

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE**

M. Tech. (IT) 5½ Years

VIII SEMESTER



Jan. 2017 – May 2017

Sub. Code	Sub. Name	L	T	P	C
IT-803B	Artificial Intelligence	3	1	0	4
IT-801C	Analysis & Design of Algorithm	3	1	0	4
IT-813	Ethics in Computer	3	1	0	4
IT-802A	Software Engineering	3	1	0	4
IT-814	Advance Computer Architecture	3	1	0	4
IT-806A	Artificial Intelligence Lab	0	0	4	2
IT-807	Comprehensive Viva	0	0	0	4
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INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
M. Tech. (5 ½ Years) VIII Semester
IT-803B: Artificial Intelligence

Aim of Course: To familiarize students with techniques of representing knowledge required to build intelligent machines capable of taking decision like human beings.

Objectives:

The course is designed to make students:

- To familiarize students with techniques of solving problems that need human intelligence.
- To enable students to formulate Artificial Intelligence problems
- To enable students to use heuristic techniques to solve the AI problem.

Course Contents:

Unit-I

Introduction to AI & Problem Solving in AI:

What is AI, AI Techniques, Defining the Problem in AI, Problem Spaces, Problem Characteristics, Production System and its Characteristics.

Unit-II

Heuristic Search Techniques: Heuristic Search, Criteria for Success, various search techniques-Generate and Test, Depth and Breadth First, Hill Climbing , Best first Search, A* algorithm.

Unit-III

Knowledge Representation and Issues: Types of Knowledge, Representation and mapping, approaches and issues in knowledge representation, Predicate Logic- representation of simple facts, computable functions, resolution, logic programming, matching, control knowledge.

Unit-IV

Prolog Programming:

Introduction and applications, facts, objects and predicates, Linguistic variables, Rules, input-output operations, controlling execution: Recursion, fail; Arithmetic operations, List, dynamic databases; expert system design.

Unit-V

Knowledge Representation Techniques and Advanced AI: Slot and filler structure – introduction, weak and strong structure, semantic nets, frames, conceptual dependency and Frames; fuzzy logic and robotics, Expert system-concept and design.

Reference Books:-

1. Artificial Intelligence: Elaine Rich and Kevin Knight (TMH publication)
2. Introduction to AI and expert systems: D.W. Patterson (PHI publication)
3. Essential References: Artificial Intelligence: Petric Henry Winston (Addison-Wesley)
4. N.J.Nilson: Principles of Artificial Intelligence, Narosa Publications.
5. Introduction to Turbo Prolog: Carl Townsend(BPB publication)

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IT-801C: Analysis & Design of Algorithm

Aim of Course: This course aims to introduce the classic algorithms in various domains, and techniques for designing efficient algorithms.

Objectives:

The course is designed to make students:

- Learn to analyze the running time of the algorithms
- Understand the application of algorithms and design techniques to solve problems.
- Learn to analyze the complexities of various problems in different domains and design efficient algorithms.
- Understand asymptotic notation to provide a rough classification of algorithms
- Study algorithms for fundamental problems in computer science and engineering work and compare with one another.
- Understand the problems for which it is unknown whether there exist efficient algorithms or even algorithm

Course Contents:

UNIT I

Introduction to Algorithms: Definition, Algorithm Specification, Performance analysis. Review of Data Structures: Stacks, Queues, Trees and Graphs.

UNIT II

Divide and Conquer: General Method, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Selection Sort, radix sort.

Dynamic Programming:- The General Method, Matrix Chain Multiplication, Memoisation, Memoised Fibonacci series computation. 0/1 Knapsack, Traveling Salesperson Problem.

UNIT III

The Greedy Strategy: General Method, Knapsack Problem, Job Sequencing with deadlines, Minimum Cost Spanning Trees - Prim's Algorithm, Kruskal's Algorithm

UNIT IV

Basic Traversal and Search Techniques:- Techniques for Binary Trees and Graphs

Back Tracking:- The General Method, The 8-Queens Problem

Branch And Bound:- The General Method, Traveling Salesperson Problem.

UNIT V

NP-Hard and NP-Complete Problems:- The Basic Concepts, Non-Deterministic Algorithms, The Classes NP-Hard & NP-Complete.

Reference Books:

1. Thomas H. Cormen, Charles E. Leiserson, Donald L. Rivest. Introduction to Algorithms. Indian Edition Published.
2. Ellis A. Horowitz, Sartaj Sahni, Fundamentals of Computer Algorithm, Computer Science Press.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
M. Tech. (5 ½ Years) VIII Semester
IT-813: Ethics in Computers

COURSE OBJECTIVES

- To understand the concepts of computer ethics in work environment.
- To understand the threats in computing environment
- To understand the intricacies of accessibility issues
- To ensure safe exits when designing the software projects

UNIT I COMPUTER ETHICS INTRODCUTION AND COMPUTER HACKING

A general Introduction – Computer ethics: an overview – Identifying an ethical issue – Ethics and law – Ethical theories - Professional Code of conduct – An ethical dilemma – A framework for ethical decision making - Computer hacking – Introduction – definition of hacking – Destructive programs – hacker ethics - Professional constraints – BCS code of conduct – To hack or not to hack? – Ethical positions on hacking.

UNIT II ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY RIGHTS

Aspects of computer crime - Introduction - What is computer crime – computer security measures – Professional duties and obligations - Intellectual Property Rights – The nature of Intellectual property – Intellectual Property – Patents, Trademarks, Trade Secrets, Software Issues, Copyright - The extent and nature of software piracy – Ethical and professional issues – free software and open source code

UNIT III REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY

Introduction – In defence of freedom expression – censorship – laws upholding free speech – Free speech and the Internet - Ethical and professional issues - Internet technologies and privacy – Safety and risk – assessment of safety and risk – risk benefit analysis – reducing risk.

UNIT IV COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES

Introduction – Principle of equal access – Obstacles to access for individuals – professional responsibility - Empowering computers in the workplace – Introduction – computers and employment – computers and the quality of work – computerized monitoring in the work place – telecommuting – social, legal and professional issues - Use of Software, Computers and Internet-based Tools - Liability for Software errors - Documentation Authentication and Control – Software engineering code of ethics and practices – IEEE-CS – ACM Joint task force

UNIT V SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING

Software Development – strategies for engineering quality standards – Quality management standards – Social Networking – Company owned social network web site – the use of social networks in the hiring process – Social Networking ethical issues – Cyber bullying – cyber stalking – Online virtual world – Crime in virtual world - digital rights management - Online defamation – Piracy – Fraud.

REFERENCES:

1. Penny Duquenoy, Simon Jones and Barry G Blundell, “Ethical , legal and professional issues in computing”, Middlesex University Press, 2008
2. George Reynolds, “Ethics in Information Technology”, Cengage Learning, 2011

3. Caroline Whitback, "Ethics in Engineering Practice and Research", Cambridge University Press, 2011
 4. Richard Spinello, "Case Studies in Information and Computer Ethics", Prentice Hall, 1997.
 5. John Weckert and Douglas Adeney, Computer and Information Ethics, Greenwood Press, 1997.
 6. Sara Baase, "A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet", 3rd Edition, Prentice Hall, 2008
7. http://www.infosectoday.com/Articles/Intro_Computer_Ethics.htm

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
M. Tech. (IT) 5 ½ Years VIII SEMESTER
IT-802A: Software Engineering

Aim of Course: To gain a broad understanding of the discipline of software engineering and its application to the development of and management of software systems.

Objectives:

The course is designed to make students:

- Understand the various activities undertaken for a software development project.
 - Develop and write a software project proposal
 - Develop and write a Software Requirements Specification and design document.
 - Learn to work within a team and understand team dynamics
1. Be able to effectively communicate the work (Presentation skills)

Course Contents:

UNIT I

Introduction to Software Engineering: Software problem, Software engineering problem, Software engineering approach, Software characteristics and Applications.

Software Processes: Software processes and its components, characteristics of software processes, Software development processes: Linear Sequential model, Prototyping model, RAD model, Iterative Enhancement model, Spiral model, Component based development, Comparative study of various development models

UNIT II

Project management process: The people, product, process and project, Phases of project management process, the W5HH principle. Software configuration management process, Process management process: Capability Maturity Model (CMM).

UNIT III

Software Requirement Analysis and Specification: Software requirements, Problem analysis, Requirements specifications, Validation and Verification, Metrics.

Project Planning: Project estimation (Size & Cost), Project Scheduling, Staffing and personnel planning, Software configuration management plans, Quality assurance plans, Project monitoring plans, Risk management.

UNIT IV

Software Design: Design principles: Problem partitioning and hierarchy, Abstraction, Modularity, Top-down and Bottom-up strategies. Effective Modular design: functional independency, Cohesion, Coupling. Structured design methodology.

UNIT V

Software Quality Assurance: Quality concept, Quality management system, movements and assurance, Software reviews: formal and technical, Formal approaches to SQA, Statistical software quality assurance, Software reliability, ISO 9000, SQA plan.

Software Testing: Software testing techniques: Testing fundamentals, White box testing, Black box testing, testing for specialized environments, architectures and applications. Software testing strategies: A strategic approach to software testing, Strategic issues, Unit testing, Integration testing, Validation testing and system testing, the art of debugging

Reference Books:

1. Ian Sommerville, Software engineering, Ninth edition Pearson.
2. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publishing House.
3. R. S. Pressman, Software Engineering-A practitioner's approach, Tata McGraw-Hill

International Editions, New York.

4. Richard E. Fairly, Software Engineering Concepts, Tata McGraw Hill Inc. New York.
5. W. S. Jawadkar, Software Engineering: Principle & Practice, Tata McGraw-Hill, New York
6. Rajib Mall, Fundamentals of Software Engineering, PHI, New Delhi.

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M. Tech. (5 ½ Years) VI Semester

IT-814: Advanced Computer Architecture

Aim of Course: To understand the concepts of design and analysis of the hardware of a Parallel pipeline and distributed computing system and its components such as processing element, memory.

Objectives:

The course is designed to make students:

- Learn concept of parallel processing.
- Understand various model of parallel computing
- Understand the concept of pipelining

Course Contents:

Unit I

Introduction to Parallel Processing, Parallelism in Uniprocessor system, Parallel Processing mechanism, Parallel Computer Structure, Architectural Classification schemes, Parallel Processing Applications.

Unit II

Concept of Virtual memory in Multiprocessor system, Program locality & Relocality, Paged memory system, Segmented Memory System, Cache memory organization.

Unit III

Concept of Pipelining, Principals of Liner Pipelining, Classification of Pipeline Processor, Reservation table, Interleaved memory organization. Principals of Designing of Pipeline Processor, Vector Processing requirements.

Unit IV

SIMD Array Processor, SIMD interconnection Networks, Processor organizations. Parallel Algorithms for Array Processor, Associative search algorithm.

Unit V

MIMD Computers, Algorithms for MIMD computer, Process communication and Synchronization on MIMD Model, Expression concurrency, Message Passing, Classification of Concurrent Programming Languages.

Reference Books:

1. Computer Architecture and Parallel Processing – Kai Hwang and Faye A. Briggs, McGraw-Hill.
2. Computer Architecture and Organisation – John P. Hays, McGraw-Hill