VELLALAR COLLEGE FOR WOMEN

(AUTONOMOUS)

ERODE – 12

Department of Computer Science (PG)

Course contents, Scheme of Examination, Credits and Syllabus

(for students admitted during 2017-2018 and onwards)

Question Paper Pattern

Components of CIA Marks

Tests (I & II)	Assignment / Seminar / Subject Viva	Model Examination	Total
10	**5**	**10**	**25**

CIA

Section	Choice	Marks	Total
A	Compulsory (MCQ-2, Fill ups-2)	4 x 1 = 4	30
B	Either / Or	2 x 5 = 10	
C	Open Choice (2 out of 3)	2 x 8 = 16	

Model and End Semester Examination

Section	Choice	Marks	Total
A	Compulsory (MCQ-5, Fill Ups-5)	10 x 1 = 10	75
B	Either / Or	5 x 5 = 25	
C	Open Choice (5 out of 8)	5 x 8 = 40	

Vellalar College for Women (Autonomous), Erode - 12.

Master of Science in Computer Science

2017 – 2018 onwards

Course Content and Scheme of Examinations (CBCS Pattern)

Semester I

Part	Study Component	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
III	Core	15CSPC101	Advanced Computer Architecture	4	3	25	75	100	4
		16CSPC102	Design and Analysis of Algorithms	5	3	25	75	100	4
		15CSPC103	Advanced Software Engineering	4	3	25	75	100	4
		15CSPC104/ 15CAPC309	Advanced Operating System	5	3	25	75	100	4
		16CSPC105/ 16CAPC310	Advanced Relational Database Management System	4	3	25	75	100	4
	Practical	16CSPCP01	Design and Analysis of Algorithms Lab	5	3	40	60	100	3
IV	Skill Based Subject I	15CSPSP01	RDBMS Lab	3	3	40	60	100	3
							Total	700	26

Semester II

III	Core	16CSPC206	Advanced Java	6	3	25	75	100	5
		16CSPC207	Digital Image Processing	6	3	25	75	100	5
	Practical	16CSPCP02	Advanced Java Lab	5	3	40	60	100	3
		16CSPCP03	Digital Image Processing Lab	5	3	40	60	100	3
	Elective I	15CSPE211 /15CAPE544	Mobile Computing	5	3	25	75	100	5
		15CSPE221	Object Oriented Analysis and Design						
		16CSPE231/ 16CAPE412	Soft Computing						
		17CSPE241	Internet of Things						
IV	Skill Based Subject II	16CSPS202/ 16CAPS403	Advanced Multiskill Paper	3	1 *	40	60	100	3
							Total	600	24

* Online Examination

Semester III									
Part	**Study Component**	**Subject Code**	**Title of the Paper**	**Inst. Hrs./ Week**	**Exam. Dur. Hrs.**	**Max. Marks**			**Credits**
						CIA	**ESE**	**Total**	
III	Core	15CSPC308	SOA and Web Services	5	3	25	75	100	5
		16CSPC309/ 16CAPC514	ASP.NET Programming	4	3	25	75	100	4
		15CSPC310	Data Mining	5	3	25	75	100	5
	Practical	16CSPCP04/ 16CAPCP09	ASP.NET Programming Lab	5	3	40	60	100	3
	Elective II	11CSPE312/	Network Security /	5	3	25	75	100	5
		16CSPE322	Cloud Computing and Big Data Analytics						
		11CSPE332	Principles of Compiler Design						
		17CSPE342/ 15CAPE431	TCP/IP						
IV	Skill Based Subject III	16CSPSP03	Web Designing lab	3	3	40	60	100	3
	Skill Based Subject IV	16CSPSP04	Software Testing Lab	3	3	40	60	100	3
							Total	700	28
Semester IV									
III	Project	11CSPC4PV	Major Project *	-	-	-	200	200	12
							Total (I - IV Semesters)	**2200**	**90**

*Project – 80% Viva-Voce – 20%((Both Internal and External)

CIA - Continuous Internal Assessment Marks

EOS - End of Semester Examinations

SEMESTER - I

Core Paper – 1

ADVANCED COMPUTER ARCHITECTURE

Instructional Hrs: 60 **Sub. Code: 15CSPC101**

Max.Marks: CIA-25; ESE-75 **Credits: 4**

Objective: To enable the students to learn about parallel processing and gain knowledge about problem solving skills using parallel algorithms.

UNIT I **12 Hrs.**

Introduction to parallel processing: Evolution of Computer Systems– Parallelism in uniprocessor Systems – Parallel Computer structures – Architectural Classification schemes –Flynn' Classification – Feng's Classification – Handler's Classification – *Parallel Processing Applications*.

UNIT II **12 Hrs.**

Principles of Pipelining and Vector Processing: Pipelining: An Overlaped Parallelism – Principles of Designing Pipelined Processors - Instruction Prefetch and Branch Handling - Data Buffering and Busing structure – Internal forwarding and Register Tagging – Hazard Detection and Resolution – Job Sequencing and Collision Prevention – Vector processing requirements - *Characteristics* –Pipelined Vector Processing methods.

UNIT III **12 Hrs.**

Solving Problems in Parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel Processing with Specialized Processor – Inter-task Dependency. **Instructional Level Parallel Processing:** Pipelining of Processing Elements – Delays in Pipeline Execution – *Difficulties in Pipelining*.

UNIT IV **12 Hrs.**

Structure of Parallel Computers: A Generalized Structure of Parallel Computers- Classification of parallel Computers- Vector Computers- A Typical Vector Supercomputers- Vector Computer on a CHIP-IRAM- Array Processors- Shared memory Parallel Computers.

UNIT V **12 Hrs.**

Parallel Algorithms: Models of computation – Analysis of Parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations – *Practical Models of Parallel Computation*.

Note: Self study topics are denoted in *Italics*

TEXT BOOKS

1. **Kai Hwang, Faye A. Briggs**, *Computer Architecture and Parallel Processing* Mc Graw – Hill Book Company, 1985.
2. **V. Rajaraman, C. Siva Ram Murthy**, *Parallel Computers Architectures and Programming*, PHI, 2012.

REFERENCE BOOKS

1. **Michael J. Quinn**, *Parallel Computing Theory and Practice*, TMCH, Second Edition, 2002.
2. **Barry Wilkinson, Micheal Allen**, *Parallel Programming: Techniques and Applications*, Prentice Hall, 1999.

SEMESTER – I

Core Paper – II

DESIGN AND ANALYSIS OF ALGORITHMS

Instructional Hrs: 75 **Sub. Code: 16CSPC102**

Max.Marks: CIA-25; ESE-75 **Credits: 4**

Objective: To enable the students to learn the Elementary Data Structures and algorithms and also to understand the various design and analysis of the algorithms.

UNIT I **15 Hrs.**

Introduction: Algorithm Definition and Specification – Performance Analysis. **Elementary Data structures:** Trees – *Dictionaries* – Priority Queues – Sets and Disjoint Set Union – Graphs. **Divide – And – Conquer: -** General method – Binary Search – Finding the Maximum and Minimum – Merge Sort – *Quick Sort*.

UNIT II **15 Hrs.**

The Greedy Method: General Method – Knapsack Problem – Minimum Cost Spanning Tree : Prim's Algorithm and Kruskal's Algorithm – Single Source Shortest Path.

UNIT III **15 Hrs.**

Dynamic Programming : General Method – Multistage Graphs – All Pair Shortest Path –0/1 Knapsack – *Traveling Salesman Problem* .

UNIT IV **15 Hrs.**

Backtracking: General Method – 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – *Knapsack Problem*.

UNIT V **15 Hrs.**

Basic Traversal and Search Techniques – Branch and Bound Method – 0/1 Knapsack Problem – *Traveling Salesperson*.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Ellis Horowitz, Sartaj sahni,Sanguthevar Rajasekaran, *Fundamentals of Computer Algorithms*, Galgotia Publications, 2006.

REFERENCE BOOKS

1. **Vinod K.Rajput**, *Analysis and Design of Algorithms*, S.K.Kataria and Sons, 2012.

2. **Goodrich**, *Data Structures & Algorithms in Java*, Wiley 3 edition.

SEMESTER – I

Core Paper - III

ADVANCED SOFTWARE ENGINEERING

Instructional Hrs: 60 **Sub. Code: 15CSPC103**

Max.Marks: CIA-25; ESE-75 **Credits: 4**

Objective: To help students to develop skills that will enable them to construct software of high quality that is reliable and reasonably easy to understand, modify and maintain.

UNIT I **12 Hrs.**

Introduction to Software Engineering : The evolving role of software – The changing nature of software . A Generic View of Process – Process Models – Agile Process Models – Software Engineering practice- *planning and modeling practice*.

UNIT II **12 Hrs.**

Requirement Engineering: Requirement Engineering tasks - Initiating the Process - Eliciting Requirements- *Developing Use Cases* - Negotiating Requirements -Validating Requirements – Building the Analysis Models:Data Modeling Concepts-Flow-Oriented Modeling-Class-Based Modeling.

UNIT III **12 Hrs.**

Design Engineering: Design Process-Design Concepts – Design Models – Pattern Based Design – Software Architectural – *Data Design* – Component – Designing class based components.

UNIT IV **12 Hrs.**

Testing Strategies: Software Testing Strategies -Strategic Issues -Test Strategies for conventional software -Strategies for object oriented software - Validation testing -

System testing – . **Testing Tactics**: Testing Fundamentals – Black Box – White Box – Basis Path-Control Structure.

UNIT V **12 Hrs.**

SCM and Quality Assurance: Product Metrics. Estimation: Empirical Estimation models – Risk Management – Quality Management: Concepts-SQA-Software Reviews-Formal Technical Reviews-Statistical Software Quality Assurance – Change Management -Software Configuration Management-*The SCM Process*.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Roger S. Pressman, *Software Engineering – A practitioner's Approach*, Sixth Edition, 2007.

REFERENCE BOOKS

1**. Carlo Ghezzi, Mehdi Jazayari, Dio Mandrioli,** *Fundamentals of Software Engineering*, Prentice Hall of India 1991**.**

2. **Fleeger.p,** *Software Engineering*, Prentice Hall, 1999**.**

3. **Sommerville,** *Software Engineering*, Addison Wesley, 5th Edition 1996.

SEMESTER – I

Core Paper - IV

ADVANCED OPERATING SYSTEM

Instructional Hrs: 75 **Sub Code: 15CSPC104/ 15CAPC309**

Max.Marks: CIA-25 ; ESE -75 **Credits: 4**

Objective: To enable the students to understand the concepts of Distributed Operating System using UNIX.

UNIT I **15 Hrs.**

Fundamentals: What is a Distributed Computing System? Distributed Commuting System Models – What is Distributed Operating system – *Issues in Designing a Distribued Operating System* – Introduction to Distributed Computing Environment. Remote Procedure Calls: Introduction – The RPC Model – Transparency of RPC – Implementing RPC Mechanism – Stub Generation – RPC Messages – Server Management – Parameter Passing Semantics – Call Semantics – Communication Protocols for RPCs.

UNIT II **15 Hrs.**

Distributed Shared Memory: Introduction – General Architecture of DSM Systems – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory Space – Consistency Models – *Replacement Strategy* – Thrashing – Advantages of DSM.

Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock.

UNIT III **15 Hrs.**

Resource Management: Introduction – Desirable Features of a Good Global Scheduling Algorithm – Task Assignment Approach – Load Balancing Approach – Load Sharing

Approach. **Process Management:** Introduction – Process Migration – Threads – **Distributed File System :** Introduction – Desirable Features of a Good Distributed File System – File Models – *File Accessing Models* – File Sharing Semantics – File Caching Schemes – File Replication.

UNIT IV **15 Hrs.**

Introduction to the Kernel : Architecture of the Unix operating system – introduction to system concepts – kernel data structures. **Internal Representation of Files :** Inodes – structure of a regular file – directories – conversion of a path name to an inode – superblock – inode assignment to an new file – *allocation of disk blocks*. **The structure of processes:** process states and transitions – layout of system memory – the context of a process.

UNIT V **15 Hrs.**

Process Control: Process creation – process termination – awaiting process termination – invoking other programs – system boot and the init process. **Process scheduling and time:** Process scheduling – *system calls for time*.

Note: Self study topics are denoted in *Italics*

TEXT BOOKS

1. **Maurice J.Bach**, *The Design of the Unix Operating System*, PHI Private Limited, 2006.
2. **Pradeep K, Sinha**, *Distributed Operating System – Concepts and Design*, Prentice Hall of India Private Limited, 2006.

REFERENCE BOOKS

1. **Andrew S.Tanenbaum, Maarten Van Steen**, *Distributed Systems: Principles and Paradigms*, Prentice Hall of India, 2003.
2. **Colulouris, G.Dollimore Timkindberg**, *Distributed System: Concepts and Design*, Addition Wesley, 2000
3. **Sumitabha Das**, *Unix Concepts and Design*, TMH, Third Edition.

SEMESTER – I

Core Paper - V

ADVANCED RELATIONAL DATABASE MANAGEMENT SYSTEM

Instructional Hrs. : 60 **Sub. Code : 16CSPC105 / 16CAPC310**

Max. Marks : CIA -25; ESE -75 **Credits: 4**

Objective : To enable the students to gain knowledge on Advanced RDBMS, Object oriented databases and Data modeling.

UNIT I **12 Hrs.**

Databases and Database Users: Introduction **Database System Concepts:** Data Models, Schemas and instances – Three schema Architecture and Data Independence – *Database Languages and Interfaces* – Database System Environment .

Data Modeling Using ER Model: Entity Types, Entity Sets, Attributes and Keys – Relationships, Relationship Types, Roles and Structural Constraints – Weak Entity Types – ER Diagrams, Naming Conventions and Design issues - Enhanced Entity-Relationship (EER) Modeling.

UNIT II **12Hrs.**

SQL: Data Definition Language(DDL) – Data Management and Retrieval - Working with Tables Functions and *Grouping* - Join and Set Operators **Advanced Features: Objects, Transactions and Data Control:** Views.

UNIT III **12 Hrs.**

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines – Functional Dependencies - Normal Forms Based on Primary Keys – Definitions for Second and Third Normal Forms – *Boyce – Codd Normal Form*. **Relational Database Design Algorithms and Further Dependencies :** Multivalued

Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing – Transaction and System Concepts – Desirable Properties of Transaction – Transaction Support in SQL.

UNIT IV **12 Hrs.**

PL/SQL Cursors and Exceptions: Cursors – Implicit Cursors – Explicit Cursors – Explicit Cursors Attributes - *Implicit Cursors Attributes* – Cursor FOR Loops – SELECT …FOR UPDATE Cursor – WHERE CURRENT OF Clause – Cursor with Parameters – Cursor Variables: An Introduction – Exceptions – Types of Exceptions. **PL/SQL Named Blocks**: Procedures- Functions – Packages – Triggers.

UNIT V **12 Hrs.**

Enhanced Data Models for Advanced Applications : Multimedia Databases- **Introduction to Deductive Databases:** Overview of deductive Databases – Prolog/Datalog Notation-Clausal form and Horn Clauses –*Interpretation of Rules* – Datalog Programs and their Safety.

Distributed Databases: Distributed Database Concepts – Types of distributed Database Systems

Note: Self study topics are denoted in *Italics*

TEXT BOOKS

1. **Ramez Elmasri, Shamkant B. Navathe,** *Fundamentals of Database Systems*, PearsonEducation, Fourth Edition, 2005
2. **Nilesh Shah**, *Database Systems Using Oracle*, Pearson Education, Second Edition. (Unit II & IV)

REFERENCE BOOKS

1. **Abraham Silberschatz, Henry F. Korth, Sudarshan .S**, *Database System Concepts*, MCGraw – Hill International, 6th Edition, 2014.

2. **Kandare S.S,** *Database Management and Oracle Programming*, S.Chand & Company Ltd, 1st Edition, 2004.
3. **Rajesh Narang,** *Database Management Systems*, Prentice Hall of India, 3rd Edition 2004.
4. **C.J.DATE,** *An Introduction To Database System*, Addition Wesley Publications, Seventh Edition.

SEMESTER - I

PRACTICAL I

DESIGN AND ANALYSIS OF ALGORITHMS LAB

Instructional Hrs: 75 **Sub.Code: 16CSPCP01**

Max. Marks: CIA-40; ESE -60 **Credits: 3**

Objective: To make the students understand the concepts of Design and Analysis of Algorithms.

Data Elementary Structures

1. Perform Stack Operations for the finite number of elements.
2. Perform the Queue Operations for the finite number of elements.

Divide and Conquer Method

3. Search an element in the array of elements using Binary Search Method.
4. Sort the array of elements using Quick Sort Method.

Basic Search Tree Traversal

5. Search the Path for a given nodes using Birth First Search and Depth First search Method.

Greedy Method

6. Solve the Knapsack problem and find the optimal solution using Greedy Method
7. Compute Minimum Cost Spanning Tree - Prim's Algorithm for any given graph using Greedy Method.

Dynamic Programming Method

8. Construct the shortest path using Multistage graph in dynamic programming
9. Determine the shortest path from source to destination for any given Matrix using All Pair Shortest Path method.

Backtracking Method

10. Solve the N-Queens Problem using Backtracking Method.
11. Color any given number of nodes (no two edges carries same color) using Graph Coloring Method.

Branch and Bound Method

12. Solve the Traveling Sales Person problem using Branch and Bound Method.

SEMESTER – I

Skill Based Subject I

RDBMS LAB

Instructional Hrs: 45 **Sub.Code: 15CSPSP01**

Max.Marks: CIA-40; ESE-60 **Credits: 3**

Objective: To enable the students to implement the concepts of Relational Data Base Management System.

i. SQL

1. Table Management.
2. Aggregate Functions.
3. Set Operations.
4. Triggers.
5. Views.

ii. PL / SQL

1. Functions.
2. Procedure.
3. Cursor.
4. Packages.
5. Exception Handling

SEMESTER – II

Core Paper – VI

ADVANCED JAVA

Instructional Hrs: 90 **Sub.Code: 16CSPC206**

Max.Marks: CIA-25; ESS-75 **Credits: 5**

Objective: To make the students understand the advanced concepts of JAVA.

UNIT I **18 Hrs.**

A Closer Look at Methods and Classes : Overloading Methods - Overloading Constructors - Using Objects as Parameters - Argument Passing- Returning Objects - Recursion - Introducing Access Control. **Inheritance** : Inheritance Basics - Using super - Creating a Multilevel Hierarchy - Method Overriding - Dynamic Method Dispatch - *Using Abstract Classes* - Using final with Inheritance. **Packages.**

UNIT II **18 Hrs.**

Interfaces : Defining an Interface - Implementing Interfaces - Nested Interfaces - Applying Interfaces- Variables in Interfaces - Interfaces Can Be Extended. **Multithreaded Programming :** The Java Thread Model - The Main Thread - Creating a Thread - Creating Multiple Threads - Thread Priorities. **Synchronization :** Using Synchronized Methods - The synchronized Statement - Interthread Communication - Suspending, Resuming, and Stopping Threads - Using Multithreading. ***I/O Basics.***

UNIT III **18 Hrs.**

The Applet Class : Two Types of Applets - Applet Basics - Applet Architecture - An Applet Skeleton - Simple Applet Display Methods - Requesting Repainting - Using the Status Window. **Event Handling. Introducing the AWT: Working with Windows, Graphics, and Text :** AWT Classes - Window Fundamentals - Working with Frame

Windows - Creating a Frame Window in an Applet. Working with Graphics - *Working with Color - Setting the Paint Mode - Working with Fonts* - Managing Text Output Using Font Metrics.

UNIT IV **18 Hrs.**

Using AWT Controls, Layout Managers, and Menus : Control Fundamentals - Labels - Using Buttons - Applying Check Boxes – Checkbox Group - Choice Controls - Using Lists - *Managing Scroll Bars - Using a TextField - Using a TextArea*. Understanding Layout Managers. Menu Bars and Menus, Dialog Boxes. **Introducing Swing :** The Origins of Swing - Swing Is Built on the AWT - Two Key Swing Features - The MVC Connection - Components and Containers - The Swing Packages. **Java Beans.**

UNIT V **18 Hrs.**

Servlets: The lifecycle of a Servlet – Using Tomcat for servlet development– A Simple Servlet – The Servlet API – The Javax.Servlet Package – Reading servlets Parameters.The javax.servlet.http package – Handling HTTP requests and responses – Using cookies. Database Access with JDBC: JDBC Architecture – Accessing a DataBase – Sample JDBC Servlet.

Note: Self study topics are denoted in *Italics*

TEXT BOOKS

1. **Herbert Schildt**, *The complete Reference Java*. TMH New Delhi, Seventh Edition, Eleventh Reprint, 2010. (Unit I to IV)
2. **Dustin R.Gallaway**, *Inside Servlets server side programming for the Java Platform*, Pearson Edition, 2009. (Unit V)

REFERENCE BOOKS

1. **Herbert Schildt,** *Swing a Beginners Guide*, TMH Edition, Second Reprint 2009.
2. **R.Krishnamoorthy, S.Prabhu**, *Internet and Java Programming*, New Age International Private Ltd., NewDelhi, 2009.
3. **M.P.Bhave & S.A.Patekar**, *Programming with Java*, Pearson Education, First Edition, 2009.

SEMESTER – II

Core Paper –VII

DIGITAL IMAGE PROCESSING

Instructional Hrs: 90 **Sub.Code: 16CSPC207**

Max.Marks: CIA-25; ESE-75 **Credits: 5**

Objective : To make the students understand the basic concepts of digital image processing.

UNIT I **18 Hrs.**

Introduction: What is Digital Image Processing – the origin of DIP – Examples of fields that use DIP – Fundamentals Steps in DIP – Components of an Image Processing System. **Digital Image Fundamentals:** Elements of Visual Perception – Light and the Electromagnetic Spectrum – Image Sensing and Aacquisition – Image Sampling and Quantization – *Some Basic Relationship Between Pixels* – Linear& Nonlinear Operations.

UNIT II **18 Hrs.**

Intensity Transformations and Spatial Filtering: Background – Some Basic Intensity Transformations Functions – Histogram Processing – Fundamentals of Spatial Filtering – Smoothing Spatial Filters – Sharpening Spatial Filters – Combining Spatial Enhancement Methods.

UNIT III **18 Hrs.**

Image Restoration: A Model of the Image Degradation / Restoration Process – Noise Models – Restoration is the Process of Noise only – Spatial Filtering – Periodic Noise Reduction by Frequency Domain Filtering – Linear, Portion – Invariant Degradations – Estimating the Degradation Function – Inverse Filtering– Geometric Mean Filter.

UNIT IV **18 Hrs.**

Image Compression: Fundamentals. **Some Basic Compression Methods**: Huffman Coding – Arithmetic Coding – LZW Coding.**Patterns and Pattern Classes**- Recognition Based on Decision-Theoretic Methods- Structural Methods

UNIT V **18 Hrs.**

Image Segmentation: Fundamentals – Point, Line, Edge Detection – Thresholding – Region – Based Segmentation – Segmentation by Morphological Watersheds.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

1. **Rafael C. Gonzalez, Richard E. Woods**, *Digital Image Processing*, PHI / Pearson Education, New Delhi, Third Edition, 2012.

REFERENCE BOOKS

1. **Chanda B, Dutta Majumder D**, *Digital Image Processing and Analysis*, PHI, New Delhi, 2003.
2. **Nick Efford**, *Digital Image Processing a practical introducing using Java*, Pearson Education, New Delhi, 2004.

SEMESTER -II

Practical II

ADVANCED JAVA LAB

Instructional Hrs: 75 **Sub.Code: 16CSPCP02**

Max. Marks: CIA -40; ESE -60 **Credits: 3**

Objective: To make the students understand the concepts of JAVA

Program using following Concepts:

1. Classes and objects
2. Inheritance
3. Packages
4. Interfaces
5. Multithreading
6. Applets
7. AWT controls
8. Event Handling
9. Menu
10. Layout Managers
11. Swing Controls and Trees
12. JDBC

SEMESTER –II

Practical III

DIGITAL IMAGE PROCESSING LAB

Instructional Hrs: 75 **Sub.Code: 16CSPCP03**

Max.Marks: CIA-40; ESE-60 **Credits: 3**

Objective: To make the students understand the concepts of Digital Image Processing using MATLAB.

1. Image Enhancement (Contrast manipulation, Histogram Equalization, Gray-level Slices, Threshold operation).
2. Filtering Techniques-Spatial Technique
3. Edge Detection.
4. Binary Image Processing (Morphological Operations)
5. Color Image Processing
6. Segmentation
7. Classification
8. Image Descriptor Computation

SEMESTER - II

Elective – I

MOBILE COMPUTING

Instructional Hrs: 75 **Sub.Code: 15CSPE211/ 15CAPE544**

Max.Marks: CIA-25; ESE-75 **Credits: 5**

Objective: To enable the students to gain knowledge on Mobile communication Techniques, Wireless LAN and devices involved in Mobile Computing.

UNIT I **15 Hrs.**

Introduction: Wireless the beginning – Mobile Computing – networks – Middleware and gateways – security in mobile computing – standard bodies. **Mobile computing architecture:** Architecture – *Three tire architecture* – Mobile computing through Internet. Emerging Technologies.

UNIT II **15 Hrs.**

Global System for Mobile Communications - Short Message Service – **General Packet Radio Service:** GPRS and Packet Data Network – GPRS Network Architecture – Operations – Data Services – *Applications* – Limitations.

UNIT III **15 Hrs.**

Wireless Application Protocol : Introduction – WAP – MMS. **CDMA & 3G**: IS-95 – CDMA versus GSM – Third Generation networks – *Application on 3G*. **Wireless LAN:** Introduction – IEEE 802.11 standards – Wireless LAN Architecture – Mobility and Deploying Wireless LAN – Mobile Adhoc network and sensor network.

UNIT IV **15 Hrs.**

Intelligent Networks and Interworking: SS#7 Signaling – IN Conceptual Model - Client Programming. **J2ME:** J2ME Technology.

UNIT V **15 Hrs.**

Wireless Devices with Windows CE: Architecture – Development Environment. **Voice Over Internet Protocol and Convergence:** Convergence Technologies – call routing – Voice over IP Applications – *IP Multimedia Subsystems* – Mobile VoIP. **Security Issues in Mobile Computing:** Introduction – Security Frameworks for Mobile environment.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Asoke K Talukder, Roopa R Yavagal, *Mobile Computing Technology Applications and Services*, TMH Publishing Company Ltd, Second Edition, 2012.

REFERENCE BOOK

Jochen Schiller, *Mobile Communication*, Pearson Education, Second Edition, 2003

SEMESTER – II

Elective – I

OBJECT ORIENTED ANALYSIS AND DESIGN

Instructional Hrs: 75 **Sub.Code: 15CSPE221**

Max.Marks: CIA-25; ESE-75 **Credits: 5**

Objective: To enable the students on to understand the object oriented programming concepts and gain knowledge of UML.

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UNIT I **15 Hrs.**

The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying Object Model. **Classes and Objects:** *The nature of an Object* – Relationships among objects.

UNIT II **15 Hrs.**

Classes and Objects: The nature of the class- Relationships among classes- the interplay of Classes and Objects – On building quality classes and Objects. **Classification:** The importance of proper classification – *Identifying proper Classes and Objects* – Key Abstraction Mechanism.

UNIT III **15 Hrs.**

UML – Meta Model – Purpose of Analysis and Design – Overview of the Process – Inception – Elaboration – *Construction* – Refactoring – Transition – Iterative Development – Use Cases.

UNIT IV **15 Hrs.**

Class Diagrams: *Essentials* – Interaction Diagram – Class Diagram: Advanced Concepts.

UNIT V **15 Hrs.**

Packages and Collaborations – *State Diagram* – Activity Diagram – Physical Diagram – UML and Programming.

Note: Self study topics are denoted in *Italics*

TEXT BOOKS

1. **Grady Booch**, *Object Oriented Analysis and Design*, Pearson Education, Pvt Ltd, New Delhi, Second Edition, 2008.
2. **Martin Fowler, Kendall Scoutt**, *UML Distelled, A Brief Guide to the Standard Object Modeling Languages*, Pearson Education, Second Edition 2004.

REFERENCE BOOKS

1. **Erich Gamma, Richard Helm, Raiph Johnson, John Vilssides,** *Design Patterns: Elements of Resuable Object Oriented Software*, Pearson Education, Pvt Ltd, New Delhi, 2009.
2. **James Rumbaugh et al,** Object Oriented Modeling and Design, Pearson Education, 2005.
3. **Ivar Jacobson,** *Object Oriented Software Engineering: A Use Case Driven Approach*, Pearson Education, 1995.
4. **Eriksson**, *UML Tool Kit*, Pearson Education, 2012.

SEMESTER II

Elective – I

SOFT COMPUTING

Instructional Hrs: 75 **Sub.Code: 16CSPE231 / 16CAPE412**

Max. Marks: CIA -25; ESE -75 **Credits: 5**

Objective: To make the students understand the basic concepts of soft computing

UNIT I **15 Hrs.**

Introduction to Artificial Intelligence Systems – Fundamentals of Neural Networks: Basic Concepts of Neural Networks – Human Bran – Modal of an Artificial Neuron – Neural Network Architectures – *Characteristics of Neural Network* – Learning Methods – Taxonomy of Neural Network Architectures – History of Neural Network Research – Early Neural Network Architectures – Some Application Domains.

UNIT II **15 Hrs.**

Back propagation Networks: Architecture of a Back Propagation Network – Back Propagation Learning – Illustration – *Applications* – Effect of Tuning Parameter of the Back Propagation Neural Network – Selection of Various Parameters in BPN – Variations of Standard Back Propagation Algorithm – Research Directions.

UNIT III **15 Hrs.**

Fuzzy Set Theory: Fuzzy Versus Crisp – *Crisp Sets* – Fuzzy Sets – Crisp Relations – Fuzzy Relations.

UNIT IV **15 Hrs.**

Fuzzy System: Crisp Logic – Predicate Logic – Fuzzy Logic – Fuzzy Rule Based System – Defuzzification Methods – *Applications*.

UNIT V **15 Hrs.**

Fundamentals of Genetic Algorithms: History of Genetic Algorithms – Basic Concepts – Creation of Off Springs – Working Principle – *Encoding* – Fitness Function – Reproduction. **Evolutionary computing algorithms:** Introduction-ACO-BCO-SA-PSO.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Rajasekaran S, Vijalakshmi Pai G.A, *Neural Networks, Fuzzy Logic, and Genetic Algorithms, Synthesis and Applications*, Prentice-Hall of India Private Limited, New Delhi, 2005.

REFERENCE BOOK

Samir Roy, *Introduction to Soft Computing: Neuro - Fuzzy and Genetic Algorithms***,** Pearson Education, First edition, 2013.

SEMESTER II

Elective – I

INTERNET of THINGS

Instructional Hrs. : 75 **Sub. Code : 17CSPE241**

Max. Marks :CIA-25 ; ESE -75 **Credits:5**

Objective: To learn IoT concepts and technologies.

UNIT I **15 Hrs.**

Introduction – Concepts behind the Internet of Things: The IoT paradigm- Smart objects-Bits and atoms-Goal orientation-Convergence of technologies,Internet in general and Internet of Things.

UNIT II **15 Hrs.**

Technologies behind the Internet of Things: RFID + NFC - Wireless networks + WSN - RTLS + GPS- Agents + Multi agent systems- layers-protocols-packets- services-performance parameters of a packet network as well as applications such as web- Peer-to-peer- sensor networks, and multimedia.

UNIT III **15 Hrs.**

Creative thinking techniques: Modifications - Combination scenarios - Breaking assumptions - Solving problems, Transport services: TCP, UDP, socket programming-Network layer: forwarding & routing algorithms (Link, DV), IP-addresses, DNS, NAT, and routers-Local Area Networks, MAC level, link protocols such as: point-to-point protocols, Ethernet, WiFi 802.11, cellular internet access, and Machine-to-machine.

UNIT IV **15 Hrs.**

Mobile Networking: Roaming and handoffs-mobile IP- and ad hoc and infrastructure less networks. Realtime networking: soft and real time- quality of service/information-resource reservation and scheduling and performance measurements.

UNIT V **15 Hrs.**

IoT : overview, applications, potential & challenges, and architecture. IoT examples: Case studies, e.g. sensor body-area-network and control of a smart home.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning,***The Internet of Things: From RFID to the Next-Generation*, Pervasive Networked Systems,**2008.

REFERENCE BOOK

Kurose James F., Ross KeithW., Computer networking: a top-down approach, Boston, Mass. Pearson Co., **Fifth Edition,***2010.*

SEMESTER II

Skill Based Subject II

ADVANCED MULTISKILL PAPER

Instructional Hrs: 45 **Sub Code: 16CSPS202 / 16CAPS403**

Max. Marks: CIA - 40; ESE -60 **Credits: 3**

OBJECTIVE: To familiarize the students with various types of tests that is employed by the diverse examining bodies.

UNIT I **9 Hrs**

Communication: Question tags - Gerund and Infinitives - Spotting the errors – Synonyms – Antonyms - One word substitution – Sentence completion –Prepositions – Articles. **General Awareness and Scientific Aptitude:** Socio - Economic - Banking – Basic Sciences. People and Environment - Politics and Current Affairs - Higher Education - Information and Communication Technology - Teaching Aptitude - Research Aptitude.

UNIT II **9 Hrs**

Logical Reasoning : Syllogism – Statement Conclusions – Statement Arguments – Statement Assumptions – Statement Courses of Action – Inference – Cause and Effect – Visual Reasoning – Direction Sense Test – Blood Relation – Coding and Decoding – Deductive Reasoning.

UNIT III **9 Hrs**

Numerical Reasoning and Quantitative Aptitude: Age – speed – Heights and Distance – Time and Distance - Ratio and Proportion – Percentage – Fraction – Profit and Loss – Interest – Average – Calendar – Clocks– Probability – Series – Venn Diagram - Data Interpretation.

UNIT IV **9Hrs.**

Overview of Research Methodology :- Introduction – Mathematical tools for analysis- Research problems in management – types of research – research process.

Algorithmic Research: - Algorithmic Research problems – **Types of Algorithmic Research problems**: polynomial Algorithm for polynomial problem – **Steps of Algorithmic Research. Algorithmic Research:** Meta Heuristics for Combinatorial problems

UNIT V **9Hrs.**

Report writing and Presentation : Introduction – Types of Report – Guidelines for Reviewing draft – Report format – Typing instructions – Oral Presentation. **Hands on Tools** : SPSS / NS2 / LATEX.

REFERENCE BOOKS

1. **Agarwal.R.S,** *Quantitative Aptitude*, S. Chand and Company, Reprint 2012.
2. **Chopra.J.K,** *Bank Probationary Officers' Examination*, Unique Publishers, 2010.
3. **Datason. R.P, Manish Arora and Gulati.SW.L**, *Clerical Cadre Recruitment in State Bank of India*, Newlight Publishers, 2013.
4. **Davinder Kaur Bright**, *Railway Recruitment Board*, Bright Publications, 2010.
5. **Lal, Jain and Vashishtha, K.C**, *UGC NET/JRF/SET Teaching and Research Aptitude*, Upkar Prakashan Publishers, 2012.
6. **Pratyogita Darpan**, *UGC NET/JRF/SET Teaching and Research Aptitude*, Upkar Prakashan Publishers, 2012.
7. **Sharma.J.K,** *IBPS Recruitment of Bank Clerical Cadre Examination*, Unique Publishers, 2013.
8. **Tara Chand**, *General Studies for Civil Services Preliminary Examinations*, Paper – I, Tata Mc Graw Hill Education Private Ltd, 2013.
9. **Hari Mohan Prasad and Uma Rani Sinha,** *Objective English for Competitive*

Examinations. New Delhi: Tata McGraw Hill Education Private Ltd, 2011.

10. **Jain T.S**. *Upkar's SBI Clerical Cadre Recruitment Examination*. Agra: Upkar Prakashan
11. **Panneerselvam.R**, *Research methodology*, PHI Learning Private Ltd, New Delhi, 2010.

SEMESTER – III

Core Paper – VIII

SOA AND WEB SERVICES

Instructional Hrs: 75 **Sub.Code: 15CSPC308**

Max. Marks: CIA -25; ESE -75 **Credits: 5**

Objective: To make the students understand the concepts of SOA and web services.

UNIT I **15 Hrs.**

INTRODUCTION: Role of XML - *XML and The Web* - XML Language Basics - SOAP - Web Services - Revolutions of XML - Service Oriented Architecture (SOA) – Creating Markup with XML : Introduction to XML Markup – Parsers and Well Formed XML documents – parsing an XML document with MS XML – characters – Markup - Cdata Sections – XML Namespaces.

UNIT II **15 Hrs.**

DTD : Parsers, Well-Formed and Valid XML Documents – Document Type Declaration – Element Type Declarations – Attribute Declarations – Attribute Types – Conditional Sections. Schemas : Introduction – Schema vs DTDs – Microsoft XML Schema : Describing Elements - Describing Attributes – Data types.

UNIT III **15 Hrs.**

DOM : Introduction – DOM Implementation – DOM with Java Script - DOM Components. XSLT: Introduction – Templates – Creating Elements and Attributes – Iteration and Sorting – Conditional Processing – Copying Notes – Combining Style Sheets – Variables.

UNIT IV **15 Hrs.**

SOAP: Overview Of SOAP - *HTTP* - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.

UNIT V **15 Hrs.**

WEB SERVICES: Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And *Web Services in E-Com* - Overview Of .NET And J2EE.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

1. **Deitel, Deitel, Nieto, Lin, Sadhu,** *XML How to Program,* Pearson Education, 2009.
2. **Frank P. Coyle,** *XML, Web Services And The Data Revolution,* Pearson Education, 2008.

REFERENCE BOOKS

1. **McGovern, et al.,** *Java Web Services Architecture,* Morgan Kaufmann Publishers, San Fransisco, 2005.
2. **Mike Mcgraph,** *XML in easy Steps,* Dream Tech, 2006.
3. **Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh,** *Developing Java Web Services,* Wiley Publishing Inc., New Delhi, 2004.
4. **Sandeep Chatterjee, James Webber,** *Developing Enterprise Web Services,* Pearson Education, New Delhi, 2004.

SEMESTER V

Core Paper - XIV

ASP.NET PROGRAMMING

Instructional Hrs: 60 **Sub Code: 16CSPC309/ 16CAPC514**

Max.Marks: CIA-25; ESS-75 **Credits: 4**

Objective: To understand the structure of .NET Framework and to gain the practical working knowledge of the ASP.NET.

UNIT I **12Hrs.**

Getting Started with .NET Framework 4.0 – Introducing Visual Studio 2010 : Exploring the Visual Studio 2010 IDE – Performing basic IDE operation – Introducing C# 2010 – Flow Control.

Unit II **12Hrs.**

.NET and SQL Server – Data Access with ADO.NET

UNIT III **12Hrs.**

ASP.NET 4.0 Essentials – Developing a Web Application

UNIT IV **12Hrs.**

Application Structure and State – Web Forms : Standard Controls

UNIT V **12Hrs.**

Validation Controls – Working with Database Controls : The SqlDataSource Control – The AccessDataSource Control – The XmlDataSource Control – The GridView Control – The DataList Control – The FormView Control - The Chart Control.

Note: Self study topics are denoted in *Italics*

TEXT BOOK

Kogent Learning Solutions Inc.,.*NET 4.0 Programming (6-in-1) Black Book,* DreamTech Press, Edition 2011.

REFERENCE BOOKS

1. **Mattnew MacDonald** ,*Beginning ASP.NET 2.0 in VB 2005,* APress, First Indian Reprint 2006.
2. **Adam Freeman** , *Applied ASP.NET 4 in Context,* APress, First Indian Reprint 2012.

SEMESTER - III

Core Paper – X

DATA MINING

Instructional Hrs: 75 **Sub. Code: 15CSPC310**

Max. Marks: CIA – 25; ESE – 75 **Credits: 5**

Objective: To enable the students to gain knowledge on Data Mining techniques.

UNIT I **15 Hrs.**

Introduction: Fundamentals of data mining – Data Mining functionalities – Classification of Data Mining – Task Primitives- Integration of a Data Mining system with a database or Data Warehouse system – Major Issues.

UNIT II **15 Hrs.**

Data Preprocessing: Need for Preprocessing – Descriptive Data Summarization - Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III **15 Hrs.**

Classification and Prediction: Issues – Decision tree Induction – Bayesian classification – Back propagation – Support Vector machine. Prediction – Other classification methods. Prediction: Accuracy and error measure – Evaluating the accuracy of a classifier or predictor – Ensemble methods - Model selection.

UNIT IV **15 Hrs.**

Clustering Analysis: Cluster analysis Introduction - Types of data in cluster analysis- Hierarchical methods – Density-Based Method - Outlier Analysis – Mining Frequency Patterns, Associations, and Correlations: Efficient and Scalable Frequent Itemset Mining Methods - Mining Various Kind of Association Rules - Constraint-Based Association Mining.

UNIT V **15 Hrs.**

Social Network Analysis - Spatial Data Mining – Text Mining – Mining the World Wide Web.

TEXT BOOK

Jiawei Han and Micheline Kamber, *Data Mining Concept and Techniques*, Morgan Kaufmann Publishers, Second Edition, 2008.

REFERENCE BOOKS

1. **Arun K. Pujari**, Data Mining Techniques, Universities Press (India) Pvt. Ltd., Third Edition, 2013.
2. **Margaret H. Dunhan**, Data Mining : Introductory and Advanced Topics, Pearson Education, 2013.

SEMESTER V

Practical – IX

ASP.NET PROGRAMMING LAB

Instructional Hrs. : 75 **Sub. Code : 16CSPCP04/ 16CAPCP09**

Max. Marks : CIA -40; ESE -60 **Credits: 3**

Objective : To implement the ASP .NET database programming.

1. Develop a web application containing the following controls: ListBox , Button, Image, Label. The listbox is used to list items available in a store. When the user clicks on an item in the listbox, its image is displayed in the image control. When the user clicks the button, the cost of the selected item is displayed in the Label control.
2. Develop a web application for Arithmetic calculator.
3. Develop a web application to demonstrate CSS and Hyper link control.
4. Develop a web application that gets user input such as the student name, course and major. After the user enters the appropriate values the Validation button must validates the values entered using validation controls.
5. Develop an ASP.net web page to upload an image and load it within same page. Repeat for multiple image upload and display all in the same page.
6. Develop an ASP.net Custom Control (User Control) to be used by multiple pages within web application.
7. Develop a web application to demonstrate Dataset, DataReader controls.
8. Develop a web application using Data List, DataGridView Controls.
9. Develop a web application using Chart Control.
10. Design login page using user authentication from database(password & user name)

SEMESTER – III

Elective – II

NETWORK SECURITY

Instructional Hrs: 75 **Sub.Code: 11CSPE312**

Max.Marks: CIA-25; ESE-75 **Credits: 5**

Objective: To know and apply the theory and practice of modern cryptographic systems, the theory and practice of protocols for secured electronic communication.

UNIT I **15 Hrs.**

Classical Encryption Techniques – Block Ciphers and the Data Encryption Standard

UNIT II **15 Hrs.**

Advanced Encryption Standard – Contemporary Symmetric Ciphers

UNIT III **15 Hrs.**

Public-Key Cryptography and RSA – Message Authentication and Hash Functions – Digital Signatures and Authentication Protocols.

UNIT IV **15 Hrs.**

Authentication Applications – Electronic Mail Security – Web Security.

UNIT V **15 Hrs.**

Intruders – Malicious Software – *Firewalls.*

Note: Self study topics are denoted in *Italics*

TEXT BOOK

William Stallings, *Cryptography and Network Security – Principles and Practices*, Pearson Education, Fourth Edition, 2006.

REFERENCE BOOKS

1. **Atul Kahate,** *Cryptography and Network Security*, Tata McGraw Hill, 2003.
2. **Bruce Schneier**, *Applied Crptography*, John Wiley & Sons Inc, 2001.
3. **Charles B. Pfleeger, Shari Lawrence Pfleeger**, *Security in Computing*, Fourth Edition, 2007.
4. **Stewart S.Miller**, *Wi-Fi Security*, McGraw-Hill, 2000.

SEMESTER – III

Elective – II

CLOUD COMPUTING AND BIGDATA ANALYTICS

Instructional Hrs: 75 **Sub. Code: 16CSPE322/ 16CAPE524**

Max. Marks: CIA -25; ESE -75 **Credits: 5**

Objectives: To enable the students to understand about the current challenges in cloud computing, designing cloud systems and implement cloud-based applications.

UNIT I **15 Hrs.**

Cloud computing – History of Cloud Computing – Cloud Architecture –Cloud Storage – Advantages of Cloud Computing – Disadvantages of Cloud Computing –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 – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – *IBM Clouds*.

UNIT II **15 Hrs.**

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management — Collaborating on Project Management – *Collaborating on Word Processing* – Collaborating on Databases – Storing and sharing Files.

UNIT III **15 Hrs.**

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.*

UNIT IV **15 Hrs.**

Introduction: Data mining and predictive analytics - The behavior and benefits of predictive models - Applications of predictive analytics - Reaping the benefits, avoiding the pitfalls - What is Big Data? - *How much value does Big Data add?* **Types of Predictive Models:** Linear models - Decision trees (classification and regression trees) - (Artificial) neural networks - Support vector machines (SVMs) – Clustering - Expert systems (knowledge-based systems) - What type of model is best? - Ensemble (fusion or combination) systems.

UNIT V **15 Hrs.**

Build a Predictive Model : Exploring the data landscape - Sampling and shaping the development sample - Data preparation (data cleaning) - Creating derived data - Understanding the data - Preliminary variable selection (data reduction) - Pre-processing (data transformation) - Model construction (modeling) - *Validation: Selling models into the business - The rise of the regulator.*

Note: Self study topics are denoted in *Italics*

TEXT BOOKS

1. **Michael Miller**, *Cloud Computing: Web-Based Applications that Change the Way You Work and Collaborate Online*, Que Publishing, August 2008.
2. **Steven Finlay,** *Predictive Analytics, Data Mining and Big Data: Myths, Misconceptions and Methods*, Macmillan Publishers Limited, First Edition, 2014.

REFERENCE BOOKS

1. **George Reese**, *Cloud Application Architectures: Building Applications and Infrastructurein the Cloud*, Orelly's, First Edition, April 2009.
2. **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 Pvt. Ltd, July 2008.

SEMESTER – III

Elective – II

PRINCIPLES OF COMPILER DESIGN

Instructional Hrs: 75 **Sub. Code: 11CSPE332**

Max.Marks: CIA-25; ESE-75 **Credits: 5**

Objective:. To make the students understand the principles of compiler design.

UNIT I **15 Hrs.**

Introduction to Compiling: Compilers – analysis of the source program – phases of compiler - cousins of the compiler – grouping of phases – compiler construction tools. A simple one pass compiler: overview – syntax definition – syntax directed translation – parsing – A translator for simple expressions. **Lexical analysis:** Role of lexical analyzer – input buffering – *specifications of tokens* – recognition of tokens.

UNIT II **15 Hrs.**

Syntax analysis : Role of parser – context free grammar – top down parsing – bottom up parsing – shift reduce parsing – operator precedence parsing . **Type checking:** Type systems – specification of a simple type checker. Runtime Environments: Source language issues – storage organization – *storage allocation strategies* –symbol tables - access to non local names – parameter passing.

UNIT III **15 Hrs.**

Intermediate code generation: Intermediate languages - declarations – assignment statements – *Boolean expressions* – case statements – back patching – procedure calls.

UNIT IV **15 Hrs.**

Code Generation: Issues in the design of code generator – target machine – run time storage management - basic blocks in flow graphs – next use information – a simple code generator – DAG representation of basic blocks – peephole optimization.

UNIT V **15 Hrs.**

Code Optimization and Runtime Environments: Introduction – principle sources of optimization – optimization of basic blocks – loops in flow graphs – introduction to global data flow analysis.

Note: Self study topics are denoted in *Italics*

TEXT BOOKS

1. **Alfred Aho, Ravi Sethi, Jeffery D. Ullman**, *Compiler Principles, Techniques and Tools*, Pearson Education Asia 2003.

REFERENCE BOOKS

1. **Alfred Aho, Jeffery D. Ullman**, *Principles of Compiler Design*, Narosa Publishing House, Indian Student Edition, 2002.
2. **Santanu Chattopadhyah**, *Compiler Design*, PHI Learning Private Limited, New Delhi, 2009.

SEMESTER – III

Elective – II

TCP/IP

Instructional Hrs: 75 **Sub.Code:17CSPE342**

Max.Marks: CIA-25; ESE-75 **Credits: 5**

Objective: To understand basic concepts of routing protocols and network management.

UNIT I **15Hrs.**

A Brief history : Arpanet-Milnet-Csnet-Nsfnet-Ansnet-Protocols and Standards-Standards and Organizations-*TCP/IP Protocol Suite*-Addressing-Connecting Devices-Classful Addressing-Classless Addressing.

UNIT II **15Hrs.**

ARP : Proxy ARP - ATMARP- ARP Package - **Internet control protocol version 4 :** Datagram-Fragmentation-Optios-Checksum-*IP Package*-**Internet Control Message Protocol Version 4(ICMPV4)** : Messages-Debugging Tools- ICMP Package.

UNIT III **15Hrs.**

Multicasting and Multicast Routing Protocols :- Group management-IGMP messages-**Multicast Routing:**-Optimal Routing Shortest Path Trees-**Routing Protocols :-** MOSPF-Multicast Distance Vector-DVMRP-CBT-PIM-**Host configuration :-**DHCP operation-**Domain name system :-**Namespace-DNS in the internet-Resolution-DNS messages-*Types of Records*.

UNIT IV **15Hrs.**

File Transfer Protocol: FTP-TFTP-**Electronic mail:** User agent- -Message Transfer Agent (SMTP) - Message Access Agent –MIME- *Web Based Mail.*

UNIT V **15Hrs.**

Network Management SNMP : Concept-management components-SMI-MIB-SNMP-UDP ports-Security-**IPV6 Addressing :-** Introduction-Address Space Allocation-Global Unicast Address-AutoConfiguration-Renumbering- **IPV6 protocol**: Introduction-*Packet format.*

Note: Italics denotes Topics for Self Study

TEXT BOOK

Behrouz A. Forouzan, *TCP/IP Protocol Suite,* Tata McGraw – Hill Publishing Company, New Delhi, 4th Edition, 2010.

REFERENCE BOOKS

1. **Richard Stevens W,** *TCP/IP Illustrated Volume 1: The Protocols,* Pearson Education, New Delhi, 2nd Edition, 2003.
2. **Comer,***Internet working with TCP/IP Volume 1: Principles, Protocols & Architectur*e, Pearson Education, New Delhi, 5th Edition, 2007.

SEMESTER – III

Skill Based Subject III

WEB DESIGNING LAB

Instructional Hrs: 45 **Sub. Code: 16CSPSP03**

Max. Marks: CIA -40; ESE -60 **Credits: 3**

Objective: To make the students understand the concepts of advanced web designing tools

1. Web page creation.
2. Create a registration form.
3. Form validation.
4. Prepare a Student mark sheet.
5. Display today's news and events for an institution using scroll text.
5. XML document for Product Catalog.
6. XML document to store book information using Schema.
7. XML document to store student information using DOM.

SEMESTER – III

Skill Based Subject IV

SOFTWARE TESTING LAB

Instructional Hrs: 45 **Sub. Code: 16CSPSP04**

Max.Marks: CIA-40; ESE-60 **Credits: 3**

Objective To make the students understand the concepts of Software Testing.

Various software testing can be done related to the methods given below using software testing automated tools or manually.

1. Design Phase Testing.
2. Program Phase Testing.
3. Debugging.
4. Evaluation of Test Results.
5. Acceptance Testing.
6. Unit Testing.
7. System Testing.
8. Stress Testing.

SELF LEARNING PAPER

IT ENABLED SERVICES

Sub. Code: 13CSPSL01

Max. Marks: ESE -100 **Credits: 5**

Objective: To gain the knowledge about the various process in out sourcing.

UNIT I

Introduction to Business Process Outsourcing – Introduction to Offshore BPO – Career Opportunities in the BPO Industry.

UNIT II

Introduction to the Call Center Industry – Classification, Functioning, Work Environment.

UNIT III

Computer Skills : Call Center Software – Customer Relationship Management – Technologies used in ECRM.

UNIT IV

Selling over the Telephone – Delivering Customer Service over Telephone – Handling Complaints and Tricky Situations.

UNIT V

The Agent: Eligibility, Recruitment, Training – Personality Development for becoming a Professional – Managing Stress.

TEXT BOOKS

1. **Sarika Kulkarni, "***Business Process Outsourci",*, Jaico Publishing House, Mumbai, 2005.
2. **Vikas Gupta, "***Call Center Training Course Ki"t*, Dreamtech Press, New Delhi, 2003.

REFERENCE BOOKS

1. **Deepak Shil Kapur, "***BPO Diges"t,* Ameya Publications, 2004.
2. **Real Bergevin,"** *Call Centers for Dummies",* Wiley Publications, 2006.

SELF LEARNING PAPER

PERL

Sub.Code: 16CSPSL15

Max.Marks: 100 **Credits: 5**

Objective: To learn and develop programs in PERL through free online resources.

UNIT I

Overview and Installation of PERL - Variables in Perl - Comments in Perl.

UNIT II

for for each loops - while do while loops - Conditional statements - More Conditional statements.

UNIT III

Data Structures - Arrays - Array functions - Hash in Perl - Functions in Perl.

UNIT IV

Blocks in Perl - Access Modifiers in PERL - Referencing and Dereferencing - Special Variables in PERL**.**

UNIT V

File Handling - Exception and error handling in PERL - Including files or modules - Sample PERL program - Perl Module Library (CPAN) - Downloading CPAN module - Perl and HTML

Material: Video Tutorials of Spoken Tutorial, IIT Bombay

SELF LEARNING PAPER

Scilab

Max.Marks: 100 **Sub.Code: 16CSPSL25**

Credits : 5

Objective : To learn and develop programs in Scilab through free online resources.

UNIT I

Why Scilab – Installing - Getting Started - Vector Operations

UNIT II

Matrix Operations - Scripts and Functions - Conditional Branching – Iteration - Plotting 2D graphs - Xcos Introduction - File handling - User Defined Input and Output

UNIT III

Integration - Solving Non linear Equations - Linear equations Gaussian Methods - Linear equations Iterative Methods

UNIT IV

Interpolation - ODE Euler methods - ODE Applications - Optimization Using Karmarkar Function

UNIT V

Digital Signal Processing - Control systems - Discrete systems - Calling User Defined Functions in XCOS

Material: Video Tutorial of Spoken Tutorial, IIT Bombay