "Morgan Kaufmann Publishers – Elsevier Science, India, Indian Reprint 2003.
2. Keith D Cooper and Linda Torczon, "Engineering a Compiler", Morgan Kaufmann Publishers Elsevier Science, 2004.
4. Charles N. Fischer, Richard. J. LeBlanc, "Crafting a Compiler with C", 2008.

Elective List:

PAPER NAME: Cryptography and Network Security

Module 1(9L): INTRODUCTION & NUMBER THEORY
Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid‟s algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat‟s and Euler‟s theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

Module 2(10L): BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY
Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management – Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

Module 3(8L): HASH FUNCTIONS AND DIGITAL SIGNATURES
Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 – SHA – HMAC – CMAC – Digital signature and authentication protocols – DSS – EI Gamal – Schnorr.

Module 4(8L): SECURITY PRACTICE & SYSTEM SECURITY 8L
Authentication applications – Kerberos – X.509 Authentication services – Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls – Firewall designs – SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

Module 5 (8L): E-MAIL, IP & WEB SECURITY 9L
E-mail Security: Security Services for E-mail-attacks possible through E-mail – establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. IPSecurity: Overview of IPSec – IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

References:

1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd
2. BehrouzA.Foruzan, Cryptography and Network Security, Tata McGraw Hill 2007.
3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2

PAPER NAME: Neural Network & Neuro Fuzzy Computing

Module 1(9L): Introduction: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

Module 2(8L): Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search Game Playing: Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

Module 3(8L): Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propos ional logic, Resolution, Forward & Backward. Chaining.

Module 4(8L): First order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

Module 5(6L): Characteristics of Neural Networks, Historical Development of Neural Networks Principles, Artificial Neural Networks: Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units.

Module 6(8L): Feedforward Neural Networks:
Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of pattern storage Networks. Analysis of Pattern Mapping Networks.

Module 7(6L): Feedback Neural Networks
Introduction, Analysis of Linear Auto associative FF Networks, Analysis of Pattern Storage Networks.

Module 8(8L): Competitive Learning Neural Networks & Complex pattern Recognition
Introduction, Analysis of Pattern Clustering Networks, Analysis of Feature

Mapping Networks, Associative Memory.

References:

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.
2. Artificial Intelligence, 2nd Edition, E.Rich and K.Knight (TMH).
3. Artificial Intelligence and Expert Systems – Patterson PHI.
4. Neural Networks Simon Haykin PHI
5. Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition.