

**A.VEERIYA VANDAYAR MEMORIAL SRI PUSHPAM COLLEGE
(AUTONOMOUS),
POONDI, THANJAVUR DIST.**

**Question Pattern for UG and PG Programmes for students to be
admitted during 2014 – 2015 and afterwards.**

Total Marks : 75

QUESTION PATTERN

**SECTION – A
(Question 1 to 10)**

10 x 2 = 20 Marks

1. Short Answer Questions.
2. Two Questions from each unit (All are answerable)

**SECTION – B
(Question 11 to 15)**

5 x 5 = 25 Marks

1. 5 Paragraph type questions with "either / or" type choice.
2. One question from each unit of the Syllabus.
3. Answer all the questions.

**SECTION – C
(Question 16 to 20)**

3 x 10 = 30 Marks

1. 5 Essay type questions – any three are answerable.
2. One questions from each unit of the Syllabus.

Semester	Subject code	Title of the course	Hours of Teaching /Week	No. of Credits
I	14P1CSC1	Core – MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	6	5

Objective

- ❖ To know about Mathematical techniques required for computer science.

Unit I

Hrs 18

Statements and Notation – Connectives – Negation – Conjunction – Disjunction - Statements formulas and Truth tables-Conditional and Biconditional - Well formed formulas – Tautologies -Equivalence of formulas - Duality law - Tautological Implications - Formulas with Distinct Truth tables.

Unit II

Hrs 18

Two state devices and statement logic-Disjunctive Normal Forms-Conjunctive normal forms-Principal Disjunctive normal forms-Principal Conjunctive Normal forms - Rules of inference-Consistency of premises and indirect method of proof-Theory of inference for the predicate calculus.

Unit III

Hrs 18

Matrices - Various types of matrices - Operations on matrices - Multiplication of matrices -Adjoint and Inverse of a matrices - Characteristic roots and Characteristic Equation of a matrices.

Unit IV

Hrs 18

An Introduction to Description Logics-From networks to Description Logics-Knowledge representation in Description Logics- Description Logics systems - Applications developed with Description Logics systems-Relationship to other fields of Computer Science - Basic Description Logics- Introduction -Definition of the basic formalism-Reasoning algorithms- Language extensions - Complexity of Reasoning- Introduction- OR- branching: finding a model - AND- branching: finding a clash – Combining sources of complexity- Reasoning in the presence of axioms – Undecidability - Reasoning about individuals in ABoxes-A list of complexity results for subsumption and satisfiability- Relationships with other Formalisms.

Unit V

Hrs 18

AI knowledge representation formalisms - Logical formalisms - Database models Expressive Description Logics- Introduction - Correspondence between Description Logics and Propositional Dynamic Logics - Functional restrictions - Qualified number restrictions- Objects- Fixpoint constructs - Relations of arbitrary arity - Finite model reasoning - Undecidability results - Extensions to Description Logics – Introduction- Language extensions- Non-standard inference problems.

Text books

1. Discrete mathematical structure with applications of computer science-P.Tremblay R.Manohar-McGraw Hill Publishing Company limited, 2003
2. An Introduction to matrices – S.C.Gupta-Sultan chand and son’s publication.
3. Formal Languages and Automata Dr.Ranisiromoney-The Diosesan press, madras-1984.
4. Discrete Mathematics, 3rd Edition B.S.Vatssa, 2001.
5. THE DESCRIPTION LOGIC HANDBOOK:-Theory, implementation, and applications- Edited by Franz Baader, Deborah L. McGuinness, Daniele Nardi, Peter F. Patel-Schneider.

Semester	Subject code	Title of the course	Hours of Teaching / Week	No. of Credits
I	14P1CSC2	Core – OBJECT ORIENTED SYSTEM DEVELOPMENT	6	5

Objective

- ❖ To understand object oriented analysis and design techniques.

UNIT- I

Hrs 18

An Overview of Object Oriented Systems Development - Object Basics - Object Oriented Systems Development Life Cycle.

UNIT- II

Hrs 18

Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns-Frameworks - Unified Approach - Unified Modeling Language - Use case - class diagram - Interactive Diagram - Package Diagram - Collaboration Diagram - State Diagram - Activity Diagram.

UNIT- III

Hrs 18

Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.

UNIT- IV

Hrs 18

Design axioms - Designing Classes - Access Layer - Object Storage - Object Interoperability.

UNIT- V

Hrs 18

Designing Interface Objects - Software Quality Assurance – System Usability - Measuring User Satisfaction

BOOKS FOR STUDY:

1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 1999

REFERENCES:

1. Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw-Hill, 2003.
2. James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.
3. Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, "UML Toolkit", OMG Press Wiley Publishing Inc., 2004.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
I	14P1CSC3	.NET FRAMEWORK AND C# PROGRAMMING	6	5

Objective

- To understand Programming techniques in c#.
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Unit I

Hrs 18

Introduction to Dot Net

Introduction to Dot net, Common Type System, Common Language Specification, Common Language Runtime – Understanding Assemblies- Introduction to Visual Basic.net Windows and Console applications development environment – Elements of C#.net: foundation, lexical analysis, option , imports and namespace directives – C#.net operators:- Arithmetic , Relational , logical ,bit wise and specialized operators – Sample Programs

Unit II

Hrs 18

Console Applications in C#.net

Software Design and Flow of Controls (In Console Applications)
Conditional statements and sample programs:-if , if-else , switch case and nested if - Iterative statements and sample programs:- while, do while , for and for each.
C# .net Collections and Streams (in Console Applications)Arrays : Single dimension, Multi dimension, Jagged Array – Array List- Stack – Queue – Hash table – Files and Directories – Streams Readers & Writers - Strings and String Builder.

Unit III

Hrs 18

Data Base Programming in C#.net

Introduction to ADO .net objects for OLEDB and SQLDB– Connection , Command , Adapters , Data set and Data table - sample data base application for console environment -Introduction to data and crystal reports –Threads and Synchronization – Exception handling and classes.

Unit IV

Hrs 18

Basic ASP .net Controls (Code behind C# .net)

Features of ASP .net - ASP .Net namespaces – Global .aspx – ASP Configuration file- Sample coding for ASP Controls :- List Box, Combo box, Bulleted list–Tables– Panels – Place holder – text box – button. Validation Controls :- Requiredfield validator, Range Validator, Compare Validator, Custom Validator - Ad Rotator.

Unit V

Hrs 18

ASP .net Database and Web Services (Code behind C# .net)

Introduction to ADO .net OLEDB and SQLDB objects – Data source controls: MS Access and SQL data source- Data Controls: Grid view, form view, List view. Introduction to Web Services – SOAP, WSDL, Configuring ASP.net Web services – deploying web service in to web application.

References:

1. C# and the Dot net plat form – Andrew Troelsen,
2. C# programming "E.BALAGURUSAMY", Second Edition, Tata McGraw Hill, 2008.
3. C# Dot Net Funds – Yashavant kanetkar's – BPB Publications, 2002.
4. C# 4.0. The Complete reference, Herbert schildt, Tata McGraw Hill, 2010.

Semester	Subject code	Title of the course	Hours of Teaching / Week	No. of Credits
I	14P1CSCP1	OBJECT ORIENTED SYSTEM DEVELOPMENT LAB	3	3

OBJECTIVES

- Introduction to UML notations and diagrams.
- Hands on exposure of “Visual Paradigm software for UML” involving analysis and design with UML diagrams.
 1. use case, class diagrams in online ticket reservation systems
 2. use case, class diagrams in hotel reservation systems
 3. use case, class diagrams in student information system
 4. use case, class diagrams in sales & marketing system
 5. use case, class diagrams in banking system and inventory tracking system.
 6. Behavioural diagrams for application systems
 7. state chart diagram for application systems
 8. component diagrams for systems
 9. deployment diagrams for systems – Test cases, integration test cases for systems

Semester	Subject code	Title of the course	Hours of Teaching/Week	No. of Credits
I	14P1CSCP2	C# PROGRAMMING LAB	3	3

Objective

- To understand Programming techniques in c#.

Console Applications

1. C# .net program for Ascending Order and Descending Order.
2. C# .net program for Matrix Multiplication.
3. C# .net program for Stack and Queue collections.
4. C# .net program to perform various string operations.
5. C# .net program to insert, select, delete and update student name , register number and five subject mark list with total and average in MS Access data base.

Web Applications

6. C# .net program to display browser capabilities.
 7. C# .net program to perform Range validation, Required Field Validation, Compare Validation and Custom Validation.
 8. C# .net program to display a MS Access student database in Grid View.
 9. C# .net program to display a MS Access employee database in form View.
- Create a ASP.net web service for arithmetic operations and deploy the same.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
I	14P1CSEL1A	Elective – I ADVANCED SOFTWARE ENGINEERING	6	4

Objective

* To Understand advances in Development software

UNIT I

Hrs 15

A Generic view of Process: Layered Technology-Process Framework-Capability Maturity Model Integration-Process Patterns-Process Assessment-Personal and Team Process Models-Process Technology-Product and Process. **Process Models:** Waterfall Models-Incremental Process Model-Evolutionary Process Model-Specialized Process Model-Unified Process.

UNIT II

Hrs 20

Requirement Engineering: Tasks-Initiating Requirement Engineering Process-Eliciting Requirements-Developing Use case-Building Analysis Model-Negotiating Requirements-Validating Requirements. **Building Analysis Model:** Requirement Analysis –Analysis Modeling Approaches-Data Modeling Concepts-Object Oriented Analysis-Scenario Based Modeling-Flow Oriented- Class Based –Behavioral Model.

UNIT III

Hrs 15

Design Engineering: Context of Software Engineering –Design Process and Design Quality-Design Concepts-Design model-Pattern Based Design. **Architectural Design:** Software Architecture-Data Design-Architectural Styles and Pattern-Architectural Design-Alternate Architectural Design-Mapping Data Flow. **User Interface Design:** Golden Rules-User Interface Analysis and Design-Interface Analysis-Interface Design- Design Evaluation.

UNIT IV

Hrs 20

Testing Strategies: Strategic Approach-Strategic Issues-Strategic for Conventional Software-Strategic for Object Oriented Software-Validation Testing-System Testing-Art of Debugging. **Testing Tactics:** Testing fundamentals-Black box Testing-White Box Testing-Basis Path Testing-Control Structure Testing-Object Oriented Testing-Testing Methods Applicable-Interclass Test Case Design-Testing for Specialized Environments-Testing Patterns.

UNIT V

Hrs 20

Project Management: Management Spectrum – People –Product-Process-Project-W5HH Principle-Critical Practices. **Quality Management:** Quality Concepts-Software quality Assurance-Software Reviews-Technical Reviews –Statistical SQA-Software Reliability-ISO 9000 Quality Standards-SQA Plan. **Change Management:** Software Configuration management-SCM Repository-SCM Process-Configuration Management for Web Engineering.

References:

1. Software Engineering (Sixth Edition) by ROGER S. PRESSMAN, McGraw-Hill International Edition, 2005.
2. Richard E.Fairley, "Software Engineering Concepts", McGraw-Hill Book Company – 1985.

Semester	Subject code	Title of the course	Hours of Teaching /Week	No. of Credits
I	14P1CSEL1B	Elective – I DESIGN AND ANALYSIS OF ALGORITHM	6	4

UNIT I

Hrs 18

Algorithm Analysis – Time Space Tradeoff – Asymptotic Notations – Conditional asymptotic notation – Removing condition from the conditional asymptotic notation - Properties of big-Oh notation – Recurrence equations – Solving recurrence equations – Analysis of linear search.

UNIT II

Hrs 18

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

UNIT III

Hrs 18

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem .

UNIT IV

Hrs 18

Backtracking: General Method – 8 Queens problem – sum of subsets – graph coloring – Hamiltonian problem – knapsack problem.

UNIT V

Hrs 18

Graph Traversals – Connected Components – Spanning Trees – Biconnected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem – Introduction to NP-Hard and NP-Completeness.

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/ C++, Second Edition, Universities Press, 2007. (For Units II to V)
2. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (For Unit I)

REFERENCES:

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", Second Edition, Prentice Hall of India Pvt. Ltd, 2003.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.

Semester	Subject code	Title of the course	Hours of Teaching/Week	No.of Credits
I	14P1CSEL1C	Elective -I NETWORK MANAGEMENT	6	4

Objective

*To know about Management Administration Techniques of Networking.

Unit I

Hrs 18

Introduction: Need for Network management, A Model, Data Representation, Component of the framework, Structure of Management Information, MIB, Models, Conformance Statement, Co existence.

Unit II

Hrs 18

Administration and Operation Models: Concepts of Administrative Models, Communities, Procedures, Protocols Interaction Transport Mappings, Coexistence, Network Management RFCs, Network Management Assignments.

Unit III

Hrs 18

Network Monitoring and Control: Network Monitoring architectures, Performance Monitoring, Fault Monitoring, Account Monitoring Configuration Control, and Security Control.

Unit IV

Hrs 18

SNMP: Network Management Concepts, Management Information, Standard MIBs, Simple Network Management Protocols (SNMP), NMPv2, Management Information Protocols, MIBs and Conformance.

Unit V

Hrs 18

RMON: Remote Networking Monitoring, Statistics Collections, Alarms and Filters RMON2, Extension to RMON1 for RMON2 devices, OV-NNM Overview, Practical Aspects.

Reference:

1. William Stallings," SNMP, SNMP2 and RMON", Addison Wesley, 1996.
2. Marshall T. Rose," An Introduction to Network Management", Prentice Hall, 1996.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
II	14P2CSC4	Core- CLOUD BASED WEB SERVICES	5	4

Objective

*To understand various services of web

UNIT I

Hrs 15

Introduction to Web Services – XML Fundamentals - Client/Server, CORBA, JAVA RMI, Micro Soft DCOM, MOM - Challenges in Distributed Computing - Components of Webservices – SOAP – WSDL – UDDI – SOAP Sever.

UNIT II

Hrs 15

Cloud components - Cloud architecture - Cloud delivery model – SPI framework, SPI evolution, SPI vs. traditional IT Model - Cloud deployment model - Virtualization and Cloud Computing – Web services through Cloud.

UNIT III

Hrs 15

Web Services Interoperability – Means of ensuring Interoperability, Overview of .NET and J2EE. Calling a Web Service by Using a Proxy - Creating a Simple web service - Creating and Calling a Web Service by Using Visual Studio .NET.

UNIT IV

Hrs 15

The J2EE Web Service APIs - SOA support in J2EE – SOAP web service example in java using eclipse - RESTful webservices - Building webservices with JAX-WS – Building RESTful webservices with JAX-WS.

UNIT V

Hrs 15

Web Services Security – XML security frame work, XML encryption, XML digital signature, XKMS structure, guidelines for signing XML documents. XML Serialization in the .NET Framework.

Text book : Compiled and edited by T.S.Baskaran, Dept of Computer Science,A.V.V.M Sri Pushpam college.

REFERENCE BOOKS

1. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter TATA McGraw- Hill , New Delhi - 2010
2. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller-Que 2008
3. Developing Java Web Services, R.Nagappan, R.Skoczylas, R.P. Sriganesh, Wiley India, rp – 2008.
4. Developing Enterprise Web Services, S.Chatterjee, J.Webber, Pearson Education, 2008.
5. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.
6. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn., 2008.
7. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
8. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
9. Java Web Services Programming, R.Mogha,V.V.Preetham, Wiley India Pvt.Ltd.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
II	14P2CSC5	Core - ADVANCED DISTRIBUTED TECHNOLOGIES	6	5

Objective:

To impart knowledge about the distributed environment, its architecture and application development using J2EE and Server side programming.

Unit – I

Hrs 18

Distributed Hardware Architecture:

Evolution of personal Computer – PC to PC Communication – Local Area – Network – File server Architecture – Client – Server Architecture – Database Server Architecture – Corporate Network- Intranet – wide Area Network – Internet

Distributed Software Architecture:

Mainframe – File Sharing – Client Server Architecture: Single tier – 2 tiers – 3 tiers – N tier architecture – Distributed Application.

Unit – II:

Hrs 18

Server side programming–servlets– Java Server Pages – Applet to Applet communication –applet to Servlet communication–JDBC–Using BLOB and CLOB objects–storing Multimedia data into databases–Multimedia streaming applications–Java Media Framework.

Unit – III:

Hrs 18

NETWORK PROGRAMMING IN JAVA

Sockets–Client based communications with sockets - Server communications using sockets- secure sockets – custom sockets – UDP datagrams – multicast sockets – URL classes–Reading Data from the server – writing data – configuring the connection – Reading the header – telnet application – Java Messaging services

Unit IV:

Hrs 18

Distributed Application Development using J2EE:

J2EE Platform: J2EE Architecture–Containers–J2EE Technologies–Component Technologies–Service Technologies–Communication Technology–Developing J2EE Application

Distributed Computing Using RMI:

RMI Architecture – RMI Exceptions – Developing Applications with RMI – Introduction to Struts Framework

Unit – V:

EJB Architecture and Design:

Introduction to EJB – The EJB Containers – J2EE and its Services – Working With EJB – Session Beans and Business Logic – Entity Beans and Persistence

Books for Study:

1. Subrahmanyam Allamaraju, "Professional Java Server Programming"– J2EE Edition Vol I Shroff Publishers and Distributors Pvt. Ltd.
2. Elliotte Rusty Harold, " Java Network Programming", O'Reilly publishers, 2000
3. Hortsman & Cornell, "CORE JAVA 2 ADVANCED FEATURES, VOL II", Pearson Education, 2002.
4. Distributed Application Development using J2EE
5. Distributed Software Architecture
6. EJB Architecture and Design

Reference Book:

Jim Keogh, J2EE Complete Reference, 2010.

Semester	Subject code	Title of the course	Hours of Teaching /Week	No. of Credits
II	14P2CSC6	MOBILE COMPUTING	5	5

Unit - 1. Overview

Hrs 15

Introduction: Evolution of Mobile Radio Communications, Present Day Mobile Communication, Fundamental Techniques, How a Mobile Call is Actually Made?, Future Trends, Modern Wireless Communication Systems: 1G: First Generation Networks, 2G: Second Generation Networks, 3G: Third Generation Networks, Wireless Transmission Protocols, Conclusion: Beyond 3G Networks, The Cellular Engineering Fundamentals: What is a Cell?, Frequency Reuse, Channel Assignment Strategies, Hando_ Process, Interference & System Capacity, Enhancing Capacity And Cell Coverage, Trunked Radio System.

Unit – 2 Mobile Computing Architecture

Hrs 15

GSM- services and system architecture – Calling-Handover-security-New data services-General Packet Radio Services-High speed circuit-DECT.

Unit – 3 Database in Mobile Computing

Hrs 15

Database: Database Hoarding Techniques-Data caching-Client server computing and Adaptation-transaction model-Query processing-Data recovery process-Issues relating to quality of service.

Unit – 4 Android Computing Platforms

Hrs 15

Introducing the Android Computing Platform- Setting Up Development Environment - Understanding Android Resources - Understanding Content Providers- Understanding Intents - Building User Interfaces and Using Controls.

Unit – 5 Android Designs

Hrs 15

Working with Menus- Fragments for Tablets and More- Working with Dialogs - Exploring ActionBar-Advanced Debugging and Analysis-Responding to Configuration Changes.

Text Book:

Unit – 1

Dr. Abhijit Mitra, Lecture Notes on Mobile Communication, IITG.

Unit – 2

Mobile Computing-Raj Kamal Oxford University Press.

Unit – 4, 5

S. Komatineni, D. MacLean, "Pro Android 2", Apress (2012).

Reference book:

Mobile Computing by Asoke k Talukder, Roopa R yavagal Technology, applications and services creation@ 2005, Tata Mc Graw-Hill Publishing Company Limited, First reprint 2006.

Semester	Subject code	Title of the course	Hours of Teaching / Week	No. of Credits
II	14P2CSCP3	SERVER SIDE PROGRAMMING LAB	4	4

Objectives:

To learn the practical knowledge of using distributed application development packages.

1. Design TCP iterative Client and Server application to reverse the given input sentence.
2. Design TCP Client and Server application to transfer file.
3. Design a TCP concurrent Server to convert a given text into upper case using multiplexing system call "select".
4. Design a TCP concurrent Server to echo given set of sentences using Poll functions.
5. Design UDP Client and Server application to reverse the given input sentence.
6. Design UDP Client Server to transfer a file.
7. Design using Poll Client Server application to multiplex TCP and UDP requests for converting a given text into upper case.
8. Design a RPC application to add and subtract a given pair of integers.
9. Program to determine the host ByteOrder
10. Program to set and get socket options
11. Distributed applications using RMI
 - a. Simple RMI application
 - b. RMI application with a server and more than one client
 - c. RMI application with Database Connectivity
12. Enterprise Java Beans
 - a. Session Bean
 - i. Stateless Session Bean
 - ii. Stateful Session Bean
 - b. Entity Bean
 - i. Container Managed Persistence
 - ii. Bean Managed Persistence

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
II	14P2CSCP4	MOBILE APPLICATIONS LAB	4	3

OBJECTIVES

- Building mobile applications.
- Availing variety of mobile brands and models for testing objectives in same location.
- Pushing the innovation in mobile applications.

Perform the experiments in J2ME / Android SDK framework

1. Form design for mobile applications.
2. Applications using controls.
3. Graphical and Multimedia applications.
4. Data retrieval applications.
5. Networking applications.
6. Gaming applications
7. Micro browser based applications using WAP, WML and WML scripts
8. Checking the phone number validation using Text box
9. SlideShow example
10. TextBox Capturing Program
11. Ticket List Program

Program for question & answer with commands Program

Semester	Subject code	Title of the course	Hours of Teaching /Week	No. of Credits
II	14P2CSEL2A	Elective – II SELECTED TOPICS IN COMPUTER SCIENCE	6	4

OBJECTIVES:

- To understand the fundamentals of special topics in Computer science.
- To understand the fundamentals of data warehousing, data mining, parallel computing, windows programming and data communication.

Unit I DATA WAREHOUSE Hrs 18

Data Warehousing-Operational Database Systems vs Data Warehouses- Multidimensional Data Model-Schemas for Multidimensional Databases-OLAP operations-Data Warehouse Architecture-Indexing-OLAP queries & Tools.

Unit II DATA MINING & DATA PREPROCESSING Hrs 18

Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

Unit III Parallel Computing Hrs 18

Flynn’s classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors **Message Passing Architectures:** Message passing paradigms, Grid architecture, Workstation clusters, User level software

Unit IV Windows Programming Hrs 18

Windows Programming Fundamentals – MFC – Windows – Graphics – Menus – Mouse and keyboard – Bitmaps – Palettes – Device-Independent Bitmaps - Controls – Modal and Modeless Dialog – Property – Data I/O – Sound – Timer - Memory management – SDI – MDI – MFC for Advanced windows user Interface – status bar and Toolbars – Tree view – List view – Threads

Unit V Data Communication Hrs 18

Discrete messages and information content – Concept of amount of information – Average information – Entropy – Information rate – Source coding to increase average information per bit – Shannon-fano coding – Huffman coding – Lempel-Ziv (LZ) coding – Shannon’s theorem – Channel capacity – Bandwidth – S/N trade-off – Mutual information and channel capacity – Rate distortion theory – Lossy source coding.

Text Books:

1. Jiawei Han and Micheline Kamber “Data Mining Concepts and Techniques” Second Edition, Elsevier, Reprinted 2011.
2. John Hennessy and David Patterson, *Computer Architecture: A Quantitative Approach*, Morgan Kauffman Publisher.
3. Richard C.Leinecker and Tom Archer, “Visual C++ 6 Programming Bible”, Wiley DreamTech Press, 2006.
4. Herbert Taub and Donald L Schilling., “Principles of Communication Systems”, 3rd Edition, TMH, 2008.

Semester	Subject code	Title of the course	Hours of Teaching / Week	No. of Credits
II	14P2CSEL2B	Elective – II UBIQUITOUS COMPUTING	6	4

Objectives

- To understand the advances in pervasive computing.

Unit – I

Hrs 18

An Introduction to Ubiquitous Computing : Founding Contributions to Ubiquitous Computing - Ubiquitous Computing in U.S. Universities - Ubiquitous Computing in European Laboratories and Universities - Modern Directions in Ubiquitous Computing - The Research Community Embraces Ubiquitous Computing - The Future of Ubiquitous Computing

Unit – II

Hrs 18

Ubiquitous Computing Systems : Ubicomp Systems Topics and Challenges - Creating Ubicomp Systems-Implementing Ubicomp Systems-Evaluating and Documenting Ubicomp Systems.

Unit – III

Hrs 18

Privacy in Ubiquitous Computing : Understanding Privacy - Technical Solutions for Ubicomp Privacy - Address Privacy. Ubiquitous Computing Field Studies : Three Common Types of Field Studies - Study Design - Participants- Data Analysis - Steps to a Successful Study

Unit – IV

Hrs 18

Ethnography in Ubiquitous Computing - From Ethnography to Design - Design-Oriented Ethnography in Practice. From GUI to UUI: Interfaces for Ubiquitous Computing: Interaction Design-Classes of User Interface-Input Technologies.

Unit – V

Hrs 18

Location in Ubiquitous Computing: Characterizing Location Technologies - Location Systems. Context-Aware Computing: Context-Aware Applications - Designing and Implementing Context-Aware Applications - Issues to Consider when Building Context-Aware Applications- Challenges in Writing Academic Papers on Context Awareness

Reference:

1. Ubiquitous Computing Fundamentals - Edited by John Krumm Microsoft Corporation Redmond, Washington, U.S.A.

Semester	Subject code	Title of the course	Hours of Teaching / Week	No. of Credits
II	14P2CSEL2C	Elective – II DIGITAL IMAGE PROCESSING	6	4

Objectives:

- To describe and explain basic principles of digital image processing
- To design and implement algorithms that perform basic image processing (e.g., noise removal and image enhancement)
- To design and implement algorithms for advanced image analysis (e.g., image compression, image segmentation & image representation)

UNIT I:

Hrs 18

Introduction : Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels.

UNIT II:

Hrs 18

Image enhancement in the spatial domain : Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods.

UNIT III:

Hrs 18

Image restoration : A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function.

UNIT IV:

Hrs 18

Color Image Processing : Color fundamentals, color models, pseudo color image processing, basics of full–color image processing, color transforms, smoothing and sharpening, color segmentation.

UNIT V:

Hrs 18

Image Compression : Fundamentals, image compression models, error-free compression, lossy predictive coding, image compression standards.

TEXT BOOK:

1. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.

REFERENCE BOOKS:

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications
4. Digital Image Processing using Matlab, Rafeal C.Gonzalez, Richard E.Woods, Steven L. Eddins, Pearson Education.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
III	14P3CSC7	Core – COMPILER DESIGN	6	5

Objective

* To Understand design principles of compiler.

Unit I

Hrs 18

Introduction to Compilers: Compilers and Translators, Structure of a Compiler, Compiler Writing tools, Programming Languages, High Level Programming Languages, Definitions of Programming Languages, Lexical and syntactic structure of a Language-Finite Automata and Lexical analysis, Role of a lexical analyzer, Regular expressions, Finite Automata, Minimizing the number of syntactic specification of Programming languages.

Unit II

Hrs 18

Context free grammars, derivations and parse tree, capabilities of context free grammars- Basic Parsing techniques: Shift reproduce parsing- Operator precedence parsing- Top down Parsing- Predictive Parsers – Automatic Constructions of efficient Parsers.

Unit III

Hrs 18

LR Parser- Constructing SLR- Canonical LR and LALR Parsing tables- Using Ambiguous Grammars- Automatic Parser Generator- Implementation of LR Parsing Tables. Syntax Directed Translation: Schemes- Implementation- Intermediate Code- Postfix Notation- Parse Tree and Syntax Trees- Three Address Code- Quadruples and Triples- Translation of Assignment Statements- Boolean Expression- postfix Translations- Translation with a Top- Down Parser.

Unit IV

Hrs 18

Symbol Tables, Contents data Structures, representing scope information. Runtime Storage Administration, Implementation and Storage allocation of simple stack allocation schemes and block structured languages, Error detection and recovery, Lexical Phase Errors, Syntactic Phase errors, Semantic errors.

Unit V

Hrs 18

Introduction to Code Optimization, Principle Sources of Optimization, Loop Optimization, DAG Representation of basic blocks, Global data flow Analysis, Code generation, Problems in Code Generation Register allocation and Assignment, Code Generation from DAG's, Peephole Optimization.

Reference:

1. Alfred V.Aho and Jeffrey D.Ullman, "Principles of Compiler Design", Addison Wesley, Narosa publishing House, 1999.

General References:

1. Gray Cornell and Cay S.Horstman, Core Java Vol1 and 2, Sun Microsystems Press, 1999.
2. Stephen Asbury, ScottR. Weiner, Wiley, Developing Java Enterprise Applications, 1998.

Semester	Subject code	Title of the course	Hours of Teaching/Week	No.of Credits
III	14P3CSC8	Core- HUMAN COMPUTER INTERACTION	5	4

Objective

- ❖ To Understand the concepts and techniques for effective interaction between Human and Computers

Unit I:

Hrs 15

Cognitive Psychology and Computer Science - Capabilities of Human-Computer Interaction (HCI)-Goals of Human-Computer Interaction (HCI)-Roles of Human, Computer and Interaction in HCI - Basic User Interfaces- Advanced User Interfaces-Justification of Interdisciplinary Nature-Standard Framework of HCI-HCI Design Principles-Interface Levels in HCI- Steps in Designing HCI Applications -Graphical User Interface Design -Popular HCI Tools - Architecture of HCI Systems - Advances in HCI - Overview-HCI Sample Exercises **Usability Engineering** -Introduction-HCI and Usability Engineering-Usability Engineering Attributes -Process of Usability-Need for Prototyping.

Unit II

Hrs 15

Modelling of Understanding Process – Introduction- Goals, Operators, Methods and Selection Rules (GOMS) - Cognitive Complexity Theory (CCT) - Adaptive Control of Thought-Rational (ACT-R)-State, Operator, and Result (SOAR)-Belief-Desire-Intention (BDI)-ICARUS-Connectionist Learning with Adaptive Rule Induction On-line (CLARION)-Subsumption Architecture -**Spoken Dialogue System**- Introduction - Factors Defining Dialogue System-General Architecture of a Spoken Dialogue System- Dialogue Management (DM) Strategies -Computational Models for Dialogue Management-Statistical Approaches to Dialogue Management - Learning Automata as Reinforcement Learners-Case Study: Learning Dialogue Strategy Using Interconnected Learning Automata -Software and Toolkits for Spoken Dialogue Systems Development.

Unit III

Hrs 15

Recommender Systems- Introduction- HCI Study Based on Personalisation - Personalisation in Recommender Systems -Relation between Information Filtering and Recommender Systems -Application Areas of Recommender Systems-Recommender System Field as an Interdisciplinary Area of Research -Phases of Recommender Systems -User Profiling Approaches-Classification of Recommendation Techniques - Advantages and Disadvantages of Recommender System Approaches -Need of Software Agent-based Approach in Recommender Systems -Evaluating Recommender Systems -Integrated Framework for Recommender Systems -Case Study: Music Recommender System .

Unit IV

Hrs 15

Advanced Visualisation Methods- Ontology Definition -Ontology Visualisation Method -Space Dimensions of Ontology Visualisation -Ontology Languages-Ontology Visualisation Tools -Ontology Reasoning-Reasoner Case Study 1: Teaching Ontology with C Programming Language-Case Study 2: Activity for Ontology Creation with a Case of a Software Company Scenario-Case Study 3: Activity for History Ontology Creation.

Unit V

Hrs 15

Ambient Intelligence: The New Dimension of Human-Computer Interaction - Introduction - Ambient Intelligence Definition-Context-aware Systems and Human-Computer Interaction -Middleware - Modelling Data for AmI Environment - Development of Context-awareness Feature in Smart Class Room— A Case Study - Context-aware Agents for Developing AmI Applications—A Case Study.

Text book:

1. K. Meena, R. Sivakumar, "Human-Computer Interaction", PHP Learning Private limited Delhi-110092, 2015.

Reference:

1."Alan Dix, Janet Finlay, Gregory D.Abowd, Russell Beale", "Human-Computer Interaction", 3rd Edition, Pearson publications, 2008.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
III	14P3CSC9	Core –EMBEDDED SYSTEMS	5	5

Objective

* To understand embedded concepts and techniques for Microprocessors

UNIT I

Hrs 15

Embedded system-Applications areas-Categories of Embedded system-Overview of Embedded system-Recent trends. Hardware Architecture-Applications Software-Communication Software-Process of Generating Executable Image- Development/Testing tools.

UNIT II

Hrs 15

GNU Development Tools-Bit Manipulation using C-CRC- Memory Management-Timing Programs-Device Drivers-Productivity Tools-Code Optimization-C Coding Guidelines-Programming in C++-J2ME-Server Side Programming-java development Tools.

UNIT III

Hrs 15

Architecture of the Kernal-Task Scheduler-Interrupt Service Routines-Semaphores-Mutex-Mailboxes-Message Queues-Even Registers-Pipes-Signals-Timers-Memory Management-Priority Inversion Problem.
Overview of Unix/Linux-Shell Variables-Shell Programming Constructs-System Programming-Processes-Signals-Multithreading-Semaphores-Mutex-Shared Memory-Message Queue.

UNIT IV

Hrs 15

Types of Hardware Platforms-89c51 Micro Controller Development Environment-Cross Platform Development Tools-SDCC-8051-Communication Interfaces-RS232/UART-USB Physical Interface-Features of USB-Infrared Interfaces.
89C59 Micro Controller Development Environment-Cross Platform Development Tools-SDCC-8051 SIM-Application Development.

UNIT V

Hrs 15

Operating System Software-Target Image Creation for Windows XP Embedded-Porting RTOS on a Micro Controller Board. Digital Thermometer-Handheld Computer-Navigation System-IP Phone-Software Defined Radio-Smart Cards-RF Tags-IEEE 1394 Firewire-Ethernet-IEEE802.11-Bluetooth System and its Architecture.

Reference:

1. Embedded/Real-Time Systems, Concepts, Design and Programming, 2005, Dr.K.V.K.K.Prasad
Unit 1: Chapter 1.1 to 1.4, 1.6, 2.1 to 2.6
Unit 2: Chapter 3.1 to 3.11
Unit 3: Chapter 7.1 to 7.13 and 11.1 to 11.3
Unit 4: Chapter 5.1, 5.2, 6.1, 6.2, 6.4, 6.5 and 17.1 to 17.3
Unit 5: Chapter 6.9, 9.1 to 9.3 and 10.1 to 10.7

General References:

1. Introduction to Microprocessor - Aditye P.Matlur.
2. Microprocessor and Interfacing-Programming and Hardware Douglas V.HALL.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
III	14P3CSC10	SOFT COMPUTING	5	5

Objective

To Understand Artificial Intelligence, Neural network and Fuzzy system concepts.

UNIT – I

Hrs 15

Problems, Problem Spaces and Search: Defining the Problem as a State Space Search – Production Systems – Problem Characteristics– Production System characteristics – Issues in the Design of Search Programs– Additional Problems.
Heuristic Search Techniques: Generate and Test – Hill Climbing – Best-First Search – Problem Reduction – Constraint Satisfaction – Means-Ends Analysis.

UNIT - II

Hrs 15

Knowledge Representation Issues: Representing and Mappings – Approach to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem.
Using Predicate Logic: Representing Simple Facts in Logic – Representing Instance and Isa Relationships – Computable Functions and Predictions – Resolution.
Representing Knowledge using Rules: Procedural versus Declarative knowledge – Logic Programming – Logic Programming – Forward versus Backward Reasoning-Matching.

UNIT - III

Hrs 15

Artificial Neural Networks: Concepts –Neural Attributes –Modeling-basic model of a Neuron-Learning in Artificial Neural Networks-Characteristics of ANNs-Important ANNs Parameter-Artificial Neural Network Topology-Learning Algorithm-Discrimination ability-ANN adaptability-The Stability-Plasticity Dilemma. **Neural Network Paradigms:** McCulloch-Pitts Model-The Perceptron

UNIT - IV

Hrs 15

ADALINE and MADALINE Models:-Winner-Takes-All Learning Algorithm-Back-Propagation Learning Algorithm-Cerebellum Model Articulation controller(CMAC)-Adaptive Resonance Theory(ART) Paradigm-Hopfield Model-Competitive Learning Model-Memory Type Paradigms-Linear Associative Memory (LAM) – Real Time Models – Linear Vector Quantization(LVQ) Self-Organizing Map(SOM) Probabilistic Neural Network(PNN) – Radial Basis Function(RBF) – Time –Delay Neural Net(TDNN) Cognitron and Necognitron Models- Simulated Annealing – Boltzmann Machine- Other Paradigm.

UNIT - V

Hrs 15

FUZZY LOGIC: Propositional Logic – The Membership function – Fuzzy logic – Fuzzy Rule Generation – Defuzzification of Fuzzy Logic – Time- Dependent Fuzzy Logic – Temporal Fuzzy Logic(TFL) - Applying Temporal Fuzzy Operators – Defuzzification of Temporal Fuzzy Logic – Example: Applicability of TFL in Communications Systems- Fuzzy Neural Networks – Fuzzy Artificial Neural Network(FANN) Fuzzy Neural Example- Neuro-Fuzzy Control- Fuzzy Neural Net –A Reality? **Applications:** Signal Processing –Image Data Processing – Communication Systems- Intelligent Control- Optimization Techniques- Other Applications – Tools and Companies.

Text Book:

1. Stamatios V.KartaLopoulos, "understanding Neural Networks and Fuzzy logic". Prentice –Hall of India Private Limited, New Delhi, 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence" Second Edition, Tata McGraw – Hill publishing Computing ltd. NewDelhi,1999.

Semester	Subject code	Title of the course	Hours of Teaching/Week	No.of Credits
III	14P3CSCP5	Core PL – EMBEDDED LAB	3	3

Objective

❖ To apply embedded concepts in Microprocessors and Micro controllers

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1. Addition, Subtraction of bytes and words.
 2. Multiplication and division.
 3. Greatest and smallest number in an array of data.
 4. Evaluating simple expression
 5. Pattern comparison
 6. Blinking of LEDs & traffic control
 7. Keyboard interface
 8. Replay interface
 9. Stepper motor interface.
 10. Time delay routine, and calculation of the delay

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
IV	14P4CSEL3A	Elective – III OPEN SOURCE PRODUCT LAB	6	4

Students have to apply the concepts studied throughout the semesters using various Open Source tools like DataMining, Simulation, Image Processing, Ontologies, Artificial Neural networks , Parallel Computing and Cloud Computing.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
IV	14P4CSEL3B	Elective – III SOFTWARE COMMUNICATION AND DOCUMENTATION	6	4

Objective

- ❖ To know about various Software Communication and Documentation concepts.

Unit I BASIC CONCEPTS

Hrs 18

Importance of communication and documentation; Different types of communications; Spoken communication; written communication; Different types of documentation.

Unit II SPOKEN INDIVIDUAL SPOKEN COMMUNICATION

Hrs 18

Elements of good individual communication – getting over nervousness – organizing one self – characteristics of effective communication – augmenting spoken words by actions and other means – other aspects of spoken communication like speeches; presentation; use of visual aids.

Unit III GROUP COMMUNICATION

Hrs 18

Meeting – Effective participation – effective management of meetings – preparing minutes – “Virtual” meetings – audio conference – video conference – use of collaboration tools.

Unit IV DIFFERENT TYPES OF WRITTEN COMMUNICATION

Hrs 18

Principles of effective written communication – differences between written communication and spoken communication – resume writing – email; effective email techniques – proposals – contracts – user guides – external technical documentation for software – internal software technical documentation – users guides – letters and different types of letters – legal issue.

Unit V TECHNOLOGY AND STANDARDS

Hrs 18

Use of various tools and technologies – need for standardization – role of processes and standards in documentation – on-line help – Impact of internet on documentation – common challenges in the harnessing of technology ; course summary.

Text books

1. Huckin, et al, Technical Writing and Professional Communication, McGraw Hill, 1991.
2. Ron Ludlow and Fergus Panton, The Essence of Effective Communication, PHI (P) Ltd., New Delhi, 1995.

References

1. W.R.Gordin and Edward W.Mammen: The Art of Speaking Made Simple, Rupa&Co., 1982.
2. Sushil Bahl : Business Communication Today, Response Books, New Delhi, 1996.
3. Eyre, Effective Communication Made Simple, W.H. Allen, London, 1979.
4. Gloria Wilson and Garry Bitter, Learning Media Design (Text and CD Rom), PHI (P) Ltd., New Delhi, 1998.
5. Simmon Collin – Multimedia Made Simple Asian Books (P) New Delhi, 1996.
6. Bennet – Illustrated World of DTP Dreamland Publications, New Delhi, 1998.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No. of Credits
IV	14P4CSEL3C	Elective – III ONTOLOGICAL ENGINEERING	6	4

Objective

- ❖ To understand various ontological Engineering.
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Unit1: Theoretical Foundation of Ontologies

Hrs 18

From Ontologies towards Ontologies Engineering-What is Ontologies - Main components of an Ontologies-Types of Ontologies-Ontologies Commitments-Principles for the Design of Ontologies.

Unit II: The most outstanding Ontologies

Hrs 18

Knowledge Representation Ontology - Top level Ontologies - Linguistic Ontologies -Domain Ontologies.

Unit III: Methodologies and methods for Building Ontology

Hrs 18

Ontologies Development Process - Ontology Methodology Evolution-Ontology Development methods and Methodologies - Method for Re-Engineering Ontologies - Ontologies learning Methods - Ontology Merging Methods and methodologies - Co4: a Protocol for Cooperative Construction of Ontologies - Methods for Evaluating Ontologies.

Unit IV: Languages for Building Ontologies

Hrs 18

Ontology Language Evolution - Selection of ontology Language-Traditional Ontology Language-Ontology Mark up Languages.

Unit V: Ontology Tools

Hrs 18

Ontology Tools Evolution - Ontology Development Tools and Tools Suites - Ontology Merge Tools – Ontology - based Annotation Tools.

Text Books:

1. Asuncion Gomez-perez, Mariano Fernandez-Lopez and Oscar Corcho. "Ontological Engineering", Springer 2nd Printing, 2011.

Semester	Subject code	Title of the course	Hours of Teaching/ Week	No.of Credits
IV	14P4CSPR	Core – PROJECT	3 Months	8

Main Project

Objective

- ❖ To master technical and Software development Skills.

Students have to undergo Industrial Software Development projects using recent technologies.