

ANNA ADARSH COLLEGE FOR WOMEN
DEPARTMENT OF COMPUTER SCIENCE – SHIFT I
COURSE HANDOUT
PROGRAMME: M.Sc. COMPUTER SCIENCE

LIST OF STAFF MEMBERS

S.No	Name	Designation	Degree
1	Dr.Hannah Vijaykumar	Associate Professor	M.C.A., M.Phil., Ph.D
2	Ms. A.Lakshmi	Associate Professor	M.C.A., M.Phil., SET
3	Ms. A.P.Tharani	Associate Professor	M.Sc., M.Phil
4	Dr.A.Parameswari	Associate Professor	M.Sc., M.Phil, SET., Ph.D
5	Ms.M.Revathy Meenal	Associate Professor	M.C.A., M.Phil
6	Dr.K.Maheswari	Assistant Professor	M.C.A., M.Phil., Ph.D
7	Dr.P.Pakutharivu	Assistant Professor	M.Sc., M.Phil., Ph.D
8	Ms.K.Unnamalai	Assistant Professor	M.Sc., M. Phil
9	Ms.K.Sumathi	Assistant Professor	M.Sc., M.Phil., SET
10	Ms.S.Radha	Assistant Professor	M.C.A., M.Phil
11	Ms.S.Ranjana	Assistant Professor	M.Sc., M.Phil., SET
12	Ms.S.Mahalakshmi	Assistant Professor	M.Sc., M.Phil., SET
13	Ms.M.Anita Rajkumar	Assistant Professor	M.C.A., M.Phil
14	Dr.D.Sasirkeha	Assistant Professor	M.Sc., M.Phil., Ph.D

Program Outcome

PO1: Provides technology-oriented students with the knowledge and ability to develop creative solutions. Develop skills to learn new technology.

PO2: Apply computer science theory and software development concepts to construct computing-based solutions.

PO3: Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, Artificial Intelligence, Mobile applications.

Program Specific Outcomes

- PSO1: Enrich the knowledge in the areas like Artificial Intelligence, Web Services, Cloud Computing, Paradigm of Programming language, Design and Analysis of Algorithms, Database Technologies Advanced Operating System, Mobile Technologies, Software Project Management and core computing subjects.

Choose to study any one subject among recent trends in IT provided in the optional subjects.

- PSO2: Students understand all dimensions of the concepts of software application and projects.
- PSO3: Students understand the computer subjects with demonstration of all programming and theoretical concepts with the use of ICT.
- PSO4: Developed in-house applications in terms of projects.
- PSO5: Interact with IT experts & knowledge by IT visits.
- PSO6: Get industrial exposure through the 6 months Industrial Internship in the IT industry.
- PSO7: To make them employable according to the current demand of the IT Industry and responsible citizens.
- PSO8: Aware them to publish their work in reputed journals

FIRST SEMESTER

Course components	Name of Course	Credits	Exam Duration	Max.Marks	
				CIA	UE
Core -1	Design and Analysis of Algorithms	4	3	25	75
Core -2	Advanced Java Programming	4	3	25	75
Core -3	Systems Software	4	3	25	75
Core -4	Practical – I: Algorithms Lab	2	3	40	60
Core -5	Practical – II: Advanced Java Lab	2	3	40	60
Extra Disciplinary Elective-I	Theoretical Foundations of Computer Science	4	3	25	75
SoftSkill-1		2	3		

SECOND SEMESTER

Course components	Name of Course	Credits	Exam Duration	Max. Marks	
				CIA	UE
Core -6	Computer Networks	4	3	25	75
Core -7	Digital Image Processing	4	3	25	75
Core -8	Practical – III: RDBMS Lab.	4	3	25	75
Elective – I	Elective – I	3	3	25	75
Core -9	Practical – IV: Image Processing using Java Lab	2	3	40	60
Extra Disciplinary Elective-2	Object Oriented Analysis and Design	3	3	25	75
SoftSkill-2		2	3	40	60
SoftSkill-3		2	3	40	60
Internship	4 to 6 weeks of Internship during summer vacation of I year				

THIRD SEMESTER

Course components	Name of Course	Credits	Exam Duration	Max. Marks	
				CIA	UE
Core-10	Principles of Compiler Design	4	3	25	75
Core-11	Information Security	4	3	25	75
Core-12	Artificial intelligence	4	3	25	75
Elective	Elective –II	4	3	25	75
Elective	Elective – III	4	3	25	75
Core-13	Practical – V: Mini Project	2	3	40	60
SoftSkill-4		2	3	40	60
Internship	During summer vacation 4 to 6 weeks of I Year	2			100

Elective - I

Mobile Computing OR Computer Simulation and Modelling OR Computer Graphics

Elective - II

Big data Analytics OR Cryptography OR Distributed Database Systems

Elective - III

Multimedia Systems OR E-Commerce OR Cloud Computing

FOURTH SEMESTER

Course components	Name of Course	Credits	Exam Duration	Max. Marks	
				CIA	UE
Core-14	Project & Viva-Voce	20	-	20	60+20

Other Component

- ✓ Seminars
- ✓ Assignments
- ✓ Group Discussion
- ✓ Short Answer tests
- ✓ Problem Solving

End Semester Examination

TotalMarks:75 Duration: 3Hrs

Section A – 10 x 1 = 10 marks (10 out of 12 to be answered)

Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered)

Section C – 4 x 10 = 40 Marks (4 out of 6 to be answered)

SEMESTER	Subject title	subject code	Credit
I	CORE I-DESIGN AND ANALYSIS OF ALGORITHMS	PSD1A	4

Course Objectives

- Reinforce basic design concepts like pseudocode, specifications & top-down design.
- To be able to carry out the analysis of various Algorithms for mainly Time and Space Complexity.
- Knowledge of algorithm design strategies.
- Familiarity with an assortment of important algorithms.
- To develop a base for advanced study in Computer Science.

Course Outline

Unit 1: Introduction - Definition of Algorithm – pseudocode conventions– recursive algorithms– time and space complexities -big-“oh”notation – practical complexities – randomized algorithms – repeated element – primality testing - Divide and Conquer: General Method -Finding maximum and minimum – merge sort.

Unit-2: Divide and conquer contd. – Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with deadlines – optimal storage on tapes.

Unit 3: Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack. Search techniques for graphs –DFS-BFS- connected components – biconnected components.

Unit 4: Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.

Unit 5: Lower Bound Theory: Comparison trees - Oracles and advisory arguments – Lower bounds through reduction - Basic Concepts of NP-Hard and NP-Complete problems.

Recommended Texts

1) E. Horowitz, S. Sahni and S. Rajasekaran, 2007, Computer Algorithms, 2nd Edition, Universities Press, India.

Reference Books

- 1) G. Brassard and P. Bratley, 1997, Fundamentals of Algorithms, PHI, New Delhi.
- 2) A.V. Aho, J.E. Hopcroft, J.D. Ullmann, 1974, The design and analysis of Computer Algorithms, Addison Wesley, Boston.
- 3) S.E. Goodman and S.T. Hedetniemi, 1977, Introduction to the Design and Analysis of algorithms, Tata McGraw Hill Int. Edn, New Delhi.

E-learning resources

- 1) <http://www.cise.ufl.edu/~raj/BOOK.html>

Course outcomes

- Analyze the asymptotic performance of algorithms.
- Ability to compare algorithms with respect to time and space complexity.
- Write rigorous correctness proofs for algorithms.
- Apply important algorithmic design paradigms and methods of analysis

SEMESTER	Subject title	subject code	Credit
I	CORE II-ADVANCED JAVA PROGRAMMING	PSD1B	4

Learning Objectives

- Able to develop web application using Java Servlet and Java Server Pages technology
- Learn how to work with JavaBeans.
- Able to use advanced technology in Java such as Serialization and Remote method Invocation.

SYLLABUS

Unit 1

Servlet Overview – Servlet life cycle - The Java Web Server – Simple Servlet – Servlet Packages – Using Cookies - - Session Tracking - Security Issues – using JDBC in Servlets – HTML to Servlet Communication - applet to servlet communication.

Unit 2

Java Beans: The software component assembly model- The java bean development kit-developing beans – notable beans – using infobus - Glasgow developments - Application Builder tool-JAR files- Introspection-Bound Properties-Persistence-customizers - java beans API.

Unit 3

EJB: EJB architecture- EJB requirements – design and implementation – EJB session beans- EJB entity beans-EJB Clients – deployment tips, tricks and traps for building distributed and other system implementation and future directions of EJB-Variable in perl- perl control structures and operators – functions and scope.

Unit 4

RMI – Overview – Developing applications with RMI: Declaring & Implementing remote interfaces-stubs & skeletons, Registering remote objects, writing RMI clients –Pushing data from RMI Servlet – RMI over Inter-ORB Protocol.

Unit 5

JSP –Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP Working with Java Mail-Understanding Protocols in Java mail-Components-Java mail API-Integrating into J2EE-Understanding Java Messaging Services-Introducing Java Transactions.

Learning Outcomes

- Able to write sophisticated Java applications.
- Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).
- Develop Stateful, Stateless and Entity Beans

Recommended Texts

- 1) James McGovern, Rahim , Adatia, Yakor Fain, 2003, J2EE 1.4 Bible, Wiley - dreamtech India Pvt. Ltd, New Delhi
- 2) Herbert Schildt, 2002, Java 2 Complete Reference, 5th Edition, Tata McGraw Hill, New Delhi.
- 3) Jamie Jaworski, 1999, Java 2 Platform – Unleashed, First Edition, Techmedia - SAMS.

Reference Books

- (1) K. Moss, 1999, Java Servlets, Second edition, Tata McGraw Hill, New Delhi.
- (2) D. R.Callaway,1999, Inside Servlets, Addison Wesley, Boston
- (3) Joseph O’Neil, 1998, Java Beans from the Ground Up, Tata McGraw Hill, New Delhi.
- (4) T. Valesky, T.C. Valesky, 1999, Enterprise JavaBeans, Addison Wesley.
- (5) Cay S Horstmann & Gary Cornell, 2013, Core Java Vol II Advanced Features, 9th Edition, Addison Wesley.

SEMESTER	Subject title	subject code	Credit
I	CORE III-SYSTEMS SOFTWARE	PSD1C	4

Learning Objectives

- Study the architecture of a hypothetical machine, its assembly language, macro language
- To provide the knowledge and abilities to design system programs such as assemblers, linkers, loaders, macro-processors, editors, interpreters and compilers

SYLLABUS

Unit 1

Language processors – Language processing activities and fundamentals – Language specification – Development Tools – Data Structures for Language processing- Scanners and Parsers.

Unit 2

Assemblers: Elements of Assembly language programming - Overview of the Assembly process - Design of a Two-pass Assembler - A single pass Assembler for the IBM PC.

Unit 3

Macros and Macro processors – Macro definition, call and expansion – Nested macro calls – Advanced macro facilities - Design of a macro preprocessor - Compilers: Aspects of compilation.

Unit 4

Compilers and Interpreters – Memory allocation - Compilation of Expressions and Control structures - Code optimization – Interpreters.

Unit 5

Linkers: Linking and Relocation concepts – Design of a linker – Self relocating Programs – A linker for MS DOS - Linking for over-lays – loaders - Software tools: Software tools for program development - Editors - Debug monitors - Programming environments – User interfaces.

Learning Outcomes

- Understand the Program in assembly language
- Understand the structure and design of assemblers, compiler, linkers and loaders
- Understand the concepts and theory behind the implementation of high level programming

Recommended Texts

- 1) D. M. Dhamdhare, 1999, Systems Programming and Operating Systems, Second Revised Edition, Tata McGraw-Hill, New Delhi.

Reference Books

- 1) L. L. Beck, 1996, System Software An Introduction to System Programming, 3rd edition, Addison-Wesley.

SEMESTER I	Subject title	subject code	Credit
	PRACTICAL I-ALGORITHMS LAB	PSD11	2

Course Objectives

- To learn how to analyze the complexity of algorithms.
- Ability to design algorithms using standard paradigms like divide and conquer greedy, dynamic programming, and backtracking.

Course Outline

1. Divide and Conquer :
 - a. Merge Sort
 - b. Quick Sort
 - c. Maximum and Minimum
2. Greedy Method :
 - a. Knapsack Problem
 - b. Tree vertex splitting
 - c. Job Sequencing

3. Dynamic Programming :
 - a. Multistage graphs
 - b. All Pairs Shortest Paths
 - c. String Editing,
 - d. BFS and DFS.

4. Back Tracking :
 - a. 8 Queen Problems
 - b. Hamiltonian Cycles.

Course Outcomes

- To know the appropriate algorithmic design technique for specific problems.
- To design algorithms using the dynamic programming, greedy method, Backtracking, Branch and Bound strategy, and recite algorithms that employ this strategy
- To develop efficient algorithms for the new problem with suitable designing techniques.
- To introduce the methods of designing and analyzing algorithms
- To study various designing paradigms of algorithms for solving real-world problems

SEMESTER I	Subject title	subject code	Credit
	PRACTICAL II-ADVANCED JAVA LAB	PSD12	2

Learning Objectives

- Design and develop Web applications
- Designing Enterprise based applications by encapsulating an application's business logic.
- Designing applications using pre-built frameworks.

LIST OF EXERCISES:

1. HTML to Servlet Applications
2. Applet to Servlet Communication
3. Designing online applications with JSP
4. Creating JSP program using JavaBeans
5. Working with Enterprise JavaBeans
6. Performing Java Database Connectivity.
7. Creating Web services with RMI.

8. Creating and Sending Email with Java

9. Building web applications

Learning Outcomes

- create dynamic web pages, using Servlets and JSP.
- learn to access database through Java programs, using Java Data Base Connectivity (JDBC)
- make a reusable software component, using Java Bean.
- invoke the remote methods in an application using Remote Method Invocation (RMI)

SEMESTER	Subject title	subject code	Credit
I	THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE	PED1A	4

COURSE OBJECTIVES:

- 1.To understand propositional and logical operations and their applications.
- 2.To understand the fundamental theorem of arithmetic and basics of number theory.
3. To understand basic concepts of formal languages of finite automata techniques and to familiarize Regular grammars, Context free grammars, Normal form techniques and Pushdown automata techniques.

Unit 1: Propositions and Compound Propositions – Logical Operations – Truth Tables – Tautologies and Contradictions – Logical Equivalence –Algebra of Propositions – Conditional and Biconditional Statements –Arguments – Logical Implication – Quantifiers – Negation of Quantified Statements – Basic Counting Principles – Factorial – Binomial Coefficients – Permutations – Combinations – Pigeonhole Principle – Ordered and Unordered Partitions.

Unit 2: Order and Inequalities – Mathematical Induction – Division Algorithm – Divisibility – Euclidean Algorithm – Fundamental Theorem of Arithmetic – Congruence Relation – Congruence Equations – Semigroups – Groups – Subgroups – Normal Subgroups – Homomorphisms – Graph Theory: basic definitions-paths, reachability, connectedness matrix representation of graphs, trees.

Unit 3: Finite Automata and Regular Expressions: Finite State Systems – Basic definitions – non-deterministic finite automata – Finite automata with λ -moves – Regular expressions.

Unit 4: Properties of Regular sets: Pumping lemma – Closure properties – Decision Algorithms – Myhill–Nerode Theorem – Context Free Grammars – Derivation Trees.

Unit 5: Simplifying Context free grammars - Chomsky normal forms – Greibach Normal forms – Pushdown automata and context-free languages.

COURSE OUTCOMES

1. To apply counting, permutations, combinations, and recurrence relation
2. To use basic concepts of formal languages of finite automata techniques
3. To Construct context free grammar for various languages and to solve various Problems of applying normal form techniques, push down automata.

1.Recommended Texts

- (i) J.P. Tremblay and R. Manohar, 1997, Discrete Mathematical Structures with applications to Computer Science, Tata McGraw-Hill, New Delhi.
- (ii) P. Linz, 1997, An Introduction to Formal Languages and Automata, Second Edition, Narosa Pub. House, New Delhi.
- (iii) S. Lipschutz and M. Lipson, 1999, Discrete Mathematics, Second Edition, Tata McGraw-Hill, New Delhi.
- (iv) J.E. Hopcroft and J.D. Ullman, 1993, Introduction to Automata Theory, Languages and Computation, Narosa Publishing House, New Delhi.

2.Reference Books

- (i) D.C. Kozen, 1997, Automata and Computability, Springer-Verlag, New York.
- (ii) J. Martin, 2003, Introduction to Languages and the Theory of Computation, 3rd Edition, Tata McGraw-Hill, New Delhi.

RELATED ONLINE CONTENTS:

Nptel.ac.in

SEMESTER II	Subject title	subject code	Credit
	CORE VI-COMPUTER NETWORKS	PSD2A	4

Learning Objectives:

The main Objective of this Course Computer Networks is about how the Communication will happen between the client and server (computers) in the network.

- To develop an understanding of computer networking basics.
- To study the evolution of computer networks and future direction.
- To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.
- To study the concepts of computer networks from layered perspective.
- To motivate the need for network security practices in organizational units.
- To provide students with basic knowledge on various concepts of classical computer and network security paradigms.

Syllabus:

Unit 1:

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, 3G Mobile phone networks, Wireless LANs –RFID and sensor networks - Physical layer – Theoretical basis for data communication - guided transmission media

Unit-2:

Wireless transmission - Communication Satellites – Digital modulation and multiplexing - Telephones network structure – local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

Unit 3:

Elementary data link protocols - sliding window protocols – Example Data Link protocols – Packet over SONET, ADSL - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

Unit 4:

Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet- IP protocol – IP Address – Internet Control Protocol.

Unit 5:

Transport layer – transport service- Elements of transport protocol - Addressing, Establishing & Releasing a connection – Error control, flow control, multiplexing and crash recovery – Internet Transport Protocol – TCP - Network Security: Cryptography

Recommended Text:

1) A. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.

Reference Books:

1) B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.

2) F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wesley.

3) D. Bertsekas and R. Gallager, 1992, Data Networks, Prentice hall of India, New Delhi.

4) Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.

Websites:

1) <http://peasonhighered.com/tanenbaum>

Learning Outcomes:

After completion of this course, students can able to

- Use appropriate transmission media to connect to a computer network and Internet.
- Understand and building the skills of subnetting and routing mechanisms.
- Able to design new protocols for computer network and evaluate the challenges in building networks.
- Be able to identify network attacks (denial of service, flooding, sniffing and traffic redirection, inside attacks, etc.) and basic network defense tools.
- Differentiate between organizational security policies and security mechanism.
- Be able to analyze the security needs of a small enterprise, design a strategic plan to address those security requirements, and select the appropriate tools to implement the organizational policies

SEMESTER II	Subject title	subject code	Credit
	CORE VII-DIGITAL IMAGE PROCESSING	PSD2B	4

Course Objectives

- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement techniques

- To study image restoration procedures.
- To study the image compression procedures.

Course Outline

Unit 1: Introduction – steps in image processing - Image acquisition - representation – sampling and quantization - relationship between pixels. – color models – basics of color image processing.

Unit-2: Image enhancement in spatial domain - some basic gray level transformations - histogram processing -enhancement using arithmetic, logic operations - basics of spatial filtering and smoothing.

Unit 3: Image enhancement in Frequency domain – Introduction to Fourier transform: 1- D, 2 -D DFT and its inverse transform - smoothing and sharpening filters.

Unit 4: Image restoration: Model of degradation and restoration process – noise models – restoration in the presence of noise- periodic noise reduction. - Image segmentation: Thresholding and region-based Segmentation.

Unit 5: Image compression: Fundamentals – models – information theory – error free compression – Lossy compression: predictive and transform coding - JPEG standard.

Recommended Texts

- 1) C. Gonzalez, R.E.Woods, 2009, Digital Image processing, 3rd Edition, Pearson Education

Reference Books

- 1) Pratt.W.K.,Digital Image Processing, 3rd Edition, John Wiley &Sons.
- 2) Rosenfled A. & Kak, A.C, 1982, Digital Picture Processing, vol .I & II, Academic Press.

Website and e-Learning Source

- 1) <http://www.imageprocesssingplace.com/DIP/dip-downloads>.

Course Outcomes

- Review the fundamental concepts of a digital image processing system.
- Analyze images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.
- Categorize various compression techniques.
- Get broad exposure to and understanding of various applications of image processing in the industry, medicine, and defense.
- Interpret Image compression standards.
- Interpret image segmentation and representation techniques

SEMESTER II	Subject title	subject code	Credit
		PRACTICAL III-RDBMS LAB	PSD21

Learning Objectives

- To design and implement a database schema for a given problem- domain
- To give a good formal foundation on the relational model of data
- To present the concepts and techniques relating to query processing by SQL engines
- To present the concepts and techniques relating to ODBC and its implementations

LIST OF EXERCISES:

1. Library Information Processing.
2. Students Mark sheet processing.
3. Telephone directory maintenance.
4. Gas booking and delivery system.
5. Electricity Bill Processing.
6. Bank Transactions (SB).
7. Pay roll processing.
8. Inventory
9. Question Database and conducting quiz.
10. Purchase order processing.

Learning Outcomes

- Apply the basic concepts of Database Systems and Applications.
- Creating a GUI incorporating good design principles for a programming project.
- Use the basics of SQL and construct queries using SQL in database creation and interaction.
- Design a commercial relational database system by writing SQL using the system.

SEMESTER II	Subject title	subject code	Credit
		ELECTIVE I-MOBILE COMPUTING	PSDEA

Learning Objective:

- To impart fundamental concepts in the area of mobile computing
- To provide an in-depth coverage of mobile systems and devices and mobile operating systems used for application development
- To gain knowledge on mobile databases, client-server computing agents, application servers, security protocols, mobile Internet and ad-hoc networks
- To understand the social and ethical issues of mobile computing, including privacy
- To introduce selected topics of current research interest in the field

Syllabus

Unit 1: Introduction - Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing –Wireless Transmissions –Multiplexing – Spread Spectrum and Cellular Systems- Medium Access Control – Comparisons.

Unit 2: Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT – 2000 –Satellite Systems.

Unit 3: Wireless Lan - IEEE S02.11 – Hiper LAN – Bluetooth – Security and Link Management.

Unit 4: Mobile network layer - Mobile IP – Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

Unit 5: Mobile transport layer - Congestion Control – Implication of TCP Improvement – Mobility – Indirect – Snooping – Mobile – Transaction oriented TCP - TCP over wireless – Performance.

Learning Outcomes:

- To understand mobile technologies in terms of hardware, software, and communications
- To utilize mobile computing nomenclature to describe and analyze existing mobile computing frameworks and architectures
- To understand how mobile technology functions to enable other computing technologies
- To induce an awareness of professional and ethical issues, in particular those relating to security and privacy of user data and user behaviour

Recommended Text

J. Schiller, 2003, Mobile Communications, 2nd edition, Pearson Education, Delhi.

Book References

1) Hansmann, Merk, Nicklous, Stober, 2004, Principles of Mobile Computing, 2nd Edition, Springer (India).

SEMESTER II	Subject title	subject code	Credit
	PRACTICAL IV-IMAGE PROCESSING USING JAVA LAB	PSD22	2

Course Objectives

- To implement basic image manipulation techniques.
- To implement and test basic intensity transformation.
- To understand, implement and test the filtering techniques.

Course Outline

1. Basic image manipulation (reading, writing, quantization, subsampling).
2. Basic Intensity transformation.
3. Histogram Processing.
4. Filtering in spatial domain-2D FFT and smoothing filters.
5. Image coding using transformations with SPIHT algorithm.
6. Color image Enhancement with spatial sharpening.

Course Outcomes

- Students will be able to implement various operations of an image.
- Students can able to implement histogram processing.
- Students can apply and test the color image enhancement using the spatial filtering technique.

SEMESTER II	Subject title	subject code	Credit
	ELECTIVE II-OBJECT ORIENTED ANALYSIS AND DESIGN	PED2A	3

Learning Objectives

- To understand the Object-based view of Systems
- To develop robust object-based models for Systems
- To inculcate necessary skills to handle complexity in software design

SYLLABUS

Unit 1: System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.

Unit-2: Use-Case Models - Object Analysis - Object relations – Attributes - Methods – Class and Object responsibilities - Case Studies.

Unit 3: Design Processes - Design Axioms - Class Design - Object Storage – Object Interoperability - Case Studies.

Unit-4: User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.

Unit-5: Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases– test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.

Learning Outcomes

- Ability to analyze and model software specifications.
- Ability to abstract object-based views for generic software systems.
- Ability to deliver robust software components.

Recommended Texts

(i) Ali Bahrami, Reprint 2009, Object Oriented Systems Development, Tata McGraw Hill International Edition.

Reference Books

(i) G. Booch, 1999, Object Oriented Analysis and design, 2nd Edition, Addison Wesley, Boston

(ii) Roger S.Pressman, 2010, Software Engineering A Practitioner’s approach, Seventh Edition, Tata McGraw Hill, New Delhi.

(iii) Rumbaugh, Blaha, Premerlani , Eddy, Lorensen, 2003, Object Oriented Modeling And design , Pearson education, Delhi.

SEMESTER III	Subject title	subject code	Credit
	CORE X-PRINCIPLES OF COMPILER DESIGN	PSD3A	4

Learning Objectives:

The objective the compiler course is to understand the basic principles of compiler design, its various constituent parts, algorithms and data structures required to be used in the compiler.

SYLLABUS

Unit 1:

Introduction to Compilers - Finite Automata and lexical Analysis.

Unit-2:

Syntax Analysis: Context free grammars - Derivations and parse trees – Basic parsing techniques - LR parsing.

Unit 3:

Syntax - directed translation, symbol tables.

Unit 4:

Code optimization - More about code optimization.

Unit 5:

Code generation - Error detection and recovery.

Learning Outcomes:

The students will be able to i.Explain the concepts and different phases of compilation with compile time error handling.

ii. Represent language tokens using regular expressions, context free grammar and finite automata and design lexical analyzer for a language.

Recommended Texts:

1) A.V. Aho, J.D.Ullman, 1985, Principles of Compiler Design, Narosa Pub-House.

Reference Books

1) D.Gries, 1979, Compiler Construction for Digital Computers, John Wiley & Sons.

2) A.V.Aho, Ravi Sethi, and J.D.Ullman, 1986, Compilers Principles, Techniques and Tools, Addison Wesley Pub. Co.

SEMESTER	Subject title	subject code	Credit
III	CORE XI-INFORMATION SECURITY	PSD3B	4

Learning Objectives:

- To learn the security threats such as non-malicious program errors, virus, malicious code attacks and their control measures
- To understand memory address protection, file protection mechanisms, authentication, password challenges in a system
- To be aware of the security requirement, reliability and integrity of sensitive data
- To understand firewall, email security, Cryptography and the related protocols
- To mitigate the threats in security policies such as security planning, risk analysis, legal and privacy issues

Unit 1: Introduction: Security- Attacks- Computer criminals- Method of defence Program Security: Secure programs- non-malicious program errors- Viruses and other malicious code- Targeted malicious code- Controls against program threats.

Unit 2: Operating System Security: Protected objects and methods of protection- Memory address protection- Control of access to general objects- File protection mechanism- Authentication: Authentication basics- Password- Challenge-response- Biometrics.

Unit 3: Database Security: Security requirements- Reliability and integrity- Sensitive data InterfaceMultilevel database- Proposals for multilevel security

Unit 4: Security in Networks: Threats in networks- Network security control- Firewalls- Intrusion detection systems- Secure e-mail- Networks and cryptography- Example protocols: PEM- SSL- IPsec.

Unit 5: Administrating Security: Security planning- Risk analysis- Organizational security policies - Physical security - Legal- Privacy- and Ethical Issues in Computer Security - Protecting programs and data- Information and law- Rights of employees and employers- Software failures- Computer crime Privacy- Ethical issues in computer society- Case studies of ethics.

Learning Outcomes:

- To gain knowledge of threats and vulnerabilities in computer systems
- To enhance knowledge of theory, methods and techniques in information security
- To gain advanced knowledge of security management, network security, security in software and operating systems, data security and secured system development

Recommended Text

- 1) C. P. Pfleeger, and S. L. Pfleeger, Security in Computing, Pearson Education, 4th Ed, 2003
- 2) MattBishop, Computer Security: Art and Science, Pearson Education, 2003.

Reference Books

- 1) Cryptography & N/w Security: Principles and practice, 4th Edition, 2006
- 2) Kaufman, Perlman, Speciner, Network Security, Prentice Hall, 2nd Edition, 2003
- 3) Eric Maiwald, Network Security : A Beginner's Guide, TMH, 1999
- 4) Macro Pistoia, Java Network Security, Pearson Education, 2nd Edition, 1999
- 5) Whitman, Mattord, Principles of information security, Thomson, 2nd Edition, 2005

Website and e-Learning Source

- 1) <http://www.cs.gsu.edu/~cscyqz/courses/ai/aiLectures.html>
- 2) <http://www.eecs.qmul.ac.uk/~mmh/AINotes/>

SEMESTER	Subject title	subject code	Credit
III	CORE XII-ARTIFICIAL INTELLIGENCE	PSD3C	4

Course Objective:

The primary objective of this course is to introduce the basic principles, techniques, and applications of Artificial Intelligence.

1. Gain a historical perspective of AI and its foundations.
2. Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
3. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. Explore the current scope, potential, limitations, and implications of intelligent systems.

Syllabus:

Unit 1:

Introduction - Intelligent Agents- Problem Solving - by Searching - Informed Search and Exploration - Constraint Satisfaction Problems - Adversarial Search

Unit-2:

Knowledge and Reasoning - Logical Agents - First-Order Logic - Inference in First-Order Logic - Knowledge Representation

Unit 3: Planning – Planning and Acting in the Real World - Uncertain knowledge and reasoning - Uncertainty - Probabilistic Reasoning - Probabilistic Reasoning Over Time - Making Simple Decisions - Making Complex Decisions

Unit 4:

Learning - Learning from Observations - Knowledge in Learning - Statistical Learning Methods - Reinforcement Learning

Unit 5:

Communicating, Perceiving, and Acting - Communication - Probabilistic Language Processing
Perception – Robotics.

Recommended Texts:

1) Stuart Russell and Peter Norvig, 2003, Artificial Intelligence: A Modern Approach, 2nd Edition, Prentice Hall of India, New Delhi.

Reference Books:

- 1) Elaine Rich and Kevin Knight, 1991, Artificial Intelligence, 2nd Edition, Tata McGraw-Hill, New Delhi.
- 2) Herbert A. Simon, 1998, The Sciences of the Artificial Intelligence, 3rd Edition, MIT Press.
- 3) N.J. Nilson, 1983, Principles of AI, Springer Verlag

Website and e-Learning Source:

1) <http://aima.eecs.berkeley.edu/slides-pdf/>

Course Outcomes:

Upon successful completion of this course, the student shall be able to:

- 1) Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- 2) Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning
- 3) Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- 4) Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

SEMESTER III	Subject title	subject code	Credit
	ELECTIVE II-BIG DATA ANALYTICS	PSDED	4

Learning Objectives

1. Big Data analytics is a process used to extract meaningful insights, such as hidden patterns, unknown correlations, market trends, and customer preferences.
2. Big Data analytics provides various advantages.
3. It can be used for better decision making, preventing fraudulent activities, among other things.

SYLLABUS

Unit – I : Basic nomenclature - Analytics process model - Analytics model requirements - Types of data sources – Sampling - types of data elements - Visual Data Exploration and Exploratory Statistical Analysis - Missing Values - Outlier Detection and Treatment - Standardizing Data – Categorization - weights of evidence coding - Variable selection - Segmentation.

Unit –II : Predictive Analytics: Target Definition - Linear Regression - Logistic Regression - Decision Trees - Neural Networks - Support Vector machines - Ensemble Methods - Multiclass Classification Techniques - Evaluating Predictive Models.

Unit – III : Descriptive Analytics: Association Rules - Sequence Rules - Segmentation. Survival Analysis: Survival Analysis Measurements - Parametric Survival Analysis.

Unit – IV : Social Network Analytics: Social Network Definitions - Social Network Metrics - Social Network Learning -Relational Neighbor Classifier - Probabilistic Relational Neighbor Classifier -Relational logistic Regression - Collective Inference.

Unit –V : Benchmarking - Data Quality - Software – Privacy - Model Design and Documentation – Corporate Governance. Example applications: Credit Risk Modeling - Fraud Detection - Recommender Systems - Web Analytics.

Learning Outcomes:

1. To model data using decision models
2. What are decision tree and their underlying assumptions
3. To construct decision from data
4. How to use decision trees for prediction
5. Use an ensemble of decision trees, a random forest
6. Install, configure and use data management tools
7. Ethically acquire data for use in the project
8. Extract, clean, transform, load large data sets
9. Query and analyze large data sets to extract relevant information/features
10. Apply and compare different data mining techniques quantitatively

Text books:

Bart Baesens, 2014, Analytics in a Big Data World: The Essential Guide to Data Science and Its applications, Wiley India Private Limited

References:

1. Michael Minelli, Michele Chambers, 2013, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today’s Businesses, Wiley CIO
2. Stephan Kudyba, 2014, Big Data, Mining and Analytics: Components of Strategic Decision Making, CRC Press.
3. Frank J. Ohlhorst, 2013, Big data Analytics: Turning Big Data into Big Money, Wiley and SAS Business Series.
4. Foster Provost, Tom Fawcett, 2013, Data Science for Business, SPD

SEMESTER III	Subject title	subject code	Credit
	ELECTIVE III- CLOUD COMPUTING	PSDEJ	4

Learning Objectives:

- ✓ Demonstrate an understanding of guidelines, principles, and theories influencing cloud computing.
- ✓ Recognize how a cloud computing operation to be performed.
- ✓ Use the information sources available, and be aware of the methodologies and technologies supporting advances in cloud computing.
- ✓ To provide students a sound foundation of the Cloud computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.
- ✓ To enable students exploring some important cloud computing driven commercial systems and applications.

Syllabus:

Unit 1:

UNDERSTANDING CLOUD COMPUTING: Cloud Computing –History of Cloud Computing – Cloud Architecture –Cloud Storage –Why Cloud Computing Matters –Advantages of Cloud Computing – Disadvantages of Cloud Computing –Companies in the Cloud Today –Cloud Services

Unit 2:

DEVELOPING CLOUD SERVICES: Web-Based Application –Pros and Cons of Cloud Service Development –Types of Cloud Service Development –Software as a Service –Platform as a Service-Infrastructure as a service –Web Services –On-Demand Computing –Discovering Cloud Services Development Services and Tools –Amazon Ec2 –Google App Engine –IBM Clouds

Unit 3:

CLOUD COMPUTING FOR EVERYONE: Centralizing Email Communications –Collaborating on Schedules –Collaborating on To-Do Lists –Collaborating Contact Lists –Cloud Computing for the Community –Collaborating on Group Projects and Events –Cloud Computing for the Corporation

Unit 4:

USING CLOUD SERVICES: Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications –Exploring Online Planning and Task Management – Collaborating on Event Management –Collaborating on Contact Management –Collaborating on Project Management –Collaborating on Word Processing -Collaborating on Databases –Storing and Sharing Files

Unit 5:

OTHER WAYS TO COLLABORATE ONLINE: Collaborating via Web-Based Communication Tools –Evaluating Web Mail Services –Evaluating Web Conference Tools –Collaborating via Social Networks and Groupware –Collaborating via Blogs and Wikis

Recommended Text :

- 1) Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
- 2) Kumar Saurabh, “Cloud Computing –Insights into New Era Infrastructure”, Wiley Indian Edition, 2011.
- 3) Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

Reference Books :

- 1) “Cloud Computing: principles and Paradigms”, Raj Kumar Bunya, James Bromberg, Andrej Kosciusko, Wiley, New York, USA.
- 2) John Rittinghouse & James Ransome, Cloud Computing, Implementation, Management and Strategy, CRC Press, 2010.
- 3) David E.Y. Sarna Implementing and Developing Cloud Application, CRC press 2011

Websites :

- i. www.geeksforgeeks.org
- ii. www.cs.iit.edu
- iii. <https://nptel.ac.in/courses/106105163/>

Learning Outcomes:

After successful completion of this course, students can able to

- ✓ Define cloud computing, Cloud deployment Models and related concepts
- ✓ Understand the key dimensions of the challenges of Cloud Computing
- ✓ Understand how cloud components fit together
- ✓ Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost
- ✓ Identify resource management fundamentals
- ✓ Analyze various cloud programming models and apply them to solve problems on the cloud.



Head of the Department



Principal