

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

MASTER OF COMPUTER SCIENCE IN COMPUTER SCIENCE

(M.SC CS)

SYLLABUS 2015-16

NEHRU MEMORIAL COLLEGE [AUTONOMOUS]

MASTER OF SCIENCE[COMPUTER SCIENCE] FROM 2015-2016

Course	Course Code	TITLE	HRS	CREDIT	CIA	EE	TOTAL
Semester - I							
CC-I	15PS101	Automata Theory	6	5	40	60	100
CC-II	15PS102	Operating System	6	5	40	60	100
CC-III	15PS103	Data Base System	6	5	40	60	100
CC-IV	15PS104	Object Oriented analysis And Design	6	5	40	60	100
CC-V	15PS105L	Lab-I-Software Lab(OS & Data Base Design)	6	4	40	60	100
Semester - II							
CC-VI	15PS206	Programming Using Java	4	4	40	60	100
CC-VII	15PS207	Data Structures And Algorithms	4	4	40	60	100
CC-VIII	15PS208	Principles of Wireless And Mobile Network	4	4	40	60	100
CC-IX	15PS209L	Lab-II- based on CC-VI,CC-VII&CC-VIII	6	4	40	60	100
CEC-I	15PS210a	Data Mining And Data Ware Housing					
	15PS210b	Grid Computing	6	4	40	60	100
	15PS210c	Software Project Management					
OEC	15PS211a	Web Application Architecture					
	15PS211b	Web Technology	6	4	40	60	100
	15PS211c	Haskell Programming					
Semester - III							
CC-X	15PS312	Microprocessor And Microcontroller	4	4	40	60	100
CC-XI	15PS313	Principles Of Compiler Design	4	4	40	60	100
CC-XII	15PS314	Distributed Programming Using J2EE	4	4	40	60	100
CC-XIII	15PS315	Graphics And Human Computer Interaction	6	4	40	60	100
CC-XIV	15PS316L	Lab - III -based on CC-X,CC-XI & CC- XII	6	4	40	60	100
CEC-II	15PS317a	Cloud Computing					
	15PS317b	Service Oriented Architecture	6	4	40	60	100
	15PS317c	Software Testing					
Semester - IV							
CEC-III	15PS418a	Big Data Analytics					
	15PS418b	Network Security	6	4	40	60	100
	15PS418c	Rapid Application Development Using Python					
CEC-IV	15PS419a	Machine Learning					
	15PS419b	Pervasive Computing	6	4	40	60	100
	15PS419c	Software Quality Assurance					

NEHRU MEMORIAL COLLEGE [AUTONOMOUS]						
MASTER OF SCIENCE[COMPUTER SCIENCE] FROM 2015-2016						
Code	TITLE	HRS	CRE	CIA	EE	TOTAL
Semester - I						
CC-I	Graph And Automata Theory	6	5	40	60	100
CC-II	Operating System	6	5	40	60	100
CC-III	Data Base System	6	5	40	60	100
CC-IV	Object Oriented analysis And Design	6	5	40	60	100
CC-V	Lab - I - based on CC-II,CC-III & CC-IV	6	4	40	60	100
Semester - II						
CC-VI	Programming Using Java	4	4	40	60	100
CC-VII	Data Structures And Algorithms	4	4	40	60	100
CC-VIII	Principles of Wireless And Mobile Network	4	4	40	60	100
CC-IX	Lab-II- based on CC-VI,CC-VII&CC-VIII	6	4	40	60	100
	Data Mining And Data Ware Housing					
CEC-I	Grid Computing	6	4	40	60	100
	Software Project Management					
	Web Application Architecture					
OEC	Web Technology	6	4	40	60	100
	Haskell Programming					
Semester - III						
CC-X	Microprocessor And Microcontroller	4	4	40	60	100
CC-XI	Principles Of Compiler Design	4	4	40	60	100
CC-XII	Distributed Programming Using J2EE	4	4	40	60	100
CC-XIII	Graphics And Human Computer Interaction	6	4	40	60	100
CC-XIV	Lab - III -based on CC-X,CC-XI & CC- XII	6	4	40	60	100
	Cloud Computing					
CEC-II	Service Oriented Architecture	6	4	40	60	100
	Software Testing					
Semester - IV						
	Big Data Analytics					
CEC-III	Network Security	6	4	40	60	100
	Rapid Applicaton Development Using Python					
	Machine Learning					
CEC-IV	Pervasive Computing	6	4	40	60	100
	Software Quality Assurance					
CC-XV	PROJECT	18	10	40	60	100
	TOTAL	120	90			2000

Course	Code	Automata Theory	Sem	Hrs	Cre
CC-I	15PS101		I	6	5

Objectives:

- To learn the basics of automata theory
- To understand Finite State Automata and Regular Expressions
- To study Context free grammars and various normal forms
- To impart knowledge in Push down Automata, Turing Machine and Chomsky Hierarchy

Unit - I

Introduction: Strings, alphabets and languages – Graphs and Trees- Inductive proofs – Set notation – Relations

Unit - II

Finite Automata and regular expressions: Finite State Systems: Basic definitions - Non-Deterministic Finite Automata - Finite Automata with epsilon moves-Regular Expressions Applications of Finite Automata.

Unit - III

Context Free Grammars: Motivation and Introduction - Context- Free Grammars – Derivation-Trees – Simplification of Context free grammar - Chomsky Normal Form - Greibach Normal Form -The Pumping Lemma for CFL's – Closure properties of CFL's

Unit - IV

Push Down Automata: Definitions – Pushdown automata and context free languages-Turing machines: The Turing machine model – Computable languages and functions – Techniques for Turing machine construction – Modifications of Turing machines.

Unit - V

The Chomsky Hierarchy: Regular Grammars – Unrestricted grammars – Context Sensitive languages – Relation between classes of languages

Book for Study:

John E.Hopcroft& Jeffery D.Ullman, "*Introduction To Automata Theory, Languages and Computation*", Narosa Publishing House, New Delhi,1997,ISBN 81-

Books for Reference:

1. Motwani R and J .D. Ullamn, "*Introduction to Automata Theory, Languages and Computation*", Pearson Education Asia, 2nd Edition.
2. Peter linz, "*An Introduction to formal language and automata*", Third edition, Narosa publication.

Course	Code	Operating System	Sem	Hrs	Cre
CC-II	15PS102		I	6	5

Objectives:

- To introduce the underlying principles of an operating system
- To explore processor, memory, I/O and device management concepts
- To expose the architecture and features of distributed, embedded and mobile operating systems

Unit I:

Operating Systems Overview: Operating Systems objectives and functions- The evolution of OS - **Process Description and Control:** Process states - process description - process control.

Unit II:

Concurrency: Mutual Exclusion and Synchronization: Principles of concurrency - Mutual Exclusion: Software support - Hardware support - Semaphores - Monitors - Message Passing - Reader/Writer problem. **Deadlock and Starvation:** Principles of deadlock - Deadlock prevention - avoidance - detection - Dining Philosophers problem.

Unit III:

Memory Management: Requirements - Memory partitioning - Paging - Segmentation - **Virtual Memory:** Hardware and Control structures - OS software - **Scheduling:** Types of scheduling - Scheduling algorithms.

Unit IV:

I/O Management and Disk Scheduling: I/O devices - Organization of I/O function - OS design issues - I/O buffering - Disk scheduling - Disk cache - **File Management:** Overview- File organization - directories - sharing - Record blocking - Secondary storage management.

UNIT V:

Distributed Processing, Client/Server & Clusters: Client/Server computing - Distributed message passing - **Embedded OS:** Embedded systems- Characteristics of embedded OS - **iOS and Android:** Apple iOS developers - iOS architecture and SDK framework.

Books for Study:

William Stallings, "***Operating Systems, Internals & Design Principles***", 6th Edition, Prentice Hall, 2010 (Unit I- 2,3 Unit II- 5,6 Unit III-7,8,9 Unit IV- 11,12 Unit V- 13,16).

Neil Smyth, "***iPhone iOS 4 Development Essentials - Xcode***", 4th Edition, Payload Media, 2011 (Unit V- 2,5).

E-Reference: www.ebookfrenzy.com/pdf_previews/iPhoneiOS6EssentialsPreview.pdf

Reference Books:

Mukesh Singhal and Niranjan G. Shivaratri, "***Advanced Concepts in Operating Systems - Distributed, Database, and Multiprocessor Operating Systems***", Tata McGraw-Hill, 2001.,ISBN 007057572X, 9780070575721.

Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "***Operating System Concepts***", Seventh Edition, John Wiley & Sons, 2004.

Course	Code	Data Base System	Sem	Hrs	Cre
CC-III	15PS103			I	6

Objectives:

- To understand relational data model.
- To develop and refine the conceptual data models, entities and attributes.
- To apply normalization techniques.
- To learn distributed database.

Unit-I:

Introduction to Database Systems: Overview - File Systems versus a DBMS - Advantages of a DBMS - Describing and Storing Data in a DBMS - Queries in a DBMS - Transaction Management - Structure of a DBMS. **Conceptual Design and the ER model:** Overview of Database Design – Entity Relationship Data Model - Additional Features of the ER Model-Conceptual Design using ER Model - Conceptual Design for Large Enterprises –**Relational Algebra and Calculus:** Relational algebra – relational calculus.

Unit-II:

SQL: The Query Language -The Form of a Basic SQL Query-union, intersect, except - Nested Queries-Aggregate Operators-Null Values-Embedded SQL-Cursors-Dynamic SQL-**Security, Views, and SQL:** Introduction to database security-views-Acess control-Directory access control-Mandatory access control-Additional issues related to security.

Unit-III:

Database Design: Relational – First normal form – Functional dependencies – Decomposition – Boyce-codd normal form – Third Normal Form – Fourth normal form - More normal forms.

Unit-IV:

Transactions Concepts: Transaction state – concurrent execution – serializability – recoverability – testing for serializability. **Concurrency Control:** Lock based protocols – timestamp based protocols – validation based protocols – Deadlock Handling.

Unit-V:

Data base System Architecture: Centralized and client server architecture – server system architecture – parallel systems – Distributed systems - Network types. **Distributed Database:** Distributed data storage - distributed transactions – commit protocols – distributed query processing.

Books for study:

Raghu Ramakrishnan and Johannes Gehrke “**Database Management System**”, McGraw Hill publication, 2nd Edition, 2002, ISBN: 0-07-246535-2 (Unit I & II).

C.J.Date, “**An Introduction to Database system**”, Addison Wesley publication, 7th edition, 2000, ISBN: 81-7808-231-4 (Unit III).

Henry F.Korth and Abraham Silberschatz, “**Database System concepts**”, 4th Edition McGraw Hill, 2002, ISBN: 0-07-120413-X (Unit IV & V).

Books for Reference:

Bepin C.Desai, “**An Introduction to Data base system**”, Galogotia publications Private limited.

Ivan Bayross, “**SQL and PL/SQL**”, BPB Publications, New Delhi.

Course	Code	Object Oriented Analysis and Design	Sem	Hrs	Cre
CC-IV	15PS104		I	6	5

Objectives

- Understand the basic steps of OOAD.
- Gain practical knowledge in the UML diagrams and notations.
- Build an object-oriented model for a project using UML.

Unit I: FUNDAMENTALS : An Overview of Object Oriented Systems Development –Object Basics– Object Oriented Systems Development Life Cycle.

Unit II: OBJECT ORIENTED METHODOLOGIES

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: OBJECT ORIENTED ANALYSIS

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

Unit IV: OBJECT ORIENTED DESIGN

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

Unit V: SOFTWARE QUALITY AND USABILITY

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.
ISBN-13: 978-0-07-026512-7
2. Martin Fowler, “*UML Distilled*”, Third Edition, Pearson Education, 2002.
ISBN 0-321-19368-7

Books for Reference:

1. R.Stephen Schach, “*Introduction to Object Oriented Analysis and Design*”, Tata McGraw Hill, 2003.ISBN: 9780070612044.
2. James Rumbaugh, Ivar Jacobson, Grady Booch, “*The Unified Modeling Language Reference Manual*”, Second Edition with c/d, Addison Wesley, 1999.
ISBN: 9780070612044.
- 3.Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, “*UML Toolkit*”, OMG Press Wiley Publishing Inc., 2004.,SBN: 978-0-471-46361-0

Course	Code	S/W Lab-I (OS & Database Design)	Sem	Hrs	Cre
CC -V	15PS105L		I	6	4

OS LAB

Command Simulation (ls, grep, cp, cat, rm)

Processor Management

Process Scheduling (FCFS, SJF, Priority, Round robin)

Interprocess Communication (Shared Memory, Producer-Consumer problem)

Programming with Semaphores

Memory Management

First Fit, Best Fit algorithms

FIFO Page Replacement algorithms

LRU Page Replacement algorithms

Information Management

File System Calls (open(), read(), write())

Disk Scheduling algorithms (FCFS, SSTF, SCAN algorithm)

Data Base Design Lab

Student Information System

Employee Payroll System

Inventory Control System

ATM Processing System

Banking System

Do the following database design activities.

Find entity set and attributes.

Apply normalization.

Design ER model.

Implement the system using proper SQL queries.

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Course	Code	Programming Using JAVA	Sem	Hrs	Cre
CC-VI	15PS206			II	4

Objectives:

- To provide an exposure on network programming in Java, how to interface with swing, the basic database connectivity, how to develop client-server programming model using servlets and JSP and also deals with component programming using Java beans.

Unit I:

Networking Basics - Socket Programming - Proxy server - TCP/IP Sockets - Net address-datagrams.

Unit II:

Introducing Swing: swing- components and containers - the swing packages - Exploring Swing: JLabel and ImageIcon - JTextField - The Swing Buttons - JTabbed Pane - JScroll Pane - JComboBox - Trees- JTable.

Unit III:

Java Database Connectivity: JDBC Architecture - Installing the ODBC Driver - Connecting to a Database - Structured Query language. JDBC programming concept: Database URL— Executing the action commands - Query with JDBC - Populating a Database - Executing Queries - Metadata - Scrollable and Updatable Result Sets.

Unit IV:

Servlets: A simple Servlets - The servlet API - Servlet Package - Handling HTTP Request and Response. JSP: Evolution of the Web Application- Overview of the HTTP - Introduction to Servlets- JSP Overview- JSP syntax and semantics- Expressions, scriptlets and Declarations.

Unit V:

Bean Development Kit - Jar Files - Introspection - Design Pattern for properties, events and methods - Constrained Properties - Persistence

Books for Study:

1. Herbert Schildt, "**The Complete Reference Java**", Tata McGraw Hill Publishing Company Limited, Edition 7, 2007, ISBN: 9780070636774 .
2. Cays Horstmann and Gary Cornell, "**Core Java**", Volume II, Pearson Edition, 2001, ISBN: 978-0137081899 and 978-0137081608
3. Phil Hann, "**JSP 2.0: The Complete Reference**", Tata McGraw Hill Publishing Company Limited, Edition 2, 2003, ISBN-10: 0072224371; ISBN-13: 978-0072224375

Course	Code	Data Structures and Algorithms	Sem	Hrs	Cre
CC-VII	15PS207		II	4	4

Objectives:

- To introduce the concepts of algorithm and its analysis
- To imbibe the knowledge of performance analysis
- To give the clear view of Trees, Graphs and Heaps
- To elaborate the concepts of algorithm design techniques

Unit I:

Performance Analysis: Space Complexity: Components of Space Complexity – Examples – Time Complexity: Components of Time Complexity – Operation Codes – Asymptotic Notation: Big-Oh Notation – Omega and Theta Notations – Performance Measurement: Choosing instant size – Developing test data – Setting up the experiment.

Unit II:

Binary Search Trees: Definitions: Binary Search Trees – Indexed Binary Search Trees – Abstract Data Types – Binary Search Tree Operations and Implementations – AVL Trees – Red Black Trees – Splay Trees – B Trees.

Unit III:

Heaps: Definitions – Insertion into a Max Heap – Deletion from a Max Heap – Max Heap Initialization – The Class MaxHeap – Applications: Heap Sort – Machine Scheduling – Huffman Codes – Graphs: Definitions – Applications and more definitions – Properties – The ADT Graph – Representation of Unweighted Graphs – Representation of Weighted Graphs – Graph Search Methods – Applications: Spanning Trees.

Unit IV:

The Greedy Method: Optimization Problems – The Greedy Method – Applications: Single Source Shortest Paths – Divide and Conquer: The Method – Applications: Merge Sort.

Unit V :

Dynamic Programming: The Method – Applications: All-Pairs Shortest Paths – Backtracking: The Method – Traveling Salesperson.

Books for Study:

1. Sartaj Sahni, “Data Structures, Algorithms and Applications in JAVA”, Second Edition, Reprinted 2014, Universities Press (India) Private Ltd., Hyderabad, India.

Books for References:

- Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, “Data Structures and Algorithms”, Third Impression, 2008, Pearson Education, Dorling Kindersley (India) Pvt. Ltd.
- Narasimha Karumanchi, “Data Structures and Algorithms Made Easy”, Second Edition, CareerMonk Publications.
- Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, “Fundamentals of Data Structures in C++”, Second Edition, Reprinted 2013, Universities Press (India) Private Limited.

Course	Code	Principles of Wireless and Mobile	Sem	Hrs	Cre
CC-VIII	15PS208	Network	II	4	4

Objectives:

- Understand the basic concepts of Personal Communication Services(PCS) principles and fundamentals.
- Be exposed to the required Operations Mobility Management and handoff Management.
- Learn the design of the IS-41,CDPA.
- Be familiar with GSM networks functionalities.
- To understand the 3G and Paging Systems.

Unit I:Network Planning

Introduction – wireless network Topologies – Cellular Topology – Cell Fundamentals – Signal-to-Interference Ratio Calculation-Network Planning for CDMA Systems.

Unit II:Wireless Network Operation

Introduction – Mobility Management – Radio Resources and Power Management – Security in Wireless Networks

Unit III:Wireless WANS

what is GSM – Mechanisms to Support a Mobile Environment – Communication in Infrastructure – CDMA – IMT-2000 – GPRS and Higher Data rates – short Message service in GSM – Mobile Application Protocols

Unit IV:Local Broadband and Adhoc networks

IEEE 802.11 – PHY layer – MAC Sublayer -Wireless ATM – HIPERLAN – HYPERLAN-2 - IEEE 802.15 WPAN-HomeRF-Bluetooth-Interference between Bluetooth and 802.11

Unit V: Wireless Geolocation System

What is wireless Geolocation – Wireless geolocation System Architecture – Technologies for Wireless Geolocation – Geolocation standards for E-911 Services – Performance Measures for geolocation Systems.

Book for Study:

1.Kaveh Palavan, Prashant Krishnamoorthy , *Principles of Wireless Networks*, Eastern Economy Edition,2002,ISBN- 81-203-2380-7 (Chapter 5,6,7,8,9,11,12,13,14 only),ISBN: 978-0-470-69708-5

Books for Refernces :

1. Jochen Schiller, *Mobile Communications*, Second Edition, Pearson Education, Ltd., 2003 ISBN81-2. 297-0350-5.
2. T.S. Rappaport, *Wireless Communications: Principles and Practice* , Second Edition, Prentice Hall, 2002,ISBN: 9780130422323 ..

Course	Code	S/W LAB - II(JAVA& Data Structures)	Sem	Hrs	Cre
CC-IX	15PS209L			II	6

Cycle -I

1. Implementation of Swing

- a. JTabbedPane
- b. JTree
- c. JTable

2. Java Database Connectivity

3. Socket Programming

4. TCP/IP Programming

5. Datagram Programming

Cycle -II

1. Binary Search Tree

- a. Creation/Insertion
- b. Inorder display
- c. Searching an element
- d. Removing an unwanted element

2. AVL Tree

- a. Creation/Insertion
- b. Inorder display
- c. Searching an element
- d. Removing an unwanted element

3. B Tree: Searching

- a. Creation/Insertion
- b. Inorder display
- c. Searching an element
- d. Removing an unwanted element

4. Max Heap Application: Heap Sort

5. Graph: Breadth-First Search

6. Graph: Depth-First Search

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Course	Code	Microprocessor and Microcontroller	Sem	Hrs	Cre
CC-X	15PS312			III	4

Objectives:

- To learn the basic architecture of 8086 microprocessor and also about assembly language programming. The students also learn the concept 8051 microcontroller.

Unit-I: 8086 Microprocessor

Pin description of 8086 – minimum and maximum mode signals – Architecture – Register organization Bus interface unit Execution unit – interrupts – addressing modes. 10

Unit-II: Instruction and simple programs

8086 instruction set - data transfer instructions – arithmetic, logical, branching and string manipulation instructions – Addition – sum of N numbers-Multibyte addition-subtraction multiplication –division-biggest and smallest numbers program using data transfer. 15

Unit-III: 8051 Microcontroller Architecture

Microprocessor and Microcontrollers— 8051 Architecture – Microcontroller Hardware - Program and Data Memory – External memory – Counters timers – Serial data I/O - interrupts 10

Unit-IV: 8051 Microcontroller instructions and simple programs

Addressing modes –Instructions – data transfer instruction – logical – arithmetic – jump and call instructions bit manipulation – Addition –sum of N numbers , - Multibyte addition - subtraction – multiplication – division and smallest numbers. 10

Unit -V: Application of 8051 Microcontroller

Interfacing–Data acquisition system–D/A converter – A/D converter – pulse measurement– Temperature measurement - Pressure measurement - Stepper motor interfacing–Traffic light problem-water level indicator- Seven segment display interfacing. 15

Books for Study:

- 1) Yu-Chengliu, Glenn A.Gibson, " *Micro Computer System: The 8086/8088 family Architecture, Programming and Design*",Prentice Hall of India, New Delhi. 2004(UNIT I, II) ISBN 10: 0135809444
- 2) Kenneth J.Ayala,"*The 8051 Microcontroller , Architecture, Programming and Applications*", Thomson Delmar Learning (ISE) 2004[UNIT III&IV],ISBN-13:978-1401861582
- 3) Lecture Notes on Microcontroller Applications, Department of Applied Physics, Nehru Memorial College, Puthanampatti. [UNIT V]

Book for Reference:

- 1) Badri Ram,"*Advanced Microprocessor and Interfacing*",Tata McGraw Hill Publishing Company Ltd., New Delhi., 2002
- 2) Muhammad Ali Mazidi, Janice Gillispie Mazidi,"*The 8051 Microcontroller and Embedded System*", Pearson Education, 2004

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Course	Code	Principles of Compiler Design	Sem	Hrs	Cre
CC-XI	15PS313			III	4

Objectives:

- To introduce the various phases of a compiler and also to develop skills in designing a compiler

Unit-I: Introduction to compilers – compilers and translators – assembly language – macros – structure of compiler – compiler writing tools – bootstrapping. Lexical analysis – role of lexical analyzer – regular expression – finite automata – implementation of lexical analyzer – context free grammars – derivation and parse trees. 10

Unit-II: Parsers – shift reduce parsing – operator precedence parsing – top down parsing – predictive parsers – simple precedence parser – LR parsers – constructing SLR parsing tables – constructing canonical LR parsing table – constructing LALR parsing tables – using ambiguous grammars. 20

Unit-III: Syntax directed translation schemes – implementation of syntax directed translation schemes – intermediate code – postfix notation – parse trees and syntax trees – three address code, quadruples and tuples – translation of assignment statements – Boolean expression – postfix translation. 10

Unit-IV: Symbol table – the contents of a symbol table – data structures for symbol tables – Representing scope information–Errors–lexical phase errors–syntactic phase errors– Semantic errors. 10

Unit-V: Code optimization – principle sources of optimization – loop optimization – machine dependent optimization – DAG representation in basic blocks. Code generation – problems in code generation – a simple code generator – register allocations and assignment – Code generation from DAG's – Peephole optimization. 10

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Book for Study:

1) A.V.Aho and J D Ullman *The Principles of Compiler Design* Narosa Publishing House, 1987. (Chapters: 1, 3, 4, 5, 6, 7, 9, 10, 11, 12, 15) ISBN: 8185015619

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Course	Code	Distributed Programming Using J2EE	Sem	Hrs	Cre
CC-XII	15PS314			III	4

Objectives:

- To impart knowledge about the distributed environment, its architecture, application development with RMI, Java Servlets, Java Server Pages, Struts and EJB using J2EE technologies.

Unit – I

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 Server - Client-Server Architecture: Single–two tier–three tier–N-tier Architecture–Distributed Application. 10

Unit – II

Distributed Computing using **RMI: Introduction** - RMI Architecture – RMI Exceptions – Developing Applications with **RMI –RMI with Database** Connectivity.

Java Servlets: Servlet Life Cycle – Generic and HTTP Servlet – Servlet with Database Connectivity- Session Tracking: Hidden Form Fields – URL Rewriting – The Cookie Class – The Session Tracking class. 15

Unit – III

Java Server Pages: JSP Basic Concepts – JSP Elements – Expressions – Scriptlets – Request and Response Objects – Redirection and Forwarding –JSP with Database Connectivity - Session Tracking: Hidden Form Fields – URL Rewriting – The Cookie Class – The Session Tracking class. 10

Unit- IV

The Struts Framework: Introduction - J2EE Platform: J2EE Architecture – Containers – J2EE Technologies: Component – Service – Communication Technologies – Developing J2EE Application. 10

Unit – V

EJB Architecture and Design: Introduction to EJB – The EJB Container and its Services – Working with EJB – Session Bean and Business Logic – Entity Bean and Persistence. 15

Books for Study:

1. Ivan Bayross, “ **Web Enabled Commercial Applications Development using Java 2**”, Edition 2000, BPB Publications,,ISBN 10: 8176563560 ISBN 13: 9788176563567
2. Jason Hunter with William Crawford, “**Java Servlet Programming**”, Shroff Publishers & Distributors Pvt. Ltd, ISBN 1-56592-391-XE
3. Phil Hanna, “**JSP 2.0 The Complete Reference**”, Tata McGraw Hill Publishing Company Limited, ISBN-10: 0072224371; ISBN-13: 978-0072224375 .
4. James Holmes,“**Struts :The Complete Reference**”, Second Edition, Tata McGraw Hill Publishing Company Limited., ISBN: 9780070658455 .
5. Subrahmanyam Allamaraju, “**Professional Java Server Programming - J2EE Edition Volume 1**”, Shroff Publishers & Distributors Pvt. Ltd, ISBN 0-13-015592-6 .

./RA

Course	Code	Graphics and Human Computer Interaction	Sem	Hrs	Cre
CC-XIII	15PS315		IV	6	4

Objectives:

- To study the graphics techniques and algorithms.
- To enable the students to develop their creativity using Output Primitives.
- To study the human components functions and the Computer components functions.
- To Study the Interaction between the human and computer components.

Unit-I:

Output Primitives: Introduction - Line - Curve and Ellipse Drawing Algorithms –Attributes – Two-Dimensional Geometric Transformations. 15

Unit-II:

Two-Dimensional Clipping and Viewing-Three-Dimensional Concepts – Three Dimensional Object Representations – Three-Dimensional Geometric and Modeling Transformations. 18

Unit-III:

Three-Dimensional Viewing–Color models and Color Applications–Computer Animation. 18

Unit IV:

The interaction: Introduction - Models of interaction - Frameworks and HCI - Ergonomics - Interaction Styles - Elements of WIMP interface - Interactivity – The Context of the interaction - Paradigm: Introduction - Paradigms for interaction. 20

Unit V:

Interaction Design basics: Introduction - what is design? - User focus - Scenarios - Navigation design - Screen design and layout - Interaction and prototyping - HCI in the software process: Introduction - The software lifecycle - Usability engineering - Interactive design and prototyping - Design rationale. 19

Books for Study:

1. Donald Hearn and M.Pauline Baker, “*Computer Graphics C Version*”, Pearson Education,2003.(UNIT I : Chapters 1 to 6; UNIT 2: Chapter 9 – 12, 15, 16), ISBN 0-13-530924-7 .
2. Alan Dix, "*Human-computer Interaction*" Pearson Education - 2004., ISBN:0130461091

Books for Reference:

3. Foley, Vandam, Feiner, Huges, “ *Computer Graphics: Principles & Practice*”, Pearson Education, second edition 2003, ISBN-13: 978-0321399526 ISBN-10: 0321399528

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Course	Code	Lab -III	Sem	Hrs	Cre
CC-XIV	15PS316L		III	6	4

Cycle -I

Distributed applications using RMI

- a. Simple RMI application
- b. RMI application with a server and more than one clients
- c. RMI application with Database Connectivity

Cycle -II

Simple Assembly Language Programs in 8086

Designing Lexical analyzer

Cycle—III

Designing Parser

Cycle—IV

I. Implementing Servlet

- i. Servlet with JDBC
- ii. Servlet Session Tracking

II. Enterprise Java Beans

- a. Session Bean
 - i. Stateless Session Bean
 - ii. Stateful Session Beanb.
- b. Entity Bean
 - i. Container Managed Persistence
 - ii. Bean Managed Persistence

Course	Code	Data Mining and Data Warehousing	Sem	Hrs	Cre
CEC-Ia	15PS210a		II	6	4

Objectives:

- To enable students to know about data mining and data warehouse

Course	Code	Grid Computing	Sem	Hrs	Cre
EC-Ib	15PS210b			II	6

Objectives:

To give the learners a brief idea about grid computing and its types and its power to enhance computing power of desk top computer. The learners shall have a bird’s eye view of applications of grid computing

Unit-I:

Grid Computing Technology - An Overview: Grid Computing - Grid Proto cols - Types of Grid - Desktop Grid - Cluster Grid 18

Unit-II:

HPC Grids - Data Grids - The Open Grid Server Architecture 18

Unit-III:

Creating and Managing Grid Services - Desktop Supercomputing - Grid Enabling-Software Applications 19

Unit-IV:

Application Integration - Grid Enabling Network Services - Managing Grid Environments 20

Unit-V:

Grid Computing in Research and Industry - Life Sciences – telecommunications Sectors - Grids in other Industries

Books for Study:

1. Ahmar Abbas, “ Grid Computing – A Practical Guide to Technology and Applications”, Charles River Media Publication.,ISBN : 9781584502760 .

Course	Code	Software Project Management	Sem	Hrs	Cre
CEC-c	15PS210c		II	6	4

Objectives:

To discuss various techniques involved in software project management

Unit-I: Software Management Renaissance

Conventional Software Management – Evolution of Software Economics - Improving Software Economics - The Old Way and the New.

Unit-II: A Software Management Project Management Process Framework

Life-Cycle Phases - Artifacts of the Process - Model-Based Software Architectures - Work Flows of the Process - Check Points of the Process.

Unit-III: Software Management Disciplines

Iterative Process Planning – Project Organizations and Responsibilities - Process Automation.

Unit-IV: Software Management Disciplines

Project Control and Process Instrumentation - Tailoring the Process.

Unit-V: Risk Management

Introduction - Risk - Categories of risk - A framework for dealing with risk - Risk Identification - Risk assessment - Risk planning - Risk management - Evaluating risks to schedule - Applying the PERT technique - Monte Carlo simulation - Critical chain concepts.

Books For Study:

1. Walker Royce, *Software Project Management*, Pearson Education, ISBN:0-201-30958-0.
2. Bob Hughes & Mike Cotterell, *Software Project Management*, McGraw Hill Publications, ISBN-13 978-0-07-712279-9.
3. Joel Henry, *Software Project Management*, Pearson Education, ISBN 9780321223425.
4. Roger S. Pressman, *Software Engineering*, TMH Publications, ISBN-13: 978-0078022128
ISBN-10: 0078022126

Course	Code	Web Application Architecture	Sem	Hrs	Cre
OEC-a	15PS211a		II	6	4

Objectives:

- To make students to have knowledge in web Application Architecture

Unit I

Introduction to Web Application – Application Architectures – Design Patterns – Development environment

Unit II

Rails overview – First Rails App – Version Control – Git on rails – Relational Databases – Databases in rails – The active record design pattern

Unit III

Ruby: Classes and Inheritance – Objects and variables - Strings, Regular Expressions and Symbols - Expressions and Control Structures - Collections, Blocks and Iterators

Unit IV:

Middleware Technologies- HTTP introduction – MVC Design Pattern – Rails controllers – Request and Response handling

Unit V:

Presentation and User Interface : HTML structure-tags-forms – Dynamic content – CSS – introduction to javascript –Introduction to jQuery – introduction to Ajax

Books for Study:

- David Flanagan & Yukihiro Matsumoto, "***The Ruby Programming Language***", O'Reilly.,ISBN-13: 978-0596516178 ISBN-10: 0596516177.

Course	Code	Web Techonology	Sem	Hrs	Cre
OEC-b	15PS211b		II	6	4

Objectives:

To learn the technologies and tools that is essential to create dynamic web site. At the end of the programme the learners could be able to design a simple an interactive web site.

Unit-I:

Web Medium: Core web technologies – Web browsers – Markup Languages – Style Sheet technologies –client side, server side – network and related protocols – Introduction to static, dynamic and active web pages.

Unit-II:

Introduction to HTML – History – Structure of HTML Document – Basic Tags – Images – List – Ordered List and Unordered List –Table Handling.

Unit-III:

Frameset Definition – Nested frameset – Introduction to Forms – Actions attribute – Method Attribute – ENC type attribute – Prop down List – Check boxes – Radio Buttons – Text field – Text area– Password and Hidden files–Submit and Reset button–Designing sample forms.

Unit-IV:

Client Side Scripting: Overview of Java Script – languages constructs – classes and objects – properties and methods – events – functions and parameters – event handling.

Unit-V:

Introduction to AMP: Introduction to the integrated usage of Apache, MySQL, PHP technologies for designing a web page - Overview of PHP – Structure and syntax – Using PHP and MySQL – Creating interactive web page using AMP technologies.

Books for Study:

1. Thomas A Powell, "**Web Design – The Complete Reference**", Tata McGraw- Hill, Second Edition, 2003, ISBN: 0072224429
2. Achyut S Godbole, Atul Kahate, "**Web Technologies – TCP/IP to Internet Application Architectures**",TataMcGraw-Hill,2003.,ISBN: 9780070472983
3. Michael K Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner, "**Beginning PHP, Apache , MySQL Web Development**", Wiley dreamtech press, 2004 edition, ISBN 978-0-7645-5744-6 .
4. Andi Gutmans, Stig Saether Bakken, Derick Rathens, "**PHP 5 Power Programming**", Prentice Hall, 2005.,C.Xavier, "**World Wide Web Design with HTML**", Tata McGraw-Hill, 2000.,, ISBN: 0-07-041186-7

Course	Code	Haskell Programming	Sem	Hrs	Cre
OEC-c	15PS211c		II	6	4

Objectives :

- To make students to have a depth knowledge in Haskell programming

Unit I:

Getting Started – Lists – Strings and Characters – Type System – Function Application – Writing Simple functions – Understanding evaluations – Defining new Data types – Algebraic data types – Pattern matching.

(18)

Unit – II:

Functional Programming – Infix functions – Working with Lists – Think about loops – Lambda functions – Writing a Library – Working with JSON data- Anatomy of Haskell module – Pointing JSON Data.

(18)

Unit –III:

Using Type Classes – Built in Type Class – Type Classes at work – I/O – Classic I/O – Working with files – Lazy I/O – I/O Monad – Buffering.

(19)

Unit – IV:

File processing – Regular Expressions – Pattern matching – Writing Lazy Function – I/O case study – Find – Naïve finding system – Predicates.

(20)

Unit – V:

Data Structures – Association Lists – maps – Monads – Monad type class using new monad – State Monad.

Book for Study:

1. “*Real World Haskell*”, O'Reilly, ISBN:0596514980 9780596514983

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Course	Code	Cloud Computing	Sem	Hrs	Cre
CEC-IIa	15PS317a		III	6	4

Objectives:

- To understand various types of clouds
- To learn cloud computing architecture

To learn Cloud security and its importance to real time applications

Unit I :

Introduction to Cloud Computing: Roots of Cloud Computing - Layers and Types of Cloud – Features of a cloud-Infrastructure Management-Cloud Services-Challenges and Risks. Migrating into a Cloud: Approaches –Seven Step Model. Introduction-Broad Integration as a Service-Integration Methodologies- SaaS. 18

Unit II:

The Anatomy of Cloud Infrastructure- Distributed Management of Virtual Infrastructures- Scheduling Techniques for Advance Reservation of Capacity- RVWS Design – Cluster as a Service: The Logical Design – Cloud Storage : from LANs TO WANs- Technologies for Data Security in Cloud Computing . 18

Unit III:

Collaborating on Project Management: Understanding Project Management - Exploring Project Management Applications - Collaborating on Word Processing: How Web-Based Word Processing Works - Exploring Web-Based Word Processors - Collaborating on Spreadsheets: How Web-Based Spreadsheets Work - Exploring Web-Based Spreadsheets - Collaborating on Databases: Understanding Database Management - Exploring Web-Based Databases - Collaborating on Presentations: Preparing Presentations Online - Evaluating Web-Based Presentation Applications. 19

Unit IV :

Storing and Sharing Files and other online contents: Understanding Cloud Storage - Evaluating Online File-Storage and Sharing Services - Exploring Online Bookmarking Services— Sharing Digital Photographs: Exploring Online Photo- Editing Applications - Exploring Photo-Sharing Communities - Controlling it all with web based Desktops: Understanding Web-Based Desktops - Evaluating Web Based Desktops - Collaborating via web based Communication Tools: Evaluating Web Mail Services - Evaluating Instant Messaging Services - Evaluating Web Conferencing Tools. 15

Unit V:

Grid and Cloud- HPC in the Cloud: Performance related Issues –Data Security in the Cloud- The Current State of Data Security in the Cloud- Homo Sapiens and Digital Information- Risk- Identity- The Cloud, Digital Identity and Data Security – Content Level Security: Pros and Cons- Legal Issues in Cloud Computing–Data Privacy and Security Issues-Cloud Contracting models. 20

Books for Study:

1. Rajkumar Buyya, James Broberg, and Andrzej Goscinski. "***Cloud Computing Principles and Paradigms***" 2011 .(UNIT I, II, V), ISBN: 978-0-470-88799-8
2. Michael Miller" ***Cloud Computing: Web Based Applications that change the way You work and collaborate online***, Pearson Education, 644³ edition.(UNIT III,IV) ISBN: 9788131725337

Book for Reference:

1. George Reese" ***Cloud Application Architectures***" Shroff/O' Reilly,2009,ISBN: 8184047142
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Course	Code	Service Oriented Architecture	Sem	Hrs	Cre
CEC-IIb	15PS317b			III	6

Objectives:

- To elaborate software architecture and technologies related to service oriented architecture.

Unit-I:

Software Architecture – Types of IT Architecture – SOA – Evolution – Key components – perspective of SOA – Enterprise-wide SOA – Architecture – Enterprise Applications – Solution Architecture for enterprise application – Software platforms for enterprise Applications – Patterns for SOA – SOA programming models 15

Unit-II:

Service-oriented Analysis and Design – Design of Activity, Data, Client and business process services – Technologies of SOA – SOAP – WSDL – JAX – WS – XML WS for .NET – Service integration with ESB – Scenario – Business case for SOA – stakeholder objectives – benefits of SPA – Cost Savings 18

Unit-III:

SOA implementation and Governance – strategy – SOA development – SOA governance – trends in SOA – event-driven architecture – software s a service – SOA technologies – proof-of-concept – process orchestration – SOA best practices 18

Unit-IV:

Meta data management – XML security – XML signature – XML Encryption – SAML – XACML – XKMS – WS-Security – Security in web service framework – advanced messaging 20

Unit-V:

Transaction processing – paradigm – protocols and coordination – transaction specifications – SOA in mobile – research issues 19

Course	Code	Software Testing	Sem	Hrs	Cre
CEC-IIc	15PS317c		III	6	4

Objectives:

To create awareness in Software Testing Process and its methodology. The students shall learn basic concepts of testing and its methods

Unit-I:

PRINCIPLES OF TESTING Context of Testing in Producing Software – Principles of Testing – Dijkstra’s Doctrine – A Test in Time –Test the Tests First- The Pesticide Paradox –The Ends of Pendulum – Men in Black – Automation Syndrome. SOFTWARE DEVELOPMENT LIFE CYCLE MODELS Phases of Software Project – Quality, Quality Assurance and Quality Control – Testing, Verification and Validation – Process model to Represent Different Phases – Life cycle models –Comparison of Various Life Cycle Models. (Chapters 1,2) 18

Unit-II:

WHITE BOX TESTING Classification of White Box Testing – Static testing – Static Testing by Humans – Methods of Static Testing - Static Analysis Tools – Code Review Checklist - Structural Testing – Unit/Code testing – Code Coverage Testing – Code Complexity Testing – Challenges in White Box Testing. **BLACK BOX TESTING** Need for Black Box Testing – Techniques for Effective Black box testing - Requirements Based Testing – Positive and Negative Testing – Boundary Value Analysis – Decision Tables – Equivalence Partioning – State Based or Graph Based Testing – Compatibility Testing – User Documentation Testing – Domain Testing. (Chapters 3,4) 18

Unit-III:

INTEGRATION TESTING Integration Testing - Integration Testing as a Type of Testing – Top-Down Integration – Bottom-Up Integration – Bi-directional Integration – System Integration – Choosing Integration Method – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash . **SYSTEM AND ACCEPTANCE TESTING** System Testing Overview – Need for System Testing - Functional Versus Non-functional System Testing –Design/ Architecture Verification – Business Vertical Testing- Deployment Testing – Beta Testing – Certification, Standards and Testing for Compliance – Non Functional Testing – Setting up the Configuration – Scalability Testing – Reliability testing – Stress Testing – Interoperability Testing – Acceptance Testing – Acceptance Criteria – Selecting Test Cases for Acceptance Testing – Executing Acceptance Tests. (Chapters 5,6) 19

Unit-IV:

PERFORMANCE TESTING Introduction – Factors governing Performance Testing – Methodology for Performance Testing – Collecting Requirements – Writing Test Cases – Automating Performance Test Cases – Executing Performance Test Cases – Analyzing the Performance Test Results – Performance Tuning – Performance Benchmarking – Capacity Planning – Tools for Performance Testing. REGRESSION TESTING Need for Regression Testing - Types of Regression Testing – Regression Testing Phase- Method for Conducting Regression Testing- Performing an Initial Smoke or Sanity Test – Understanding the criteria for selecting the test cases – Classifying Test Cases – Methodology for Selecting the Test Cases – Resetting the Test Cases for Regression Testing – Results of Regression Testing – Best practices in Regression Testing. (Chapters 7,8) 20

Unit-V:

S/W TEST AUTOMATION: Introduction – Terms Used in Automation -Skills Needed for Automation- Scope of Automation- Design and Architecture for Automation-Generic Requirements for Test Tool/Framework-Process Model for Automation –Selecting a Test Tool- Criteria for Selecting a Test Tool –Steps for Tool Selection and Deployment-Automation for Extreme Programming Model- Challenges in Automation. (Chapter 16) 15

Book for Study:

1. Srinivasan Desikan and Gopalswamy Ramesh, “**Software Testing: Principles and Practices**”, Pearson Education Publication,ISBN:9788177581218.

Books for Reference:

1. Ron Patton, “**Software Testing**”, 2nd Edition, Pearson education , 2004, ISBN: 0672327988; ISBN-13: 978067232798
2. Ren Rajani, Pradeep Oak, “**Software testing - effective methods tools, techniques**” TMH, 2004,ISBN 9780070583528.

Course	Code	Big Data Analytics	Sem	Hrs	Cre
CEC-IIIa	15PS418a		IV	6	4

Objectives:

- To enable learners to have depth knowledge in big data and analytics

Unit I : INTRODUCTION TO BIG DATA

Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error. 15

Unit II: MINING DATA STREAMS

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions. 18

Unit III: HADOOP

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS- Basics-Developing a Map Reduce Application-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 18

Unit IV: HADOOP ENVIRONMENT

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance -Hadoop benchmarks- Hadoop in the cloud 20

Unit V: FRAMEWORKS

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere BigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications 19

Book For Study

1. Anand Rajaraman and Jeffrey David Ullman, "***Mining of Massive Datasets***", Cambridge University Press, 2012,ISBN, 1139505343, 9781139505345.
2. Tom White " ***Hadoop: The Definitive Guide***" Third Edition, O'reilly Media, 2012., ISBN-13: 978-1449311520 ISBN-10: 1449311520
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "***Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data***", McGrawHill Publishing, 2012,ISBN-10: 0071790535 ..

Books For reference

1. Michael Berthold, David J. Hand, " ***Intelligent Data Analysis***", Springer, 2007.
2. Bill Franks, "***Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics***", John Wiley & sons, 2012.
3. Glenn J. Myatt, "***Making Sense of Data***", John Wiley & Sons, 2007
4. Pete Warden, "***Big Data Glossary***", O'Reilly, 2011.
5. Jiawei Han, Micheline Kamber "***Data Mining Concepts and Techniques***", Second Edition

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Course	Code	Network Security	Sem	Hrs	Cre
CEC-IIIb	15PS418b		IV	6	4

Objectives:

- To provide understanding of various cryptography concepts and techniques.

Unit - I:

Security Goals :

Types of Attacks – Services and Mechanisms – Techniques.

Cryptography Concepts and Techniques :

Introduction – Plain Text and Cipher Text – Substitution Techniques – Transposition Techniques – Encryption and Decryption – Symmetric and Asymmetric Key Cryptography – Steganography – Key Range and Key size. 15

Unit - II:

Symmetric Key Algorithms:

Introduction – Algorithms types and Models – Data Encryption Standard (DES) – International Data Encryption Algorithm (IDEA) – Blowfish - AES.

Asymmetric Key Algorithms and Digital Signatures:

Introduction – The RSA Algorithm – Digital Signatures 19

Unit - III:

Digital Certificates and Public Key Infrastructure (PKI):

Introduction – Digital certificates – Private Key Management – XML, PKI and Security

Internet Security Protocols:

Introduction – Basic Concepts – Secure Socket Layer (SSL) – Secure Electronic Transaction (SET) –SSL Versus SET- Email Security – WAP Security. 20

Unit - IV:

User Authentication and Kerberos: Introduction – Authentication Basics – Passwords – Authentication Tokens – Certificate based Authentication – Biometric Authentication – Kerberos – Cryptographic Solutions – Key Management. 18

Unit - V:

Firewalls : Define the types of firewall – Develop firewall configuration – Design a firewall rule set – **Virtual Private Network :** Define Virtual Private Network – Deploy user VPN – Deploy site VPN – Standard VPN Technique – Types of VPN Systems. 18

Book for Study:

1. Atul Kahate, "*Cryptography and Network Security*", Second Edition, Tata McGraw-Hill Publishing Company Limited, 2008 [Unit I to IV], ISBN, 0070494835, 9780070494831 .
2. Eric Maiwald, "*Fundamentals of Network Security*", Tata McGraw-Hill Publishing company Limited, 2008 [Unit V], ISBN-13: 978-0072230932 ISBN-10: 0072230932

Books for Reference:

1. Bruce Schneier, "*Applied Cryptography Protocols, Algorithms*", John Wiley & Sons Inc 2002, Second Edition,
2. Richard E. Smith "*Internet Cryptography*", Addison -Wesley Professional Aug 1997.
3. Behrouz A. Forouzan, "*Cryptography and Network Security*", Tata McGraw-Hill Publishing Company Limited.
4. William Stallings "*Cryptography and Network Security*", Pearson Prentice Hall, Third Edition,

Course	Code	Rapid Application Development using Python	Sem	Hrs	Cre
CEC-IIIc	15PS418c		IV	6	4

Objectives:

This course aims to give a broad idea about Python Programming Language and its feature and its applications to RAD programming.

Unit-I:

Introduction – history of Python – features – Python Interpreter - Basic Syntax -Constants – Variable - Operators and Expressions – Strings 15

Unit-II:

Control Statements – if – while - for - continue – break statements – Data Structures- Lists – Tuples – Dictionary – Sequence - Reference Data types. 18

Unit-III:

Functions – Parameters – Arguments – return statement - Modules – Import Statement - Files I/O. 18

Unit-IV:

Object Oriented Methodology – Classes and Object – methods – Inheritance –Exceptions – errors – raising exception - Library Functions 19

Unit-V:

Applications of Python Programming - Scientific Programming – Web Programming- Graphics/Image Processing – Network Programming. 20

Books for Study:

1. Swaroop C H, "*A Byte of Python*" , 2003-2005 , Under Creative Commons Attribution-NonCommercial-ShareAlike License 2.0.
2. Allen Downey, Jeffrey Elkner, Chris Meyers, "*How to Think Like a Computer Scientist: Learning with Python*", Green Tea Press, 2002.,ISBN-10: 0971677506; ISBN-13:978-0971677500 .

Course	Code	Machine Learning	Sem	Hrs	Cre
CEC-IVa	15PS419a		IV	6	4

Objectives:

- To learn the basics of machine learning
- To understand Neural Networks and Genetic Algorithms
- To Know Bayesian and Computational learning, Instant learning and Advanced learning

Unit - I: INTRODUCTION : Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search. (18)

Unit -II: NEURAL NETWORKS AND GENETIC ALGORITHMS: Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning. (15)

Unit -III: BAYESIAN AND COMPUTATIONAL LEARNING :

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model. (18)

Unit - IV: INSTANT BASED LEARNING : K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning (19)

Unit -V :ADVANCED LEARNING : Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules– Sets of First Order Rule–Induction on Inverted Deduction–Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning –Task–Q–Learning – Temporal Difference Learning (20)

Book for Study:

1. Tom M. Mitchell, "**Machine Learning**", First Edition, McGraw Hill Education (India) Private Limited, (1 May 2013) ISBN-10: 1259096955 , ISBN-13: 978-1259096952

Books for Reference:

2. Ethem Alpaydin, "*Introduction to Machine Learning (Adaptive Computation and Machine Learning)*", The MIT Press 2004
3. T. Hastie, R. Tibshirani, J. H. Friedman, "*The Elements of Statistical Learning*", Springer; 1 edition, 2001

Course	Code	Pervasive Computing	Sem	Hrs	Cre
CEC-IVb	15PS419b		IV	6	4

Objectives:

- This course provides basic information about pervasive computing and its applications.

Unit I

Pervasive Computing: Past, Present and Future Pervasive Computing – Pervasive Computing Market - m-Business - Application examples: Retail, Airline check-in and booking - Sales force automation-Health care - Tracking -Car information system -E-mail access via WAP 18

Unit II

Device Technology: Hardware - Human Machine Interfaces - Biometrics – Operating Systems - Java for Pervasive devices 18

Unit III

Device Connectivity: Protocols - Security - Device Management Web Application Concepts: WWW architecture - Protocols - Transcoding - Client authentication via internet 19

Unit IV

WAP and Beyond: Components of the WAP architecture - WAP infrastructure – WAP security issues - WML - WAP push - Products - i-Mode - Voice Technology: Basics of Speech recognition- Voice Standards - Speech applications - Speech and Pervasive Computing 15

Unit V

PDA: Device Categories - PDA operation Systems - Device Characteristics – Software Components - Standards - Mobile Applications - PDA Browsers Pervasive Web Application architecture: Background - Scalability and availability - Development of Pervasive Computing web applications - Pervasive application architecture 20

Book for Study:

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, *“Pervasive Computing, Technology and Architecture of MobileInternet Applications”* , Pearson Education, 2006

Book for Reference:

1. Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, *“Fundamentals of Mobile and Pervasive Computing”* , McGraw Hill edition, 2006

Course	Code	Software Quality Assurance	Sem	Hrs	Cre
CEC-IVc	15PS419c		IV	6	4

Objectives

- To understand the basic concepts of software quality in business context, learning various types of software testing process

Unit- I:

Software quality in Business context : Defining quality – Need for quality – Quality control V/S Quality assurance – Quality assurance at each phase of SDLC – The SQA function.

Planning for software Quality Assurance : Software Quality Assurance Plans – Organizational level Initiative – Quality Planning – Dilemmas and observations. 15

Unit- II:

Product Quality and process Quality : Introduction – Software system evolution – product Quality – Models for software product quality – Process Quality .

Software Measurement and Metrics : Introduction – Measurement during software life cycle context – Defect metrics - Metrics for software maintenance – Classification of software metrics – Requirements related Metrics – measurements and process improvement – Identifying appropriate measures and metrics for projects – Metrics Implementation in Projects - benefits of Measurement and Metrics for project tracking and control – Object Oriented metrics. 19

Unit-III:

Walkthroughs and Inspection : Introduction – structured walkthroughs – Inspections – various roles and responsibilities solved in Reviews / Inspections – Some Psychological Aspects of reviews - Making reviews and inspections effective – comparison of review techniques – Inspection related checklists.

Software Configuration management : Configuration management - Why and what-software Configuration management Activities – Standards for configuration audit functions – Personnel in SCM Activities – SCM pitfalls. 18

Unit-IV:

ISO 9001 : What is ISO 9000 – Origins of ISO 9000 - How Does ISO carry out its work- ISO Standards Development Process – How the ISO 9000 Family of Standards work – ISO 9001:2000 – Why do Organisations need ISO 9000? - ISO Certification – Assessment Process – Surveillance Audits / Re-Certification / Re-Assessment Audits – ISO Consulting services and Consultants.

Software CMM and other Process Improvement Models : The Capability – Maturity Model for Software – An Overview – Practices followed at ‘Mature Organisations’ – CMM and ISO – Types of CMM Models. 20

Unit-V:

Software Testing : Purpose of Testing – Differences between Inspection and Testing – Testing v/s Debugging – Testing Life Cycle – Roles and Responsibilities in Testing – Test Artifacts – The Test Plan – The V Model for Testing phases – Testing Techniques – Test Metrics – Risk-Based Testing – Test Automation and Test Tool Selection – Extreme Testing- Test Process Improvement Framework – Human Issues and Challenges in Testing. 18

Books for Study :

1. Nina S .Godbole, "**Software Quality Assurance Principles and Practice**", Narosa Publishing House, ISBN-13: 978-1842651766 ISBN-10: 1842651765

Books for Reference :

1. Alan C.Gillie, "**Software Quality (Theory and Management)**", Thomson Internal Student Edition, Second Edition
2. Mordechai Ben , Manachem/Garry S.Marliss, "**Software Quality Producing Practical, Consistant Software Thomson Learning**"

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