

KONGUNADU ARTS & SCIENCE COLLEGE [AUTONOMOUS]

COIMBATORE-29

MASTER OF SCIENCE IN COMPUTER SCIENCE

CURRICULUM & SCHEME OF EXAMINATION UNDER CBCS

[APPLICABLE TO STUDENTS ADMITTED FROM THE ACADEMIC YEAR **2017-2018** AND ONWARDS]

Semester	Subject code	Title of the Paper	Instruction Hours / Cycle	Exam. Marks			Duration of Exam.(hours)	Credits
				CIA	ESE	Total		
I	17PCS101	C.P.1 Data Structures using C++	5	25	75	100	3	4
	17PCS102	C.P.2 Data Communications and Networks	5	25	75	100	3	4
	17PCS103	C.P.3 Information Security	5	25	75	100	3	4
	17PCS104	C.P.4 Relational Database Management Systems	5	25	75	100	3	4
	17PCS1CL	C.Pr.1 Data Structures using C++ Lab	5	30	45	75	3	3
	17PCS1CM	C.Pr.2 RDBMS Lab	5	30	45	75	3	3
II	17PCS205	C.P.5 Advanced Java Programming	4	25	75	100	3	4
	17PCS 206	C.P.6 Wireless Networks	4	25	75	100	3	4
	17PCS 207	C.P.7 .NET Framework	4	25	75	100	3	4
	17PCS 208	C.P.8 Software Project Management	4	25	75	100	3	4
	17PCS2E1	Elective Paper – I	4	25	75	100	3	4
	17PCS2CN	C.Pr.3 Advanced Java Lab	5	30	45	75	3	3
	17PCS2CO	C.Pr.4 .NET Lab	5	30	45	75	3	3
III	17PCS 309	C.P.9 Open Source Systems	5	25	75	100	3	4
	17PCS 310	C.P.10 Unix and Linux Programming	5	25	75	100	3	4
	17PCS 311	C.P.11 Data Mining and Warehousing	5	25	75	100	3	4
	17PCS 3Z1	Mini Project	---	15	60*	75	3	3
	17PCS 3E2	Elective Paper - II	5	25	75	100	3	4
	17PCS3CP	C.Pr.5 Open Source Lab	5	30	45	75	3	3
	17PCS3CQ	C.Pr.6 Unix and Linux Programming Lab	5	30	45	75	3	3

IV	17PCS412	C.P.12 Software Testing	5	25	75	100	3	4
	17PCS4E3	Elective Paper - III	5	25	75	100	3	4
	17PCS4CR	C.Pr.7 Software Testing Lab	5	30	45	75	3	3
	17PCS4Z2	Project and Viva-Voce	15	40	160**	200	3	6
TOTAL			2300				90	

*Project Record – 45 and Viva-Voce – 15

**Project Record – 120 and Viva-Voce – 40

TALLY TABLE

Subject Groups	Total Marks	Total Credits
Core Theory	1200	48
Electives	300	12
Practicals	525	21
Mini Project	75	3
Project	200	6
	2300	90

List of Electives:

1. Intelligent Computing
2. Digital Image Processing
3. Big Data Analytics
4. Network Security And Cryptography
5. Bio-Inspired Computing
6. Advanced Computing
7. Green Computing
8. Enterprise Web Services
9. Artificial Intelligence and Expert Systems
10. Distributed Systems
11. Virtual Reality
12. Embedded Systems

ADVANCED LEARNERS COURSE [ALC] - SELF STUDY SCHEME [OPTIONAL]

Subject Code	Title of the Paper	Instruction Hours/Cycle	Exam Marks			Duration of the Exam.(Hours)	Credits
			CIA	ESE	TOTAL		
17PCS0D1	ALC.1 Programming in C#	-	-	100	100	3	4
17PCS0D2	ALC.2 J2EE	-	-	100	100	3	4

C.P.1. DATA STRUCTURES USING C++

Objective :

On successful completion of the course the students should have learnt the concepts of OOPS, Stack, Queue, Linked List.

UNIT I

[15 Hrs]

Object Oriented Programming Using C++: Abstract data types-Encapsulation-Inheritance-Polymorphism-C++ and Object oriented programming.-constructors, destructor-overloading-Recursion-exceptional handling.

UNIT II

[15 Hrs]

Linear lists-Array representation: Data objects and Structures-the linear list data structures-array representation. Linear list-Linked representation: Singly linked lists and Chains-Circular list and header nodes-Doubly linked list

UNIT III

[15 Hrs]

Stacks: Definition and applications-the abstract data type-array representation-linked representation-applications.

Queues: Definition and applications-the abstract data type-**array representation***-linked representation-applications.

UNIT IV

[15 Hrs]

Sorting: elementary sorting algorithm-decision trees- efficient sorting algorithms.

Graph: definition and notation - shortest path algorithm

Hashing-hash function-Collision resolution-deletion-perfect hash function-hash function for extendible Files

PCS2

UNIT V

[15 Hrs]

Binary and other trees: Trees – Binary tree-properties of binary trees-Representation of binary trees-Common binary tree operations

Binary search trees: Definitions-Abstract data types-Binary search tree operations and implementations.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Sartaj Sahni, “Data structures, algorithms and applications in C++” second edition, University Press, 2005
2. Adam drozdek, “Data structures and algorithms in C++” , third edition, 2012
3. D.S.Malik, “Data structures using C++” 2nd edition,2003
4. Clifford A. Shaffer,” Data structures and algorithms in C++”,Dover Publications,2012.

PCS3

SEMESTER I

17PCS102

C.P.2. DATA COMMUNICATIONS AND NETWORKS

Objective:

On successful completion of the course the student should have learnt different types of Signaling, Transmission media, Networking Devices and Protocols

UNIT I

[15 Hrs]

Data communications – Networks- Protocols and Standards - Line Configuration – Topology - Transmission Mode-Categories of Networks – Internetworks - OSI Model - TCP/IP Protocol suite. Signals: Analog and Digital – Analog Signals - Composite signals - Digital signals.

UNIT II

[15 Hrs]

Encoding and Modulating: Analog to Digital Conversion - Digital to Analog Conversion. Digital Data Transmission - DTE - DCE Interface – Modems - Cable Modems. Transmission Media: Guided Media-Unguided media

UNIT III

[15Hrs]

Data link control: Flow control - Error control. Switching: Circuit switching - Packet switching - Message switching.

Networking and Internetworking: Repeaters – Bridges – Routers – Gateways - Other devices. Routing Algorithm - Distance vector routing - Link state routing. Transport layer : Connection - OSI Transport Protocol – UDP - TCP.

UNIT IV

[15 Hrs]

ISDN : Services – Subscriber Access to the ISDN – ISDN Layers. X.25: Layers - Other Protocols related to X.25.

Frame Relay: Introduction – Operations – Layers. ATM : Architecture – Switching – ATM Layers

PCS4

UNIT V

[15 Hrs]

TCP/IP :Overview –Network Layer – Addressing – Subnetting –Other protocols-BOOTP-DHCP - Telnet-Network Virtual network-SMTP-HTTP-

FTP- World Wide Web . Next Generation TCP/IP Protocol Suite *:IPv6 - ICMPv6.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Behrouz A. Forouzan, “Data Communications and networking”, 4th Edition, TATA McGRAW Hill Edition, 2007.
2. Achyut S Godbole “Data Communications and networks”, Tata McGraw Hill Publication, 2002
3. Andrew S. Tanenbaum “ Computer Networks” Pearson Fourth Edition 2005.

C.P.3. INFORMATION SECURITY

Objective:

The subject is intended to provide the common goals of protecting the confidentiality, integrity and availability of information

UNIT I

[15 Hrs]

Introduction to Information Security: Introduction-The history of information security- what is security?- components of an information system-The security systems development life cycle. The need for security: Threats-Attacks.

UNIT II

[15 Hrs]

Legal, Ethical and professional issues in Information Security: Introduction-Law and ethics in information security- International Laws and Legal Bodies- Ethics and information security. Risk Management: An overview of risk management-Risk identification-Risk assessment-**Risk Control strategies***.

UNIT III

[15 Hrs]

Security Technology: Firewalls and VPNs: Introduction-Access control-Firewalls-Protecting remote connections.

UNIT IV

[15 Hrs]

Security Technology: Intrusion detection and prevention systems, Other security tools: Intrusion detection and prevention systems-Honeypots, Honeynets and padded cell systems-Scanning and analysis tools-Biometric access controls.

UNIT V

[15 Hrs]

Implementing Information Security: Introduction-Information Security project management- Technical aspects of implementation– nonTechnical aspects of implementation.Information Security

PCS6

Maintenance: Security management maintenance models: The Security maintenance models- monitoring the external environment- monitoring the internal environment-Planning and risk assessment.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Michael E. Whitman, Herbert J. Mattord, **“Principles of Information Security “**,Cengage Learning Publications,2008
2. Debby Russell and Sr.G.T.Gangemi, ”Computer Security Basics(paperback)”, Second edition, O’Reilly Media, 2006.
3. Ross J.Anderson and Ross Anderson,”Security Engineering : A guide to building dependable distributed system”,Wiley,2001.
4. Thomas R Peltier, Justin Peltier, John Blackley, “Information Security Fundamentals”, Auerbach Publications, 2010.

C.P.4. RELATIONAL DATABASE MANAGEMENT SYSTEM

Objective :

On successful completion of the course the students should have learnt the concepts of relational database, transaction management, security and Information Retrieval.

UNIT I

[15 Hrs]

Overview of Database Systems: Managing data-File System versus a DBMS-Advantages of DBMS-Describing and storing data in a DBMS -Database design: Database design and ER diagrams-Entities, Attributes and Entity sets-Relationship and relationship sets-Additional features of the E-R model-Conceptual design with E-R model-Logical database design-Introduction to Views-Destroying altering tables and views.

UNIT II

[15 Hrs]

Queries, Constraints and Triggers: Overview-the form of a basic SQL query-Union, Intersect and Except-Nested queries-Aggregate operators-Null values-Complex integrity constraints in SQL-Triggers and active databases

UNIT III

[15 Hrs]

Transaction Management: The ACID properties-Transaction and schedule-Concurrent execution of transactions-Lock based concurrency control - **Performance of locking*** - Transaction support in SQL-Concurrency control: 2PL, Serializability and Recoverability-Introduction to lock management-Lock conversion-Dealing with deadlocks.

UNIT IV

[15 Hrs]

Schema refinement and normal forms: Introduction-Functional dependencies - Normal forms - Properties of decomposition-Normalization-Schema refinement in database design-Other kind of dependencies

Security and Authorization : Introduction-Access control-Discretionary access control - Mandatory access control.

PCS8

UNIT V

[15 Hrs]

Object-database system: New data types - Manipulating the new data - Structured data types - Operations on structured data – Encapsulation and ADT – Inheritance - Database design for ORDBMS - ORDBMS implementation challenges – OODBMS - Compare RDBMS, ORDBMS, OODBMS

Information Retrieval : Introduction to IR - DBMS versus Information Retrieval - Indexing for text search – Web search engines – Managing text in DBMS.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Ragu Ramakrishnan, Johannes Gehrke , “ Database Management Systems” , 3rd Edition , Tata McGraw Hill Publication 2003.
2. Elmarsri Navathe, Ranez Shankand, “Fundamentals of Database Systems”, 5th Edition, Pearson Publication 2008.
3. Silberschatz, Henry Korth, “ Database System Concepts”, 6th Edition, Tata McGraw Hill Publication 2011.

C.Pr.1 DATA STRUCTURES USING C++ LAB

LIST OF PRACTICAL PROGRAMS

1. Array Creation and Operations.
2. Stack and Queue Operations.
3. Recursion, Infix to Postfix Conversion.
4. Implementation of Linked List.
5. Tree Traversals.
6. Graph-Shortest Path.
7. Searching-Linear, binary, Fibonacci.
8. Sorting-Radix, shell, Quick, Heap, Merge.

Guidelines to the distribution of marks for Practical Examinations : (Total marks:75)

CIA : Total marks – 30 [Practical – 20, Observation- 5, Attendance – 5]

ESE : Two Questions will be given for each student(3 Hours / 45 Marks)

1. Record Work - 5 Marks
2. Algorithm, Coding and execution & Viva – 40 Marks

Particulars	Program 1 (Marks)	Program II (Marks)
Algorithm	5	5
Coding	10	10

C.Pr.2. RDBMS LAB

Study features of commercial RDBMS packages such as Oracle and Developer 2000. Laboratory exercise should include defining scheme of applications, creation of a database, writing SQL queries to retrieve information from database. Use of host language interface with embedded SQL. Use of forms and report writer package. Some sample applications, which may be programmed, are given below.

- Banking system various schemes.
- Online reservation system.
- Personal information.
- Student mark processing system (Internal and External marks).
- Hotel management.
- Stock maintenance.
- College admission system.(both UG and PG)

Guidelines to the distribution of marks for Practical Examinations : (Total marks:75)

CIA : Total marks – 30 [Practical – 20, Observation- 5, Attendance – 5]

ESE : Two Questions will be given for each student(3 Hours / 45 Marks)

1. Record Work - 5 Marks
2. Algorithm, Coding and execution – 40 Marks

Particulars	Program 1 (Marks)	Program II (Marks)
Algorithm	5	5
Coding	10	10
Execution & viva voce	5	5

PCS11
SEMESTER II
C.P.5. ADVANCED JAVA PROGRAMMING

Objective:

On successful completion of the course the student should have learnt the concepts of packages, interface, applets, java bean and servlets

UNIT I

[12 Hrs]

Introduction: Inheritance: basics-Using super keyword- Multilevel inheritance – overriding – Dynamic method dispatch – Abstract – Using final with inheritance.

Packages and Interfaces: Packages- Access protection-Importing Packages. Interface – Defining interface- Variables in interface-Implementing an interface.

UNIT II

[12 Hrs]

Exception handling: Fundamentals – Using try and catch – Nested try statements - Throw – Throws – Finally – Using built in exceptions – Creating own exceptions.

Multithreading: Thread model – Creating a thread- Using isAlive() and join() Thread priorities – Synchronization – Deadlock- Suspending ,resuming and stopping threads.

File Input Stream-File Output Stream. Networking: Inet address TCP/IP client/ server sockets.- Datagrams.

Applet Class: Applet basics-Applet Skeleton-A simple Applet-HTML Applet tag

UNIT III

[12 Hrs]

Event handling: Event model - Event classes - Event Listener interface- Adapter classes.

Graphics: Window Fundamentals - Working with graphics, color and font. AWT Controls Fundamentals – Labels-Buttons- Checkboxes-Lists – Text field – Layout managers -Menu bars and menus.

PCS12

UNIT IV

[12 Hrs]

JDBC: Connecting java with Oracle- Images-File -Image fundamentals.

Java Beans: advantages – using JDK – JAR files – Introspection- Developing simple bean using the JDK –**Java beans API***.

UNIT V

[12 Hrs]

Swing – JApplet – Icons and JLabel, JTextField, JPasswordField, JButton, JCheckBox, JRadioButton, JComboBox, JScroll panes - JTabbed panes – Trees - Tables

Servlets – simple servlet – life cycle – Servlet API – Servlet Package – Servlet http Package- - Handling HTTP request and responses – session tracking - Cookies.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Herbert Schildt, “Java, The Complete Reference“, Eighth edition, Tata McGraw Hill Publication, 2011.
2. Paul Deitel and Harvey Deitel, “Java How to Program, Late Objects”, Tenth Edition, Pearson Education Asia, 2014.
3. Cay S. Horstmann, Gary Cornell “Core Java®, Volume II—Advanced Features, Ninth Edition” Prentice Hall, 2013.
4. Hariom Choudhary, ”Introduction to Java Programming, Comprehensive Version 2014-2015”

C.P.6 WIRELESS NETWORKS

Objective :

On successful completion of the course the students should have:

Learnt the concepts of IEEE Concepts, Wi-Fi, Mobile IP, Cellular Concepts.

UNIT I

[12 Hrs]

WIRELESS NETWORK ARCHITECTURE AND OPERATION: Cellular concept-cell fundamentals-mobility management-introduction to GSM –GSM network and system architecture. CDMA network and system architecture. **Generation of cellular systems*.**

UNIT II

[12 Hrs]

WIRELESS LANS and PANS Introduction to wireless LANs –evolution-design issues-mac layer operations-security.IEEE802.15x technologies-PAN application and architecture- Physical layer detail-bluetooth link controller –operational states

UNIT III

[12 Hrs]

WIRELESS MAN: Wireless MAN-IEEE802.16x wireless MANS-mac layer details-IEEE802.16x/IEEE802.16a physical layer detail-common system operations. **WIRELESS WANS:** wireless in local loop: Generic WLL Architecture- WLL Technologies.-wireless ATM

UNIT IV

[12 Hrs]

WIRELESS INTERNET: Introduction-mobile IP-bindings-route optimization-handoffs-security in mobile IP. -Traditional TCP- TCP over wireless –mobile TCP.WAP-Model-Protocol stack. **ADHOC SENSOR NETWORKS:** Introduction - Ad hoc wireless internet.

WiMax / IEEE 802.16 699: Introducion – System Overview – Logical & Physical channel – Multiple Antenna techniques

PCS14

UNIT V

[12 Hrs]

RECENT ADVANCES IN WIRELESS NETWORKS: Wireless Fidelity Systems: Service provider model. Optical wireless networks: Short range infrared communication - optical wireless WDM.

Video Coding: Introduction - Transform & Quantization – Prediction – Video Coding Standards – Error Control – Video Streaming.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Gary J.Mullet, "Introduction to Wireless Telecommunication and networks ".India edition , 2006.
2. C.Siva Ram Murthy,B.S.Manoj , “Adhoc Wireless networks-Architecture and protocols”
Pearson / Prentice Hall 2007
3. Andreas F. Molish, “ Wireless Communication”, 2nd edition., IEEE Press, Nov. 2010.
4. Theodore S. Rappaport, “Wireless Communication Principles & Practice”, 2nd edition,
pearson 2009.

PCS15

SEMESTER II

16PCS207

C.P.7 .NET FRAMEWORK

Objective:

On successful completion of the course the student should have understood the .Net framework, VB.net controls, ASP.net controls, ADO.net

UNIT I

[12 Hrs]

Introduction to .NET –The .NET Framework –Benefits of .NET -Common Language Runtime –Features of CLR -Compilation and MSIL –The .NET Framework libraries –The Visual Studio Integrated Development Environment.

UNIT II

[12 Hrs]

Introduction to VB.NET – VB.NET fundamentals – Branching and Looping Statements - Classes and Objects – Constructors – Overloading-Inheritance and Polymorphism –Interfaces – Arrays – Strings – Exceptions – Delegates and Events.

UNIT III

[12 Hrs]

Building Windows Applications – Creating a Windows Applications using window controls - Windows Forms, Text Boxes, Rich Text boxes, Labels, and link labels –Buttons, Check boxes, Radio buttons, Panels and Group Boxes, List Boxes, Checked List boxes, Combo boxes and Picture boxes, Scroll bars – Calendar control, Timer control – Handling Menus – Dialog boxes – Deploying an Application –Graphics.

UNIT IV

[12 Hrs]

ASP.NET Basics: Features of ASP.NET –ASP.NET page directives -Building Forms with Web server Controls –Validation Server Controls -Rich Web Controls - Custom Controls – Collections and Lists.

PCS16

UNIT V

[12 Hrs]

Data Management with ADO.NET -Introducing ADO.NET -ADO.NET features -Using SQL Server with VB.NET –Using SQL Server with ASP.NET –LINQ queries –Building ASP.NET 3.5 Enterprise Applications: Developing ASP.NET Ajax applications –ASP.NET web services.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Jesse Liberty, Programming Visual Basic.NET 2003, Second Edition, O Reilly, Shroff Publishers and Distributors Pvt. Ltd.
2. Steven Holzner, Visual Basic.NET Programming Black Book, 2005 Edition, Paraglyph press USA&Dreamtech Press, India.
3. Bill Evjen, JasonBeres, et al. Visual Basic.NET Programming Bible, 2002 Edition, IDG books India (p) Ltd.
4. MridulaParihar et al., ASP.NET Bible,2002 Edition, Hungry Minds Inc, New York, USA.
5. Bill Evjen, Hanselman, Muhammad, Sivakumar& Rader, Professional ASP.NET 2.0, 2006 Edition, Wiley India(p) Ltd.
6. KoGENT Solutions Inc., ASP.NET 3.5 (Covers C# and VB 2008 codes) Black Book, Platinum Edition, Dreamtech press, 2010.

C.P.8. SOFTWARE PROJECT MANAGEMENT

Objective :

On successful completion of the course the students should have learnt the concepts of Product Life Cycle, Software Quality Assurance and Risk

UNIT I

[12 Hrs]

Product life cycle-Project life cycle models-metrics-introduction-The metrics Roadmap-A typical metrics strategy-what should you measure-set targets and track them-Understanding and trying to minimize variability-Act on data.

UNIT II

[12 Hrs]

Software Configuration management-some basic definitions and terminology-The processes and activities of Software configuration management-Configuration status accounting-Configuration Audit.

Software Quality Assurance-How do you define Quality?-Why is quality important in software?-Quality control and Quality Assurance-Cost and benefits of quality-Software Quality assurance tools.

Risk management-What is Risk management and why it is important?-Risk management cycle-Risk Identification: Common tools and techniques-Risk Quantification-Risk monitoring-Risk mitigation.

UNIT III

[12 Hrs]

Project initiation: Introduction- Activities-output, quality records and completion criteria-interfaces to the process database.

Software Requirements gathering-inputs and start criteria for requirements gathering-dimensions of requirements gathering-steps to be followed during requirements gathering- outputs and quality records from the requirements phase-skill sets required during the requirement phase

PCS18

Estimation-what is estimation?-when and why is estimation done?-three phases of Estimation-estimation methodology-formal models for size estimation-translating size estimate into effort estimate-translating effort estimate into schedule estimate.

UNIT IV

[12 Hrs]

Design and development phases-some differences in our chosen approach-salient features of design-evolving an architecture for blueprint-design for reusability-technology choices/constraints-Design for standards-Design for portability-Design for testability-Design for diagnosability -Design for maintainability-Design for installability-interoperability design.

Project management in testing phase-Introduction-what is testing?-what are the activities that make up testing?-**Test scheduling and types of tests***.

UNIT V

[12 Hrs]

Project management in maintenance phase-introduction-activities during the maintenance phase-management issues during the maintenance phase-configuration management during the maintenance phase-skill sets for people in the maintenance phase - estimating size, effort and people resources for the maintenance phase- - Impact of the Internet on Project Management. People Focused process models : Growing emphasis on people centric models- people capability maturity model (P-CMM).

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

- 1.Gopaldaswamy Ramesh,"Managing Global Software Projects", Tata McGraw Hill publishing company,2003.
- 2.Bob Hughes and Mike Cotterell,"Software Project Management", 4th Edition, TMH 2006.

PCS19

SEMESTER II

17PCS2CN

C.Pr.3 ADVANCED JAVA LAB

List of Practical Programs:

1. Create an employee package to maintain the information about the employee. Use Constructors to initialize the employee number and use overloading method to set the basic pay of the employee. By using this package, create a Java Program.
2. Program to implement polymorphism, inheritance and inner classes
3. Create a frame with user specific size and position it at user specific position (use command line argument). Then different shapes with different colors (use menus)
4. Java program to handle different mouse events
5. Create an applet for a calculator application
6. Java program to maintain the student information in text file
7. Client server chat using sockets.
8. Animate images at different intervals using multithreading concepts
9. Java program by using JDBC concepts to access an inventory database
10. Java program to implement the tree viewer.

PCS20

Guidelines to the distribution of marks for Practical Examinations: (Total marks:75)

CIA : Total marks – 30 [Practical – 20, Observation- 5, Attendance – 5]

ESE: Two Questions will be given for each student(3 Hours / 45 Marks)

1. Record Work - 5 Marks
2. Algorithm, Coding and execution – 40 Marks

Particulars	Program 1 (Marks)	Program II (Marks)
Algorithm	5	5
Coding	10	10
Execution & viva voce	5	5

C.Pr.4 .NET LAB

List of Practical Problems

1. Program for Various font Application.
2. Program to simulate a simple calculator.
3. Program to simulate a digital clock with reset option.
4. Program for a notepad application.
5. Program to maintain Employee details.
6. Program to maintain supplier details.
7. Program to maintain student details.
8. Program for hospital management.
9. Program for newspaper vendor.
10. Program to create and read text file.

Guidelines to the distribution of marks for Practical Examinations : (Total marks:75)

CIA : Total marks – 30 [Practical – 20, Observation- 5, Attendance – 5]

ESE : Two Questions will be given for each student(3 Hours / 45 Marks)

1. Record Work - 5 Marks
2. Algorithm, Coding and execution – 40 Marks

Particulars	Program 1 (Marks)	Program II (Marks)
Algorithm	5	5
Coding	10	10
Execution & viva voce	5	5

C.P.9. OPEN SOURCE SYSTEMS

Objective :

On successful completion of the course the students should have learnt the concepts of Web Designing, Server side scripts

UNIT I:

Introduction: HTML, XML, and the World Wide Web. **HTML:** Basic Html –The Document Body-Text-Hyperlinks-Adding More Formatting – Lists –Tables--Images.

UNIT II:

More HTML: Multimedia Objects – Frames –Forms –Toward Interactivity —XHTML –An Evolutionary Markup .**Cascading Style Sheets:** Introduction –using styles-Defining own Styles- Properties and Values in Styles- Style Sheets - A worked example-Formatting Blocks of Information.

UNIT III:

An Introduction to Java Script: JavaScript- JavaScript –The Basics –Variables –String Manipulation –Mathematical Function –Statements –Operators – Array –Function-Window objects.

UNIT IV:

Dynamic HTML With JavaScript: Data Validation – Opening New Window –Messages and Confirmations –The Status Bar –Writing to Different Frame –Rollover Buttons-Moving Images — Floating Logos.

UNIT V:

An Introduction To PHP: PHP –Using PHP – Variables –Program Control –Built in Functions- File Manipulation –Validation. **Mysql:** Establishing connection-Accessing Mysql with PHP-Starting, terminating and writing your own SQL programs.

PCS23

REFERENCE BOOKS:

1. Charis Bates, "Web Programming Building Internet Applications", Wiley India Pvt.Ltd. Second Edition, 2011
2. Adam Rizvi, Click Start Internet Basics: The Internet Basics, Written for Beginners, 2011, Click start publishing, UK.
3. Jon Duckett, Beginning Web Programming with HTML, XHTML, and CSS, 2011, Wiley publishers
4. Ivan Bayross and Sharanam Shah, "MySQL 5 for Professionals", Shroff Publishers and Distributors, Third Edition, 2011.

C.P.10. UNIX AND LINUX PROGRAMMING

Objectives: On successful completion of the course the student should

- able to apply Shell Scripting in Unix and Bash Environment
- able to integrate with Linux environment

UNIT-I

INTRODUCTION TO UNIX: The UNIX Operating System, The UNIX Architecture, Features of UNIX, Internal And External Commands, Command Structure.

GENERAL-PURPOSE UTILITIES: cal, date, echo, printf, bc, script, passwd, PATH, who, uname, tty, stty, pwd, cd, mkdir, rmdir, od.

UNIT-II

INTRODUCTION TO SHELLS: Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell Edition Environment Customization Filters, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Ordering a File, uniq. **GREP:** Operation, grep Family, Searching for File Content. **SED:** Scripts, Operation, Addresses, commands, Applications, grep and sed

UNIT-III

AWK: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications, awk and grep, sed and awk.

INTERACTIVE C SHELL: C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables

FILE MANAGEMENT: File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

PCS25

Unit – IV

What is Linux? – Distributions – The GNU Project and the Free software Foundation.
Shell programming in Linux: – vi editor – Shell syntax - variables – conditions and control structures- command execution – simple programs – System calls and library: Read – Write – File and record locking — Lseek - Close – File creation – Creation of special files – Changing directory, root, owner, mode – stat and fstat.

Unit – V

Processes and Signals: Introduction of process – Structure - Process states - Process termination – command line arguments - Process control – Process identifiers - Process relationships – Zombie process - Signals: Sending signals – Signal sets–Threads: Synchronization – Thread attributes – Canceling a Threads.

Inter process Communication: Process – popen() and pclose() – Pipes –Named pipes (FIFO) – Message queues – Semaphores - Shared Memory – Client-Server application using IPC.

REFERENCE BOOKS:

1. David Tansley “Linux and Unix Shell Programming” ,Pearsons Education ,2000.
2. Cameron Newham, Bill Rosenblatt “Learning the bash Shell: Unix Shell Programming”3rd Edition, O'Reilly Media, Inc.",2005
3. Machtelt Garrels “Introduction to linux-Beginner’s Guide”,published by Fultus Corporation,2010

PCS26

SEMESTER III

17PCS311

C.P.11 DATA MINING AND WAREHOUSING

Objective :

On successful completion of the course the students should have learnt the concepts of Clustering, Neural Networks and Genetic Algorithms.

UNIT I

[15 Hrs]

Data Mining: Introduction - what is Decision tree? – Where to use Decision Trees – How the Decision Tree Works – Case Study – Strengths and Weaknesses.

Neural Networks: What is Neural Network? – Where to use Neural Networks – How the Neural Networks – Case Study - Strengths and Weaknesses.

UNIT II

[15 Hrs]

Nearest Neighbor and Clustering: Where to use Clustering and Nearest-Neighbor Prediction – How Clustering and Nearest-Neighbor Prediction Work – Case Study - Strengths and Weaknesses.

Genetic Algorithms: What are Genetic Algorithms – Where to use Genetic Algorithms – How the Genetic Algorithm works – Case Study - Strengths and Weaknesses.

UNIT III

[15 Hrs]

Rule Induction: Where to use Rule Induction – How Rule Induction Works – Case Study - Strengths and Weaknesses.

Data Visualization: Data Visualization Principles- Parallel Coordinates – Visualizing Neural Networks – **Visualization of Trees** *- State of the Industry.

UNIT IV

[15 Hrs]

Business Analysis: Reporting and Query Tools and Applications: Tool Categories – The Need for Applications - Cognos Impromptu – Applications.

PCS27

On-Line Analytical Processing (OLAP): Need for OLAP – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – **Categorization of OLAP Tools** *– State of the Market – OLAP Tools and the Internet.

UNIT V

[15 Hrs]

Data warehousing: Introduction – Data Warehousing Components – Overall Architecture – Data Warehouse Database – Sourcing, Acquisition, Cleanup, and Transformation Tools – Metadata – Access Tools – Data Marts – Data Warehouse Administration and Management – Information Delivery System.

Building a Data Warehouse: Business Considerations: Return of Investment – Design Considerations – Technical Considerations – Implementation Considerations – Integrated Solutions – Benefits of Data Warehousing.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Alex Berson ,Stephen J.Smith “Data Warehousing, Data Mining & OLAP” Tata McGraw Hill, 2004
2. Jiawei Han and Micheline Kamber ,“Data Mining Concepts and Techniques”, Morgan Kaufman Publishers, Second Edition, 2008
3. Reema Thareja, “Data Warehousing”, Oxford University Press, First Edition, 2009.

PCS28

SEMESTER III

17PCS3Z1

MINI PROJECT

MINI PROJECT & VIVA VOCE

Evaluated by both Internal and External examiners

Guidelines to the distribution of marks:

1. CIA -15 marks
2. ESE -60 marks*

* Project record-45 and viva voce-15

C.Pr.5 OPEN SOURCE LAB

1. Designing with Javascript
 2. Designing web site using PHP
 3. Database Application using PHP/ MySQL
 4. Searching and sorting using Eclipse IDE
 5. Application using PHP, MySQL and Apache
-

Guidelines to the distribution of marks for Practical Examinations : (Total marks:75)

CIA : Total marks – 30 [Practical – 20, Observation- 5, Attendance – 5]

ESE : Two Questions will be given for each student(3 Hours / 45 Marks)

1. Record Work - 5 Marks
2. Algorithm, Coding and execution – 40 Marks

Particulars	Program 1 (Marks)	Program II (Marks)
Algorithm	5	5
Coding	10	10
Execution & viva voce	5	5

PCS30

SEMESTER III

17PCS3CQ

C.Pr.6 UNIX AND LINUX LAB

1. Bash Shell scripting using VI editor .
2. Korn Shell scripting.
3. Execution of Linux commands.

Guidelines to the distribution of marks for Practical Examinations : (Total marks:75)

CIA : Total marks – 30 [Practical – 20, Observation- 5, Attendance – 5]

ESE : Two Questions will be given for each student(3 Hours / 45 Marks)

1. Record Work - 5 Marks
2. Algorithm, Coding and execution – 40 Marks

Particulars	Program 1 (Marks)	Program II (Marks)
Algorithm	5	5
Coding	10	10
Execution & viva voce	5	5

PCS31

SEMESTER IV

17PCS412

C.P.12 SOFTWARE TESTING

Objective :

On successful completion of the course the students should have learnt the concepts of Software Life Cycle Models, Testing Tools.

UNIT I

[15 Hrs]

Introduction – Software Life Cycle Models : Phases of Software Development – Quality, Quality Assurance and Quality Control – Testing, Verification & Validation – Process Model to represent different phases – **Life Cycle Models***.

Types of testing – White Box Testing: What is White Box Testing? – Static Testing – Structural Testing – Challenges in White Box Testing.

UNIT II

[15 Hrs]

Black box testing : What is Black Box Testing ? – Why Black Box Testing? – When to do Black Box Testing – How to do Black Box Testing?

Integration Testing : What is Integration Testing? – Integration Testing as a Type of testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.

UNIT III

[15 Hrs]

System & Acceptance Testing : System Testing overview – Why is System Testing done? – Functional Vs Non-Functional Testing – Functional System Testing – Non functional System Testing – Acceptance Testing – Summary of Testing Phases.

Performance Testing: Introduction – Factors governing Performance Testing – Methodology for Performance Testing - Tools for Performance Testing – Process for Performance Testing.

PCS27

UNIT IV

[15 Hrs]

Regression Testing : What is Regression Testing? –Types of Regression Testing-When to do Regression Testing? –How to do Regression Testing? –Best practices in Regression Testing.

Testing of Object Oriented Systems : Introduction –**Primer on Object oriented software*** – Differences in OO Testing .

UNIT V

[15 Hrs]

Test planning, Management and Execution : Introduction – Test Planning – Test Management – Test Process – Test Reporting – Best Practices.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. Srinivasan Desikan, Gopalswamy Ramesh, “Software Testing Principles and Practices” , Pearson Education, 2008
2. Boris Beizer , “Software Testing Techniques”, Dream Tech Press, Second Edition, 2004
3. Renu Rajanai , Pradeep Oak, “Software Testing”, Tata Mc Graw Hill, 2004.
1. William Perry, “Effective Methods for Software Testing “, John Wiley & Sons, Third Edition, 2007.

C.Pr.6 SOFTWARE TESTING LAB

List of Practical Programs

- Project representation with UML tools
- Cost Estimation of Developed Applications
- Validation of Applications using Selenium.

Guidelines to the distribution of marks for Practical Examinations : (Total marks:75)

CIA : Total marks – 30 [Practical – 20, Observation- 5, Attendance – 5]

ESE : Two Questions will be given for each student(3 Hours / 45 Marks)

3. Record Work - 5 Marks
4. Algorithm, Coding and execution – 40 Marks

Particulars	Program 1 (Marks)	Program II (Marks)
Algorithm	5	5
Coding	10	10
Execution & viva voce	5	5

PCS34

SEMESTER IV

17PCS4Z2

PROJECT & VIVA VOCE

Evaluated by both internal and external examiners

Guidelines to the distribution of marks:

3. CIA -40 marks
4. ESE -160 marks**

** Project record-120 and viva voce-40

PCS35

KONGUNADU ARTS AND SCIENCE COLLEGE [AUTONOMOUS]

COIMBATORE - 641 029

End Of Semester Examination Question Paper Pattern

[For the candidates admitted from the academic year 2015-2016 and Onwards]

MASTER OF SCIENCE IN COMPUTER SCIENCE

Duration: 3 Hours

Maximum Marks: 75 Marks.

Answer all of the following questions

Section – A 10 x 1 = 10[10 Questions]

(Two multiple choice questions from each unit.)

Section – B 5 x 5 =25

Five questions either or type

(One question from each unit)

Section – C 5 x 8 = 40

Five questions either or type

(One question from each unit)

TOTAL 75 Marks

PCS36

ELECTIVE PAPERS

COMPUTATIONAL INTELLIGENCE

Objectives :

On successful completion of the course the students should have understood the Search space, Neural Networks, Genetic Algorithms and Fuzzy Systems.

UNIT I

INTRODUCTION – ARTIFICIAL INTELLIGENCE : Artificial Intelligence: History and Applications – Production Systems – Structures and Strategies for state space search – Data driven and goal driven search – Depth First and Breadth First Search – DFS with Iterative Deepening – Heuristic Search – Best First Search – A* Algorithm – AO* Algorithm – Constraint Satisfaction – Using heuristics in games – Minimax Search – Alpha Beta Procedure planning.

UNIT II

ARTIFICIAL INTELLIGENCE – REPRESENTATION SCHEMES : Knowledge representation – Propositional calculus – Predicate Calculus – Theorem proving by Resolution – Answer Extraction – AI Representational Schemes – Semantic Nets – Conceptual Dependency – Scripts – Frames – Introduction to Agent based problem solving.

UNIT III

NEURAL NETWORKS : Neural networks (NNs) for machine learning – models of neuron – perceptrons and perceptron learning rule – limitations of perceptrons – Multilayer perceptrons (MLPs) – back propagation learning algorithm – MLPs as classifiers – local minima and overfitting – applications of MLPs – Radial basis functions (RBFs) – interpolation and approximation with RBFs – RBFs *vs.* MLPS – related classical optimization.

UNIT IV

GENETIC ALGORITHM AND EVOLUTIONARY PROGRAMMING : Genetic algorithms: Introduction – genetic Operators – chromosomes – mutations and cross – over – Fitness functions – Evolutionary programming – learning classification systems Multi – agent

PCS37

systems – PCA and SOM with evolutionary computations – Modeling uncertainty – distributions– intervals– fuzzy sets– rough sets– Fuzzy Vs Crisp– membership pas– Fuzzy systems.

UNIT V

EXPERT SYSTEM AND LANGUAGE PROCESSING : Overview of Expert System Technology – Rule based Expert Systems– Introduction to Natural Language Processing – Languages and Programming Techniques for AI – **Introduction to PROLOG and LISP*** – Search strategies and Logic Programming in LISP– Production System examples in PROLOG.

*** Self Study and questions for examinations may be taken from the self study portions also.**

REFERENCE BOOKS:

1. George.F.Luger, “Artificial Intelligence –Structures and Strategies for Complex Problem Solving”, 4th edition, Pearson Education, 2002.
2. E. Rich, K.Knight, “Artificial Intelligence”, 2nd edition, Tata McGraw Hill, 1991 Winston. P. H, “LISP”, Addison Wesley
3. Ivan Bratko, “Prolog Programming for Artificial Intelligence”, 3rd edition, Addison Wesley, 2000
4. A.P. Engelbrecht, “Computational Intelligence”, John Wiley & Sons, 2002.

DIGITAL IMAGE PROCESSING

Objectives : On successful completion of the course the students should have understood Digital Image fundamentals, Image Restoration. Image Compression and Image Segmentation.

UNIT I

Digital Image Processing: The origins of Digital Image Processing-Example that use digital image processing-Fundamental Steps in Digital Image Processing-Components of an Image Processing System

Digital Image Fundamentals: Elements of Visual Perception-Light and the Electromagnetic Spectrum-Image Sensing and acquisition

UNIT II

Digital Image Fundamentals: Image Sampling and quantization-Basic relationship between Pixels-Linear and NonLinear operations-Image Enhancement in the Spatial Domain:some Basic Gray Level Transformations –Histogram processing-Basics of Spatial filtering

UNIT III

Image Restoration: Noise models-Restoration in the Presence of Noise Only Spatial Filtering-Color Image Processing: Color Fundamentals-Color Models-Pseudocolor Image Processing-**Color Transformations***-Color Segmentation

UNIT IV

Image Compression: Fundamentals-Image Compression Models-Elements Of Information Theory-Error-Free compression-Lossy Compression

UNIT V

Image Segmentation: Detection Of Discontinuities-Edge Linking And Boundary Detection-Thresholding: Foundation-The Role of Illumination-Basic global Thresholding-Region-Based Segmentation

* Self study – Questions for examination may be taken from the self study portions also.

PCS39

REFERENCE BOOKS:

1. Rafael C.Gonzalez,Richard E. Woods,"Digital Image Processing", 2nd Edition. Pearson Education,
2. B.Chanda, D.Dutta Majumder,"Digital Image Processing and Analysis", PHI,2003.
3. Nick Efford ,"Digital Image Processing a Practical Introducing using Java", Pearson Education.

BIG DATA ANALYTICS

Objectives: On successful completion of the course the student should

- able to apply Hadoop ecosystem components.
- able to participate data science and big data analytics projects.

Unit - I

What is big data – why big data – convergence of key trends – unstructured data – industry examples of big data – web analytics – big data and marketing – fraud and big data – risk and big data – credit risk management – big data and algorithmic trading – big data and healthcare – big data in medicine – advertising and big data – big data technologies - open source technologies – cloud and big data – mobile business intelligence – Crowd sourcing analytics – inter and trans firewall analytics.

Unit – II

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features.

Unit - III

Hbase – data model and implementations – Hbase clients – Hbase examples – praxis. Cassandra – cassandra data model – cassandra examples – cassandra clients – Hadoop integration. Pig – Grunt – pig data model – Pig Latin – developing and testing Pig Latin scripts. Hive – data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries.

Unit – IV

Introduction to NoSQL – aggregate data models – aggregates – key-value and document data models – relationships– schemaless databases – materialized views – distribution models -peer-peer replication –consistency – relaxing consistency – version stamps – partitioning and combining – composing map-reduce calculations -Document based Database – MongoDB- Introduction- Data Model- Working with data- Replication & Sharding- Development.

PCS41

Unit – V

Graph databases Neo4J- Key concept and characteristics-Modelling data for neo4j- Importing data into neo4j-Visualizations neo4j-Cypher Query Language-Data visualization- Creating Visual analytics with Tableau-Connecting your data-Creating Calculation-Using maps-Dashboard-Stories.

REFERENCE BOOKS:

1. Tom White, “Hadoop: The Definitive Guide”, Third Edition ,O’Reilly Media Inc.,2012.
2. Eelco Plugge, David Hows, Peter Membrey, Tim Hawkins “The Definitive Guide to MongoDB”,Apress,2015.
3. Rik Van Bruggen, “Learning Neo4j” Packt Publishing,2014.
4. Daniel G. Murray, “Tableau Your Data!: Fast and Easy Visual Analysis with Tableau Software” 2nd Edition,Wiley Publications,2016.
5. Pramod J. Sadalage, Martin Fowler, “NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence” Pearsons Education,2014.

PCS42

NETWORK SECURITY AND CRYPTOGRAPHY

Objectives

On Successful completion of the course the students should have understood the process of implementing the cryptographic algorithms.

UNIT I

Introduction: The OSI Security Architecture-Security Attacks-Security Services-Security Mechanisms-A model for network security. Classical Encryption Techniques: Symmetric Cipher Model-Substitution technique-Transposition Technique-Rotor Machines-Steganography.

UNIT II

Block Ciphers and the data Encryption Standard: Block Cipher Principles-The Data Encryption Standard-Block Cipher Design Principles. Advanced Encryption Standard: Evaluation Criteria for AES-The AES Cipher.

Public Key Encryption and Hash Functions: Introduction to Number theory-Public Key Cryptography and RSA-Key Management.

UNIT III

Message Authentication and Hash Functions: Authentication Registration-Authentication Functions-Authentication Codes-Hash Functions-Security of Hash Functions and MACs.

Hash and MAC Algorithms: Secure Hash algorithm-Whirlpool-HMAC-CMAC.Digital Signatures-Authentication protocols-Digital Signature Standard.

UNIT IV

Network Security Applications: Authentication Applications-**Electronic Mail Security***-IP Security-Web Security.

PCS43

UNIT V

Intruders-Intrusion Detection-Password Management-Viruses and Related Threats-Virus Counter measures-Firewall Design Principles-Trusted Systems.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOKS:

1. William Stallings, "Cryptography and Network Security Principles and Practices", Fourth Edition PHI 2011
2. Atul Kahate, "Cryptography and Network Security", Third Edition, TMH ,2005.
3. Haribhaskar,"Cryptography and Network Security",Sams Publishers, First Edition 2008.

BIOINSPIRED COMPUTING

Objectives: On successful completion of the course the student should

- able to apply the analysis of data based on optimisation algorithms.
- able to apply artificial intelligence in the field of Research.

UNIT - I

Natural to Artificial Systems – Biological Inspirations in problem solving – Behavior of Social Insects: Foraging - Division of Labor - Task Allocation – Cemetery Organization and Brood Sorting – Nest Building - Cooperative transport.

UNIT - II

Ant Colony Optimization [ACO]: Ant Behavior - Towards Artificial Ants - Combinatorial Optimization - Ant Colony Optimization Metaheuristic – Problem solving using ACO - Extensions of Ant Systems – ACO and Local search methods -ACO theoretical considerations and Convergence.

UNIT - III

Ant Colony Optimization algorithms for NP - hard problems - Routing problems - Assignment problems - Scheduling problems – Subset problems - Machine Learning Problems – ACO for Travelling Salesman problem.

UNIT -IV

Swarm Intelligence: Biological foundations of Swarm Intelligence – Swarm Intelligence in Optimization – Particle Swarms for dynamic optimization problems.

UNIT - V

Biological Inspired computing to Natural Computing – Integration of Evolutionary Computation Components in Ant Colony Optimization – Particle Swarm optimization based on Socio-cognition.

Reference Books:

- 1 . Marco Dorigo, Thomas Stutzle, “Ant Colony Optimization ” , MIT Press, 2004.
2. Eric Bonabeau, Marco Dorigo, Guy Theraulaz, ” Swarm Intelligence: From Natural to Artificial Systems” , Oxford University press, 2000.

PCS45

3. Christian Blum, Daniel Merkle (Eds.), "Swarm Intelligence: Introduction and Applications", Springer Verlag, 2008.
4. Leandro N De Castro, Fernando J Von Zuben, "Recent Developments in Biologically Inspired Computing", Idea Group Inc., 2005

PCS46

ADVANCED COMPUTING

Objectives:

On successful completion of the course the students should have understood the Grammars for Conversational Agent, Natural Language, Linking Syntax and Semantics.

UNIT I

GRID COMPUTING : Grid Computing -The data Centre, the Grid and the distributed/High performance computing –Cluster computing and Grid computing – Meta computing–Scientific, business and E-Governance Grids, web services and Grid computing. Technologies and architecture for Grid computing. World wide Grid Computing Activities, Organizations and projects. Web services and the Service oriented Architecture (SOA).

UNIT II

GRID COMPUTING ARCHITECTURE : OGSA for Resource distribution – Stateful web services in OGSA –Web services Resource Framework(WSRF) – Resource approach to stateful services-WSRF specification – Globus Toolkit. Grid Resource Management system - Grid Security Requirements – **Data management challenges.***

UNIT III

CLUSTER COMPUTING : Approaches to parallel computing –How to achieve low cost parallel computing through clusters – Definition and architecture of a cluster – Cluster Middleware : An Introduction –Levels and layers of single system Image(SSI) –Cluster middleware design objectives –Resource Management and scheduling –Cluster programming environment and tools. Process Scheduling - Load sharing and Load balancing.

UNIT IV

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

PCS47

UNIT V

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

Cloud Computing for the family - Cloud Computing for the Community - Cloud Computing for the Corporation.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCES BOOKS:

1. C.S.R Prabhu, Grid and Cluster computing, Prentice Hall of India,2008. (Units I, II & III)
2. Ian Foster, Carl Kesselman, The Grid 2: Blueprint for a New Computing Infrastructure, Elsevier Series, 2004. (Unit II)
3. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que, 2008. (Units IV & V)

PCS48

GREEN COMPUTING

Objectives: On successful completion of the course the student should

- able to apply Green Compliance and Green Assets.

UNIT I

Fundamentals of Green IT : Business, IT, and the Environment –Green computing: carbon foot print, scoop on power –Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business:Policies, Practices, and Metrics -Approaches to green computing -Middleware Support -Compiler Optimization -Product longevity -Software induced energy consumption -its measurement and rating.

UNIT II

Green Assets and Modeling : Green Assets: Buildings, Data Centers, Networks, and Devices –Green Business Process Management: Modeling, Optimization, and Collaboration –Green Enterprise Architecture –Environmental Intelligence –Green Supply Chains –Green Information Systems: Design and Development Models.

UNIT III

Grid Framework : Virtualizing of IT systems –Role of electric utilities, Telecommuting, teleconferencing and teleporting –Materials recycling –Best ways for Green PC –Green Data center –Green Grid framework.

UNIT IV

Green Compliance and Green Mobile : Socio-cultural aspects of Green IT –Green Enterprise Transformation Roadmap –Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future -Green mobile -optimizing for minimizing battery consumption -Web, Temporal and Spatial Data Mining Materials recycling.

UNIT V

Case Studies : The Environmentally Responsible Business Strategies (ERBS) –Case Study Scenarios for Trial Runs –Case Studies –Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

REFERENCE BOOKS:

1. Bhuvan Unhelkar, "Green IT Strategies and Applications -Using Environmental Intelligence", CRC Press, June 2011.
2. Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", August 2009.
3. Alin Gales, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shoff/IBM rebook, 2011. 2. John Lamb, "The Greening of IT", Pearson Education, 2009.
4. Jason Harris " Green Computing and Green IT Best Practices on Regulations and Industry Initiatives, Virtualization, Power Management, Materials Recycling and Telecommuting", Emereo Publishing,2012.

PCS50

ENTERPRISE WEB SERVICES

Objectives:

On successful completion of the course the student should have understood the concepts of Distributed services, XML and web services

UNIT I

Introduction-Why is it important-Web services and Enterprises-Xml Documents-Namespaces-Xml schema-Implementing schema Types-“any” element-Inheritance-Type declaration Managing Schema-SAX-DOM-XSL-XPath

UNIT II

SOAP &WSDL: SOAP Model-SOAP messages-SOAP Encoding-SOAP RPC-Document-RPC-Literal-Encoded-WSDL-Structure-Binding-Types Element-Services-Managing WSDL Description-Using SOAP and WSDL –Implementation &Deployment-Invoking WebServices

UNIT III

UDDI Business registry-UDDI Specification & Data Structures-Accessing UDDI-Lifecycle Management-Dynamic access point Management. Webservices Conversation language-WSCL Interface Components. **Workflow Management systems***.

UNIT IV

Security: Security is an end-end process-Web Services security issues-Types of security attacks and threats-WS security roadmap-WS security.

Quality of Service - QOSmetrics- What are holes?-Design Pattern and practices-Building Qos into Webservices.

UNIT V

Mobile WebService-Direct Mobile Webservice Access-J2ME Webservices –Portals:WSRP and WSIA Specifications-Building portals with WSRP-Deploying services. **Case study** Real World webservice application development: Enterprise Procurement-System functionality and architecture-Running EPS application.

* Self study – Questions for examination may be taken from the self study portions also.

PCS51

REFERENCE BOOKS:

1. Sandeep Chaterjee and James Webber-“Developing Enterprise Webservices-An architect’s guide Pearson Education 2009
2. Ron Schmalzer, Travis Vandersypen, Jason Bloomberg, et al, “XML and Web Services Unleashed”, Pearson Education, 2008
3. Eric New Comer, “Understanding Web Services: XML, WSDL, SOAP and UDDI”, Addison-Wesley, USA, 2002.

PCS52

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

Objectives

On Successful completion of the course the students should have

- Understood the AI & Expert Systems.
- Learnt the Heuristic techniques and reasoning

UNIT I

Introduction: AI Problems - AI techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems - Problem Characteristics - Issues in design of Search.

UNIT II

Heuristic Search techniques: Generate and Test - Hill Climbing- Best-First, Problem Reduction, Constraint Satisfaction, Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations -**Issues in Knowledge representations*** - Frame Problem.

UNIT III

Using Predicate logic: Representing simple facts in logic - Representing Instance and Isarelationships - Computable functions and predicates - Resolution - Natural deduction. Representing knowledge using rules: Procedural Vs Declarative knowledge - Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.

UNIT IV

Statistical reasoning – Knowledge representation –Planning– Understanding.

UNIT V

Learning – Common sense – Perception and Action – Expert System.

* Self study – Questions for examination may be taken from the self study portions also.

REFERENCE BOOK :

1. Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 2002.
2. George F Luger, "Artificial Intelligence",4th Edition, Pearson Education Publ,2002.

PCS53

DISTRIBUTED SYSTEMS

Objective:

On successful completion of the course the students should have learnt the concepts of Distributed Processing, Database, Client/Server Network Model.

UNIT I

Introduction: Definition – Goals - Hardware concepts - Software concepts - The Client /Server model.

UNIT II

Communication: Layered Protocols - Remote Procedure Call - Message Oriented Communication - Stream Oriented Communication.

UNIT III

Naming: Naming Entities – Locating Mobile Entities. Synchronization: Clock Synchronization - Logical Clock - Global State.

UNIT IV

Consistency and Replication: Introduction - Data Centric Consistency model - Client Centric Consistency model - Consistency Protocols.

UNIT V

Fault Tolerance: Introduction - Process Resilience - Reliable client/Server Communication-Recovery.

Security: Threats - Policies and Mechanism – **Authentication*** – Firewall.

* Self study – Questions for examination may be taken from the self study portions also.

PCS54

REFERENCE BOOKS:

1. Tanenbaum,A.S & Van Steen M, “Distributed System”, Prentice Hall,2002.
2. Coulouris G.F,Dollimore J.B & Kind Berg,T, “Distributed System:Concepts and Design”, 4th Edition, Addison Wesley,2005.
3. William Buchanan, “Distributed System and Networks”, McGraw Hill, 2000.

PCS55

VIRTUAL REALITY

Objective :

On successful completion of the course the students should have learnt the concepts of Virtual Environment, 3D Computer Graphics, Physical Simulation, VR Hardware and Software

Unit-I

Virtual Reality and Virtual Environments: Introduction –Computer Graphics –Real-time computer Graphics –Flight Simulation –Virtual Environment –Benefits of Virtual Reality–Historical Development of VR: Scientific Landmarks

Unit-II

3D Computer Graphics: Virtual world Space –Positioning the Virtual Observer –The Perspective Projection –Human Vision –Stereo Perspective Projection –3D Clipping –Color Theory –Simple 3D Modeling –illumination, reflection Models-Shading Algorithms –Radiosity –Hidden surface removal –realism-stereographic Images Geometric Modeling: 3D Space Curves –3D boundary representation –other modeling strategies –Geometrical Transformations: Frames of reference – Modeling –Instances –Picking, Flying, scaling –Collision detection.

Unit-III

Unit -III Generic VR System: Virtual Environment –computer environment –VR technology – Models of Interaction –VR Systems –Animating the Virtual Environment: The Dynamics of numbers –animation of objects –Shape and object i n between –Free-form deformation –Particle Systems

Unit -IV

Physical Simulation: Objects Falling in a gravitational field –Rotating wheels –ElasticCollisions – Projectiles –Simple Pendulums –Springs –Flight dynamics of an aircraft. Human Factors: The eye – the ear –The Somatic senses –Equilibrium.

PCS56

Unit -V

VR Hardware: Sensor Hardware –Head-Coupled display s –Acoustic Hardware –IntegratedVR Systems –VR Software: Modeling Virtual World –Physical Simulation –VR Tool Kits–VR Applications: Engineering–Entertainment –Science –training –The Future: Virtual Environments – Modes of Interaction.

Reference Books:

1. John Vince, “Virtual Reality Systems”, Pearson Education Asia, 2001

PCS57

EMBEDDED SYSTEMS

Objective :

On successful completion of the course the students should have learnt the concepts of Interrupts, RTOs, Software Lifecycle

Unit -I

Hardware Fundamentals: Terminology -Gates-Timing Diagrams-Memory Advanced Hardware Fundamentals: Microprocessors-Microprocessor architecture-Direct Memory Access-Conventions and Schematics-Introduction to embedded systems: An embedded system-Processor in the system-Exemplary embedded systems.

Unit-II

Interrupts and Software Architecture Interrupts: Interrupt basics-Interrupt service routines Survey of Software Architectures: Round Robin with interrupts-Function-Queue-Scheduling Architecture-Real Time Operating Systems Architecture Introduction to Real Time Operating Systems: Selecting in RTOS-Tasks and Task States-Tasks and Data-Semaphores and shared data.

Unit -III

Concepts of RTOS More Operating System Services: Interrupt process communication-Message queues-Mailboxes and pipes-Timer functions-Events-Memory management-interrupt routines in an RTOS environment Basic design using a Real Time Operating System: Principles-encapsulating semaphores and queues-hard real time scheduling considerations-saving memory space and power-introduction to RTL & QNX.

Unit -IV

Embedded software life cycle and tools: Embedded software Lifecycle - Software Algorithm complexity-Software development process life cycle and its models. Software development tools: development tools-hosts and target machine-linker/locators for embedded software-getting embedded software into the target machine Debugging techniques: testing on your host machine-instruction set simulators-the asset macro-using laboratory tools.

Unit -V

Case Study

PCS58

Reference Books:

1. David E. Simon, "An embedded system primer", Addison Wesley-2001
2. Raj Kamal, "Embedded Systems architecture, programming and design", Tata McGraw Hill Publishing Company Ltd., New Delhi 2003.

PCS59

ADVANCED LEARNERS COURSE (ALC)

SEMESTER II

15PCS0D1

ALC. 1 PROGRAMMING IN C #

Credit Points: 4

UNIT I

Basic Elements of C #: .Net frame work – C # language – Features – Character set – Lexical elements - Escape sequence – Identifiers – Keywords – Concepts of data – Operators – Punctuators – Primitive data types – Preprocessing Directives.

UNIT II

C# Program Structure: Program Structure – Methods – Instance – new operator – Member access – Invoking a method – Parameter Types - Constructor – Destructor – Default Constructor – this reference – Access Modifiers – Static members – Formatted method – Header of main method – Enumeration operators types – type conversion – Merging of String - is operator – Checked & unchecked operator.

UNIT III

Statements: Classification – Expression – Control Flow – Block – Declaration – Empty – Exception – Lock – Labeled – Checked & unchecked. Arrays: Regular & Jagged Arrays – Two & Three dimensional arrays – Local Arrays - Features of arrays – System Arrays – Passing array as a parameter – Application of arrays – Recursive methods – Structure – Nested Structures.

UNIT IV

Inheritance: Introduction – Types - .Net building blocks – Name Hiding – Virtual and override methods – Dynamic binding – Abstract method & class –

Advantages. Interface and Operator overloading: Interface – Declaration of Interface – Polymorphism of Interface – Operator overloading – method overloading – Collection Interfaces – Variable method Interfaces list.

PCS60

UNIT V

File Operations and Multithreading: Stream – File management – File operations – Multitasking – Multi threading – Operation of threads - Secondary threads – Synchronization.

REFERENCE BOOK:

1. S.Thamarai Selvi, R.Murugesan, **“A Text Book on C# A systematic approach to Object Oriented Programming”**, Pearson Education, first Edition 2003. [UNIT I to V]

PCS61

SEMESTER III

15PCS0D2

ALC. 2 J2EE

Credit Points: 4

UNIT-I

J2EE and J2SE - The Birth of J2EE - Databases - The Maturing of Java - Java Beans and Java Message Service - Why J2EE? J2EE Multi-Tier Architecture - J2EE Best Practices - J2EE Design Patterns and Frameworks.

UNIT-II

J2EE FOUNDATION - Java servlets - Java Server Pages

UNIT-III

Enterprise JavaBeans - JavaMail API - Java Interface Definition Language and CORBA.

UNIT-IV

Java Remote Method Invocation - Java Message Service – Security - Java Naming and Directory Interface API

UNIT-V

WEB SERVICES - SOAP - Universal Description, Discovery, and Integration (UDDI) - Electronic Business XML - The Java API for XML Registries (JAXR) - Web Services Description Language (WSDL)

REFERENCE BOOKS:

1. James Keogh, **“J2EE - The complete Reference”**, Mc-Graw Hill, 2002.
2. Stephanie Bodoff, Eric Armstrong, Jennifer Ball, Debbie Bode Carson, Ian Evans, Dale Green Kim, Haase Eric Jendrock, **“ The J2EE Tutorial”**, Second Edition, Pearson Education, 2004.