

V Semester Syllabi – IT Engineering

Sr. No.	Course Code	Course Name	L	T	P	Credits
1	IT3CO06	Design and Analysis of Algorithms	3	1	2	5
2	IT3CO10	Computer Networks	3	1	2	5
3	IT3CO12	Software Engineering	3	0	2	4
4	IT3CO17	Compiler Design	3	0	0	3
5		Elective 1	3	0	0	3
6		Elective 2	3	0	0	3
7	EN3HS04	Fundamentals of Management, Economics and Accountancy	3	0	0	3
8	EN3MC01	Open Learning Courses	1	0	0	0
		Total	22	2	6	26
		Total Contact Hours		30		

Electives V Semester

S. No	Course Code	Course Name	L	T	P	Credit
1	IT3EA01	Artificial Intelligence	3	0	0	3
2	IT3EA03	Soft Computing	3	0	0	3
3	IT3EL04	Distributed System	3	0	0	3
4	IT3EW01	Internet & Web Technology	3	0	0	3

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Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT3CO06	Design and Analysis of Algorithms	3	1	2	5

UNIT-I Introduction to Algorithms

Algorithms, Analysis, Performance issues: Time and Space complexity; Asymptotic Notations.

Mathematical preliminaries: functions & their growth rates; Recurrence relations, Methods for solving recurrences. Elementary Sorting techniques and its analysis: Selection, Bubble, Insertion sort

UNIT-II Sorting and Divide & Conquer

Advance sorting techniques and its analysis: Heap sort, Radix sort and Bucket sort, Divide and Conquer techniques and its analysis - Binary search, Merge Sort, Quick sort, Strassen's Matrix multiplication.

UNIT-III Greedy Algorithms

Greedy problems and its complexity analysis: Optimal merge patterns, Huffman coding, Minimum spanning trees, Knapsack problem, Job sequencing with deadlines, Single source shortest path problem - Dijkstra's Algorithm

UNIT-IV Dynamic Programming

Dynamic programming problems and its complexity analysis: 0/1 Knapsack, Multistage graph, Bellman Ford Algorithm, Reliability design, Floyd-Warshall algorithm, Matrix Chain Multiplication, Longest Common subsequence.

UNIT-V Backtracking and Branch & Bound

Backtracking Approach: N-Queen's problem, Hamiltonian cycle, Graph coloring problem, Sum of Subset problem. Introduction to branch & bound method, examples of branch and bound method like 15 puzzle traveling salesman problem, 0/1 knapsack. An introduction to P, NP, NP Complete and NP hard problems.

Text Books

1. Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, Introduction to Algorithms, Second Edition, MIT Press/McGraw-Hill
2. E. Horowitz, S. Sahni, S Rajasekaran, Computer Algorithms, Galgotia Publications

Reference Books

1. Saara Base, Computer Algorithms: Introduction to Design and Analysis, Addison Wesley.
2. A V Aho, J E Hopcroft & J D Ullman, The Design and Analysis of Computer Algorithms, Addison Wesley.
3. R.C.T.Lee, S S Tseng, R C Chang, Y T Tsai " Introduction to Design and Analysis of Algorithms, A Strategic approach" Tata McGraw Hill.

Course Code	Course Name	Hours per Week			Total
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IT3CO10	Computer Networks	3	1	2	5

UNIT - I

Introduction: History and development of computer networks, networks topologies. Layering and protocols. Design issues, Interface and services, connection oriented and connectionless service, ISO-OSI reference model, Description of layers, comparison with TCP/IP, Introduction to internetworking devices.

UNIT - II

Data Link Layer: Design issues, framing, error detection and correction, elementary and sliding window protocols, 1-Bit, Go Back N, Selective repeat, Bit oriented Protocol: HDLC, SDLC.

UNIT - III

Medium Access Control Sub Layer: Channel allocation problem, static and dynamic channel allocation, pure ALOHA, Slotted ALOHA, multiple access protocols, CSMA, CSMA/CD, CSMA/CA, IEEE Standards: 802.3 Ethernet, 802.4 token bus, 802.5 token ring, 802.11 Wireless LANs, 802.15 Personal Area Networks (Bluetooth).

UNIT - IV

Network layer: Design issues, Routing algorithms: flooding, Bellman ford, Link state routing, hierarchical routing, Dijkstra's algorithm, broadcast and multicast routing, RIP, OSPF, Path vector, Network Address Translation (NAT), Internet Protocol, IPv4 header format, Addressing, Subnetting, ARP, RARP, BOOTP, DHCP, ICMP, Comparison between IPv4 and IPv6.

UNIT - V

Transport layer: Design issues, Process to process delivery, TCP Connection establishment and termination. TCP header format, TCP flow control, TCP congestion control, Timers in TCP. UDP header format, Checksum. Session layer: Authentication, authorization. Presentation formatting and data compression, Domain Name Server (DNS), World Wide Web (WWW), Hypertext Transfer Protocol (HTTP), Remote login: Telnet, File Transfer Protocol (FTP).

Text Book

1. Computer Networks, Andrew S. Tanenbaum, Pearson Education
2. Computer Networking: A Top-Down Approach, James F. Kurose, Pearson Education
3. Data and Computer Communications, William Stallings, Pearson Education

Reference Books:

1. Computer Networks: A Systems Approach, Peterson, Davie, ELSEVIER.
2. Data Communications & Networking, Behrouz A. Forouzan, Tata McGraw Hill.

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT3CO12	Software Engineering	3	0	2	4

UNIT I

Software Engineering – Definition, Process, Evolution and Myths, Generic Process Model, Framework, Process Models – Waterfall, Incremental, Evolutionary, Spiral, Component Based Model, Rational Unified Process

UNIT II

Requirement Analysis, Stakeholders, Elicitation Techniques, Requirement Modelling - Use Cases, Activity Diagrams, Swimlane Diagrams, Data Modelling, Data Flow Diagram, Overview of Class Based Modelling, requirement Tracking

UNIT III

Principles of Software Design, Design Concepts – Abstraction, Architecture, Modularity, Relationships, Design Model, Component Design, User Interface Design, Configuration Management

UNIT IV

Software Quality, Approaches for Quality Assurance, Software Testing, Verification and Validation, Types of Testing, Risk Assessment, Risk Mitigation, Monitoring and Management

UNIT V

Software Metrics, Process Metrics, Product Metrics, Function Oriented Metrics, Software Project Estimations, Function Point Based Metrics, COCOMO Models, Project Scheduling, Effort Distribution

Text Book

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, McGraw-Hill.
2. Ian Sommerville, Software Engineering, Pearson Education Inc., New Delhi

Reference Book

1. Fundamentals of Software Engineering by Rajib Mall, – PHI

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Course Code	Course Name	Hours per Week			Total
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IT3CO17	Compiler Design	3	0	0	3

UNIT I

Basic machine, FSM, Transition graph, Transition matrix, Deterministic and non-deterministic FSM'S, Equivalence of DFA and NDFA, Regular Expressions, CFG, Chomsky Hierarchy of Language, Derivation and Parse Tree, Ambiguity

UNIT II

Compiler structure: Pass Structure of compiler, Translators, Phases of Compilers, Lexical Analyzer: Role of Lexical Analyzer, Specification of tokens, Recognition of tokens and input Buffering, The Syntactic Specification of Programming Languages, Cross Compiler, bootstrap Compiler

UNIT III

Basic Parsing Techniques: Top Down parsers, Recursive Descent Parsers, Predictive Parsers. Bottom Up Parsing: Operator precedence parsing, LR parsers, Construction of SLR, Canonical LR and LALR parsing tables.

UNIT IV

Syntax Directed Definition, Translation Scheme, Synthesized and inherited attributes, dependency graph, Construction of syntax trees, S-attributed and L-attributed definitions, Three address codes, quadruples, triples and indirect triples, Translation of assignment statements.

UNIT V

Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation, Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations.

Text Book

1. K.L.P. Mishra, Theory of computer Science, Prentice Hall of India Pvt. Ltd.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.
3. John E. Hopcroft, Jeffery Ullman, Introduction to Automata theory, Languages & computation, Narosa Publishers.

Reference Book

1. Compiler design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
3. Compiler Design, Kakde.

Course Code	Course Name	Hours per Week			Total
		L	T	P	Credits
IT3EA01	Artificial Intelligence	3	0	0	3

UNIT I: Introduction to artificial intelligence, various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search techniques.

UNIT II: Optimization Problems: Hill-climbing search Simulated annealing like hill Climbing, Best first Search, A* algorithm, AO* algorithms etc, and various types of control strategies, Heuristic Functions, Constraint Satisfaction Problem,

UNIT III: Knowledge Representation, structures, Predicate Logic, Resolution, Refutation, Deduction, Theorem proving, Inferencing, Semantic networks, Scripts, Schemas, Frames, Conceptual dependency.

UNIT IV: Uncertain Knowledge and Reasoning, forward and backward reasoning, monotonic and nonmonotonic reasoning, Probabilistic reasoning, Baye's theorem, Decision Tree, Understanding, Common sense, Planning.

UNIT V: Game playing techniques like minimax procedure, alpha-beta cut-offs etc, Study of the block world problem in robotics.

Text Book

1. Artificial Intelligence by Elaine Rich, Kevin Knight and Nair ISBN-978-0-07-008770-5, TMH
2. Artificial Intelligence: A Modern Approach by Peter and Norvig ISBN-0-13- 103805-2

Reference Books

1. Artificial Intelligence by Saroj Kausik ISBN:- 978-81-315-1099-5, Cengage Learning
2. Artificial Intelligence and Intelligent Systems by Padhy, Oxford University Press,
3. Nils Nilsson, Artificial Intelligence: A New Synthesis, Morgan Kaufmann, 1998.
3. David Poole, Alan Mackworth, Artificial Intelligence: Foundations for Computational Agents, Cambridge Univ. Press, 2010.

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Course Code	Course Name	Hours per Week			Total
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IT3EA03	Soft Computing	3	0	0	3

UNIT- I

Concept of computing systems, Introduction to soft computing, characteristics, applications of soft computing techniques.

UNIT- II

Neural Networks: Biological Neural Network, Different ANNs architectures, Fundamentals, Neural Network Architectures, Feedforward Networks, training techniques in different ANNs, Applications of ANN to solve real world's problems.

UNIT- III

Fuzzy Logic: Introduction to Fuzzy logic, Fuzzy sets and membership functions, Operations on Fuzzy sets, Fuzzy relations, rules, propositions, implications and inferences, Defuzzification techniques, Fuzzy logic controller design, Some applications of Fuzzy logic.

UNIT- IV

Genetic Algorithms: Concept of "Genetics" and "Evolution" and its application to probabilistic search techniques, Basic GA framework and different GA architectures, GA operators: Encoding, Crossover, Selection, Mutation, etc, Solving single-objective optimization problems using GAs.

UNIT- V

Hybrid Systems: Genetic Algorithm based Backpropagation Network, Fuzzy – Backpropagation, Fuzzy Logic Controlled Genetic Algorithms. Case studies. Case studies in Engineering

Text Book

1. Sinha, N.K. and Gupta, M. M.: "Soft Computing and Intelligent Systems - Theory and Applications", Academic Press.
2. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis, and Applications, S. Rajasekaran, and G. A. Vijayalakshmi Pai, Prentice Hall of India, 2007.

Reference Books

1. Soft Computing, D. K. Pratihari, Narosa, 2008.
2. Jang, J-S. R., Sun, C-T, Mizutani, E.: "Neuro-Fuzzy and Soft Computing", Prentice Hall of India.

Course Code	Course Name	Hours per Week			Total
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IT3EW01	Internet & Web Technology	3	0	0	3

UNIT - I

Introduction: Concept of WWW, HTTP Protocol: Request and Response, Web browser architecture and Web servers and Application server, Features of Web 2.0, Internetworking with TCP/IP, basics of DNS, SMTP, POP3.

UNIT - II

Web Design: Concepts of effective web design, Planning and publishing website, Introduction to web architecture, HTML: list, tables, images, frames, forms, Document type Definition (DTD), Document Object Model (DOM), Cascading Style Sheets and their types, Java Script: Introduction, documents, forms, statements, functions, objects.

UNIT - III

Introduction to XML, XML vs HTML uses of XML, simple XML, XML key components, DTD and Schemas, embedding XML into HTML documents, Transforming XML using CSS, XSL and XSLT.

UNIT - IV

PHP: working with variables and constants, controlling program flow, working with functions, arrays, files and directories, working with forms and databases, Introduction to Servlet, Lifecycle, API, and Servlet Packages.

UNIT - V

Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, sharing data between JSP pages, Sharing Session and Application Data, Database Programming using JDBC, web application framework, MVC framework, Introduction to bootstrap, angular JS.

Text Book

1. Web Technologies: A computer science perspective, J.C. Jackson, Pearson Prentice Hall
2. Web Technologies, Black Book, kogent learning solutions Inc. dreamtech Press.
3. Web Technologies: TCP/IP Architecture and Java Programming, A. Godbole & A. Kahate, Tata McGraw Hill.

Reference Books

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India.
2. An Introduction to Web Design and Programming, Paul S. Wang, Sanda Katila, Thomson/Brooks/Cole
3. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson.

Course Code	Course Name	Hours per Week			Total
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IT3EL04	Distributed System	3	0	0	3

UNIT I

Introduction: Definition, Design Issues, Goals, Types of distributed systems, Centralized Computing, Advantages of Distributed systems over centralized system. Limitation of Distributed systems Architectural models of distributed system, Client-server communication, Introduction to DCE

UNIT II

Distributed Objects and Remote Invocation: Communication between distributed objects Remote procedure call, Events and notifications, operating system layer Protection, Processes and threads, Operating system architecture. Introduction to Distributed shared memory, Design and implementation issue of DSM. Case Study: CORBA and JAVA RMI.

UNIT III

Clock synchronization: Clocks, events and process states, Synchronizing physical clocks, Logical time and logical clocks, Lamport's Logical Clock, Global states, Distributed mutual exclusion algorithms: centralized, decentralized, distributed and token ring algorithms, election algorithms, Multicast communication.

UNIT IV

Distributed File Systems: File service architecture, Distributed File Systems Implementation, Naming System, Network File System (NFS), Flat and nested distributed transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks.

UNIT V

Scheduling -Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types Distributed of Load Distributing Algorithms, Fault-tolerant services Highly available services, Introduction to Distributed Database and Multimedia system

Text Book

1. G. Coulouris, J. Dollimore and T. Kindberg, Distributed Systems: Concepts and design, Pearson.
2. P K Sinha, Distributed Operating Systems: Concepts and design, PHI Learning.

Reference Book

1. Tanenbaum and Steen, Distributed systems: Principles and Paradigms, Pearson.
2. Sunita Mahajan & Shah, Distributed Computing, Oxford Press.