

**ANNA ADARSH COLLEGE FOR WOMEN**  
**DEPARTMENT OF COMPUTER SCIENCE – SHIFT I**  
**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**

1. To possess advanced knowledge of Computing, Mathematical basics for contemporary Computing Specialization and Knowledge of defined problem domain.
2. To apply acquired knowledge of the domain in investigating the software design, from design of experiments, analysis of data to provision of valid conclusions.
3. To possess the skill and acumen for innovative research and be aware of publishing their work in reputed journals.
4. To possess the ability to communicate scientific facts effectively in both verbal and written form to the society.
5. To possess the ability to understand the impact of IT solutions in a global and societal context.

## 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

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

### **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.

### **SYLLABUS**

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**

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

### **COURSE OUTCOMES**

- Examine mathematically the notion of algorithm, asymptotic notations, and algorithmic efficiency with properties. Analyze the asymptotic performance of algorithms.
- Inspect the time and space complexity of the algorithms designed using brute force and divide and conquer methods
- Inspect the time and space complexity of the algorithms designed using greedy techniques.
- Understand the algorithm design techniques using dynamic programming.
- Explain the algorithm design techniques using backtracking, branch and bound and NP-complete and NP-hard problems.

## MAPPING-COURSE OBJECTIVES WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	S	M	L
CO3	S	S	M	M	S
CO4	S	S	M	L	L
CO5	S	S	M	L	S

**Key: S-Strong, M-Medium/Moderate, L-Low**

SEMESTER I	Subject title	subject code	Credit
	<b>CORE II-ADVANCED JAVA PROGRAMMING</b>	<b>PSD1B</b>	<b>4</b>

### COURSE OBJECTIVES

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

### SYLLABUS

#### Unit I

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 II

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 III

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 systems – implementation and future directions of EJB-Variable in perl- perl control structures and operators – functions and scope.

### Unit IV

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 V

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.

## **COURSE OUTCOMES**

1. Design web based applications using features of HTML
2. Develop reusable component for Graphical User Interface applications
3. Apply the concepts of server side technologies for dynamic web applications
4. Understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).
5. Implement the web based applications using effective data base access with rich client interaction

## **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.

#### MAPPING-COURSE OBJECTIVES WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	M	S
CO3	S	S	M	M	S
CO4	S	S	M	M	S
CO5	S	S	S	M	S

Key: S-Strong, M-Medium/Moderate, L-Low

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

#### COURSE OBJECTIVES

1. Study the architecture of a hypothetical machine.
2. Learning assembly language , macrolanguage programming
3. To provide the knowledge and abilities to design system programs
4. To have a knowledge in assemblers, linkers, loaders, macro-processors & editors.
5. Study about interpreters and compilers

#### SYLLABUS

##### Unit 1

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

##### 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 Controlstructures - 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 programdevelopment - Editors - Debug monitors - Programming environments – User interfaces.

#### Course Outcomes

1. Understand the Program in assembly language
2. Understand the structure and design of assemblers
3. Understand the structure and design of compiler
4. Understand the structure and design of linkers and loaders
5. 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.

#### MAPPING - COURSE OBJECTIVES WITH PROGRAMME OUTCOME

CO /PO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	S	S	M	S	M
CO3	S	S	M	S	S
CO4	S	M	M	S	M
CO5	S	M	S	S	M

Key: S-Strong, M-Medium/Moderate, L-Low

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

### 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.

### SYLLABUS

#### 1. Divide and Conquer :

- Merge Sort
- Quick Sort
- Maximum and Minimum

#### 2. Greedy Method :

- Knapsack Problem
- Tree vertex splitting
- Job Sequencing

#### 3. Dynamic Programming :

- Multistage graphs
- All Pairs Shortest Paths
- String Editing,
- BFS and DFS.

#### 4. Back Tracking :

- 8 Queen Problems
- 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

## MAPPING-COURSE OBJECTIVES WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	M	S	M
CO3	S	S	S	M	L
CO4	S	S	M	S	M
CO5	S	S	S	S	S

Key: S-Strong, M-Medium/Moderate, L-Low

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

## COURSE OBJECTIVES

1. Design and develop Web applications
2. Designing Enterprise based applications by encapsulating an application's business logic.
3. 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

### **COURSE OUTCOMES**

1. Create dynamic web pages, using Servlets and JSP.
2. Make a reusable software component, using Java Bean.
3. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC)
4. Invoke the remote methods in an application using Remote Method Invocation (RMI)
5. Develop Stateful, Stateless and Entity Beans.

### **MAPPING-COURSE OBJECTIVES WITH PROGRAMME OUTCOME**

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	M	M	S
CO3	S	S	S	M	S
CO4	S	S	S	M	S
CO5	S	S	M	M	S

Key: S-Strong, M-Medium/Moderate, L-Low

<b>SEMESTER I</b>	<b>Subject title</b>	<b>subject code</b>	<b>Credit</b>
	<b>THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE</b>	<b>PED1A</b>	<b>4</b>

### **COURSE OBJECTIVES:**

- 1.To give an overview of the theoretical foundations of computer science from the perspective of formal languages
2. To understand propositional and logical operations and their applications,basic Mathematical Concept.

3. To illustrate finite state machines to solve problems in computing
4. To familiarize Regular grammars, context free grammar, Normal form techniques and Pushdown automata techniques.
5. To use basic concepts of formal languages of finite 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  $\lambda$ -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. Use the concepts and techniques of discrete mathematics for theoretical computer science
2. Design Finite Automata for different Regular Expressions and Languages
3. Identify and use different formal languages and their relationship.
4. To solve various problems of applying normal form techniques and push down automata
5. Analyze various concepts of undecidability and Computable Function and Discuss analytically and intuitively for problem-solving situation.

#### **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. Hopcraft 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, 3<sup>rd</sup> Edition, Tata McGraw-Hill, New Delhi.

**RELATED ONLINE CONTENTS:**

[Nptel.ac.in](http://Nptel.ac.in)

**MAPPING-COURSE OBJECTIVES WITH PROGRAMME OUTCOME**

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	S	M	S	S
CO3	S	M	S	M	M
CO4	M	S	S	S	M
CO5	S	S	S	M	M

Key: S-Strong, M-Medium/Moderate, L-Low

SEMESTER II	Subject title	subject code	Credit
	<b>CORE VI-COMPUTER NETWORKS</b>	<b>PSD2A</b>	<b>4</b>

**COURSE OBJECTIVES:**

- 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 a 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

## **COURSE OUTCOMES:**

CO1: Use appropriate transmission media to connect to a computer network and Understand and build the skills of subnetting and routing mechanisms.

CO2: Able to design new protocols for computer networks and evaluate the challenges in building networks.

CO3: Be able to identify network attacks (denial of service, flooding, sniffing and traffic redirection, inside attacks, etc.) and basic network defense tools.

CO4: Differentiate between organizational security policies and security mechanisms.

CO5: 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

**RECOMMENDED TEXT BOOKS:**

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,

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

**Websites :**

i. <http://peasonhighered.com/tanenbaum>

**MAPPING WITH PROGRAMME OUTCOMES:**

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	M	M	S
CO3	S	M	S	M	M
CO4	S	S	M	S	S
CO5	M	S	M	S	M

Key: S-Strong, M-Medium



<b>SEMESTER II</b>	<b>Subject title</b>	<b>subject code</b>	<b>Credit</b>
	<b>CORE VII-DIGITAL IMAGE PROCESSING</b>	<b>PSD2B</b>	<b>4</b>

### **COURSE OBJECTIVES**

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

### **SYLLABUS**

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) Rosenfeld A. & Kak, A.C, 1982, Digital Picture Processing, vol .I & II, Academic Press.

**Website and e-Learning Source**

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

**COURSE OUTCOMES**

- Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
- Operate on images using the techniques of smoothing, sharpening and enhancement.
- Perform the restoration concepts and filtering techniques.
- Demonstrate the segmentation, features extraction, compression and recognition methods for color models.
- Compress images and use tools for image recognition.

**MAPPING WITH PROGRAMME OUTCOMES:**

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	S
CO2	S	M	M	S	L
CO3	M	S	S	M	S
CO4	S	S	S	S	M
CO5	S	M	S	M	L

**Key: S-Strong, M-Medium/Moderate, L-Low**

SEMESTER II	Subject title	subject code	Credit
	PRACTICAL III-RDBMS LAB	PSD21	4

## **COURSE OBJECTIVES**

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

## **SYLLABUS**

### **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.

## **COURSE OUTCOMES**

1. Implement the DDL , DML Commands and Constraints
2. Use the basics of SQL and construct queries using SQL in database creation and interaction.
3. Design a commercial relational database system by writing SQL using the system.
4. Formulate query, using SQL, solutions to a broad range of query and data update problems.
5. Design and Implement simple project with Front End and Back End.

## MAPPING-COURSE OBJECTIVES WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	S	M	M	S
CO3	S	S	S	M	S
CO4	S	S	S	M	S
CO5	S	S	S	M	S

Key: S-Strong, M-Medium/Moderate, L-Low

SEMESTER	Subject title	subject code	Credit
II	ELECTIVE I-MOBILE COMPUTING	PSDEA	3

## COURSE OBJECTIVES

- 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.

## COURSE 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 behavior
- To utilize mobile computing concepts for advancement of technology

### 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).

### MAPPING-COURSE OBJECTIVES WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	M	S	S	M	M
CO3	M	M	S	S	M
CO4	S	M	M	S	S
CO5	M	M	M	S	S

Key: S – Strong, M – Medium/Moderate, L - Low

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

### COURSE OBJECTIVES

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

## **SYLLABUS**

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) Rosenfeld A. & Kak, A.C, 1982, Digital Picture Processing, vol .I & II, Academic Press.

## **Website and e-Learning Source**

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

## **COURSE OUTCOMES**

- Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
- Operate on images using the techniques of smoothing, sharpening and enhancement.

- Perform the restoration concepts and filtering techniques.
- Demonstrate the segmentation, features extraction, compression and recognition methods for color models.
- Compress images and use tools for image recognition.

**MAPPING WITH PROGRAMME OUTCOMES:**

	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	S
CO2	S	M	M	S	L
CO3	M	S	S	M	S
CO4	S	S	S	S	M
CO5	S	M	S	M	L

Key: S – Strong, M – Medium/Moderate, L - Low

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

**COURSE OBJECTIVES**

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

**SYLLABUS**

Unit I

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

Unit II

Use-Case Models - Object Analysis - Object relations - Attributes - Methods – Classand Object responsibilities - Case Studies.

### Unit III

Design Processes - Design Axioms - Class Design - Object Storage - ObjectInteroperability - Case Studies.

### Unit IV

User Interface Design - View layer Classes - Micro-Level Processes - View LayerInterface - Case Studies.

### Unit V

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

### COURSE OUTCOMES

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

### 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.

### MAPPING-COURSE OUTCOME WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	S	M	S	S
CO3	S	S	M	M	S

Key: S-Strong, M-Medium/Moderate, L-Low

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



## **COURSE OBJECTIVES**

1. To understand the basic principles of compiler design
2. To understand the use of Context-free grammar
3. Enable the students to understand Parsers
4. Use of Data structures in the Compiler design
5. Enable to understand the object code optimization

## **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.

## **COURSE OUTCOMES**

1. The students will be able to explain the concepts and different phases of compilation
2. Able to understand the compile time error handling
3. Represent language tokens using regular expressions, context-free grammar, and finite automata and design a lexical analyzer for a language
4. Enables understanding of the optimization of the codes, flow graphs, data-flow frameworks, and iterative algorithms.
5. Enables construction object codes using basic blocks and generation of codes from expressions

## **REFERENCE BOOKS**

- 1) A.V. Aho, J.D.Ullman, 1985, Principles of Compiler Design, Narosa Pub-House.
- 2) D.Gries, 1979, Compiler Construction for Digital Computers, John Wiley & Sons.
- 3) A.V.Aho, Ravi Sethi, and J.D.Ullman, 1986, Compilers Principles, Techniques and Tools, Addison Wesley Pub. Co.

## MAPPING-COURSE OUTCOME WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	S	M	M	S
CO3	M	S	M	S	M
CO4	S	S	M	S	S
CO5	S	S	M	M	M

Key: S-Strong, M-Medium/Moderate, L-Low

SEMESTER III	Subject title	subject code	Credit
	<b>CORE XI-INFORMATION SECURITY</b>	<b>PSD3B</b>	<b>4</b>

### COURSE 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.

#### **COURSE 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
- To understand the network security and hardware security
- To enhance 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) Matt Bishop, 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/>

### MAPPING-COURSE OUTCOME WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	S	M	S	M	S
CO3	M	L	S	S	M
CO4	M	S	S	M	M
CO5	S	M	M	M	M

Key: S-Strong, M-Medium/Moderate, L-Low

<b>SEMESTER III</b>	<b>Subject title</b>	<b>subject code</b>	<b>Credit</b>
	<b>CORE XII-ARTIFICIAL INTELLIGENCE</b>	<b>PSD3C</b>	<b>4</b>

### COURSE OBJECTIVES

1. The primary objective of this course is to introduce the basic principles, techniques, and applications of Artificial Intelligence.
2. Gain a historical perspective of AI and its foundations.
3. Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
4. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
5. 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.

## **COURSE OUTCOMES**

- 1) Understanding fundamentals of artificial intelligence(AI) and the history of AI and its foundations.
- 2) 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.
- 3) Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.
- 4) Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- 5) Apply principles of AI in real world problems.

## **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/>

#### MAPPING-COURSE OBJECTIVES WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	M	M	S
CO3	S	M	S	M	S
CO4	S	S	M	S	M
CO5	M	S	M	S	S

Key: S-Strong, M-Medium/Moderate, L-LOW

SEMESTER III	Subject title	subject code	Credit
	<b>ELECTIVE II-BIG DATA ANALYTICS</b>	<b>PSDED</b>	<b>4</b>

#### COURSE 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.

### **COURSE OUTCOME:**

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

### **REFERENCE BOOKS**

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.

## MAPPING-COURSE OUTCOME WITH PROGRAMME OUTCOME

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	M	S	S	S	M
CO3	S	S	M	M	S
CO4	S	M	S	M	S
CO5	S	S	S	M	S

Key: S-Strong, M-Medium/Moderate, L-Low

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

### COURSE OBJECTIVES

- Demonstrate an understanding of guidelines, principles, and theories influencing cloud computing.
- Recognize how a cloud computing operation will 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 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

### **COURSE OUTCOMES**

CO1: Define cloud computing, Cloud deployment Models and related concepts and understand the key dimensions of the challenges of Cloud Computing

CO2: Understand how cloud components fit together

CO3: Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost

CO4: Identify resource management fundamentals

CO5: Analyze various cloud programming models and apply them to solve problems on the cloud

### **RECOMMENDED TEXT BOOKS**

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](http://www.geeksforgeeks.org)

ii. [www.cs.iit.edu](http://www.cs.iit.edu)

iii. <https://nptel.ac.in/courses/106105163/>

**MAPPING WITH PROGRAMME OUTCOMES**

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	M	S	S	S
CO3	S	S	M	S	S
CO4	M	M	S	M	M
CO5	S	S	M	S	M

**Procedure for Awarding Internal Marks**

Course	Particulars	Marks
Theory Papers	Tests(2 out of 3)	10
	Attendance	05
	Seminars	05
	Assignments	05
	<b>Total</b>	<b>25</b>
Practical Papers	Tests 2 out of 3	<b>30</b>
	Attendance	05
	Record	05
	<b>Total</b>	<b>40</b>

Project	Internal Marks(best 2 out of 3 presentations)	20
	Viva-Voce	20
	Project Report	60
	<b>Total</b>	<b>100</b>

#### **Awarding Marks for Attendance (out of 5)**

(i) Attendance below 60% = 0 marks, 60 % to 75% = 3 marks, 75 % to 90% = 4 marks and above 90%= 5 marks

(ii) Conducting Practical and Project Viva-voce Examination: By Internal and External Examiners

#### **SEMINARS:**

Seminars are assigned to the students based on the topic selected by the course instructor from the syllabus. Students are expected to collect comprehensive notes on the seminar topic from various books and web resources suggested by the course instructor. Students are informed to use various tools to supplement and oral presentation, such as visual aids, models etc. Seminars are usually assigned for topics that can aid students to do self-study and avoid any vagueness related to the topic.

#### **EVALUATION STANDARDS FOR SEMINAR:**

S.NO	Criteria	Max.Marks ( 5 Marks )
1	Quality of notes collected for the topic	1
2	Presentation Skill	1
3	Fluency of language	1
4	Interacting skills & body language	1
5	Tools used to present	1

#### **ASSIGNMENTS:**

Assignments are given at both individual as well as group level. Assignments are given not only on topics from the syllabus but also related topics with latest development in the respective fields.

Assignments help students to awaken their creativity skills and help them to practice as well as enhance their knowledge of the subject.

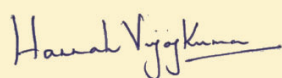
### EVALUTION STANDARDS FOR ASSIGNMENTS:

S.NO	Criteria	Max.Marks ( 5 Marks )
1	Quality of notes collected for the topic	2
2	Presentation Skill	2
3	Fluency of language & vocabulary usage	1

### Question Paper Pattern

Question Paper Pattern for All Semester (University) Examination

SECTION - A		
10 questions Out of 12 questions	10x1	10 Marks
SECTION - B		
5 questions Out of 7 questions	5X5	25 Marks
SECTION - C		
4 questions Out of 6 questions	4X10	40 Marks
	<b>Total</b>	<b>75 Marks</b>



**Head of the Department**



**Principal**