

# **Master of Computer Applications**

## **Salient Features**

- Network Management and Security: A course introduced to familiarize students in the management of Network and Security.
- Platform Based Development: A course introduced to train students in the following areas
  - a) Web Development
  - b) Game Development
  - c) Mobile Apps Development
- Elective Courses
  - Big Data Analytics
  - Haskell Programming
  - Machine Learning

**NEHRU MEMORIAL COLLEGE[AUTONOMOUS], PUTHANAMPATTI - 621 007**

**MASTER OF COMPUTER APPLICATIONS**

**COURSE STRUCTURE AND SCHEME OF EXAMINATIONS UNDER CBCS**

**For the candidates admitted from the year 2015-16**

<b>COURSE CODE</b>	<b>TITLE</b>	<b>HRS</b>	<b>CRE</b>	<b>CIA</b>	<b>EE</b>	<b>TOT</b>
<b>SEMESTER - I</b>						
15PA101	CC-I Web Design using HTML & CSS	4	4	40	60	100
15PA102	CC-II Operating System	4	4	40	60	100
15PA103	CC-III Digital Design and Architecture	4	4	40	60	100
15PA104L	CC-IV Software Lab-1[Web Design]	4	2	40	60	100
15PA105L	CC-V Software Lab-2 [System Administration]	4	2	40	60	100
15PA106	SC1 Mathematical Foundations for Computer Applications	4	4	40	60	100
15PA107	SC2 Human Resource Management	4	4	40	60	100
15PASSA	CBP I Soft Skill & Aptitude	2	--	---	---	---
<b>SEMESTER - II</b>						
15PA208	CC-VI Programming in C	4	4	40	60	100
15PA209	CC-VII Data Structures and Algorithms	4	4	40	60	100
15PA210	CC-VIII Data Base System	4	4	40	60	100
15PA211L	CC-IX Software Lab-3 [ C]	4	2	40	60	100
15PA212L	CC-X Software Lab-4[RDBMS]	4	2	40	60	100
15PA213	SC3 Graph and Automata Theory	4	4	40	60	100
15PA214	SC4 Financial and Management Accounting	4	4	40	60	100
15PASSA	CBP I Soft Skill & Aptitude	2	2	---	---	---

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COURSE CODE	TITLE	HRS	CRE	CIA	EE	TOT
<b>SEMESTER - III</b>						
15PA315	CC-XI Programming in JAVA	4	4	40	60	100
15PA316	CC-XII Network Management and Security	4	4	40	60	100
15PA317	CC-XIII Platform Based Development-I [Web]	4	4	40	60	100
15PA318L	CC-XIV Software Lab-5[Programming in JAVA]	4	2	40	60	100
15PA319L	CC- XV Software Lab-6 [Web Development]	4	2	40	60	100
15PA320	SC5 Operation Research	4	4	40	60	100
15PA321a	CEC-Ia Data Mining & Ware housing	4	4	40	60	100
15PA321b	CEC-Ib Ruby On Rails					
15PA321c	CEC-Ic Software Testing					
15PADPS	CBP II Debugging & Programming Skill	2	---	---	---	---
15PAIS	Internship	---	2	---	---	---
<b>SEMESTER - IV</b>						
15PA422	CC-XVI Distributed Programming using J2EE	4	4	40	60	100
15PA423	CC-XVII Software Engineering	4	4	40	60	100
15PA424	CC-XVIII Platform Based Development- II[ Game ]	4	4	40	60	100
15PA425L	CC-XIX Software Lab-7[J2EE]	4	2	40	60	100
15PA426L	CC-XX Software Lab-8 [Game Development]	4	2	40	60	100
15PA427	OEC Open Elective Course	4	4	40	60	100
15PA428a	CEC-IIa Service Oriented Architecture	4	4	40	60	100
15PA428b	CEC-IIb Human Computer Interaction					
15PA428c	CEC-IIc Business Intelligence					
15PADPS	CBP II Debugging & Programming Skill	2	2	---	---	---
15PAMP	Mini Project	---	2	---	---	---

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**For the candidates admitted from the year 2015-16**

<b>COURSE CODE</b>	<b>TITLE</b>	<b>HRS</b>	<b>CRE</b>	<b>CIA</b>	<b>EE</b>	<b>TOT</b>
<b>SEMESTER - V</b>						
15PA529	CC-XXI Distributed Programming using .NET	4	4	40	60	100
15PA530	CC-XXII Compiler Design	4	4	40	60	100
15PA531	CC-XXIII Platform Based Development-III [Mobile apps ]	4	4	40	60	100
15PA532L	CC-XXIV Software Lab-9[.NET]	4	2	40	60	100
15PA533L	CC-XXV Software Lab-10[Mobile Apps Development]	4	2	40	60	100
15PA534a	CEC-IIIa Big data Analytics	4	4	40	60	100
15PA534b	CEC-IIIb Haskell Programming					
15PA534c	CEC-IIIc Software Project Management					
15PA535a	CEC-Iva Cloud Computing	4	4	40	60	100
15PA535b	CEC- IVb Graphics and Multimedia					
15PA535c	CEC- IVc Machine Learning					
15PAPS	CBP III Professional Skill	2	2	---	---	---
<b>SEMESTER - VI</b>						
15PA636P	Project	---	10	100	100	200
<b>GRAND TOTAL</b>		<b>150</b>	<b>140</b>	<b>1500</b>	<b>2200</b>	<b>3700</b>

**NOTE**

<b>COURSE TYPE</b>		<b>COURSES</b>	<b>CREDITS</b>	<b>TOTAL CREDITS</b>
<b>CC(T)</b>	<b>Core Courses (Theory)</b>	<b>15</b>	<b>4</b>	<b>60</b>
<b>CC(L)</b>	<b>Core Courses (Practical)</b>	<b>10</b>	<b>2</b>	<b>20</b>
<b>SC</b>	<b>Supportive Courses</b>	<b>5</b>	<b>4</b>	<b>20</b>
<b>OEC</b>	<b>Open Elective Course</b>	<b>1</b>	<b>4</b>	<b>4</b>
<b>EC</b>	<b>Elective Courses</b>	<b>4</b>	<b>4</b>	<b>16</b>
<b>CBP</b>	<b>Competency Building Programme (CBP)</b>	<b>2</b>	<b>2</b>	<b>4</b>
<b>PW</b>	<b>Project Work</b>	<b>1</b>	<b>10</b>	<b>10</b>
<b>IS</b>	<b>Internship (End of Semester III)</b>	<b>1</b>	<b>2</b>	<b>2</b>
<b>MP</b>	<b>Mini Project (End of the Semester IV)</b>	<b>1</b>	<b>2</b>	<b>2</b>
<b>PS</b>	<b>Professional Skill Development</b>	<b>1</b>	<b>2</b>	<b>2</b>
	<b>Total Credits</b>			<b>140</b>

Course	Code	Web Design Using HTML & CSS	Sem	Hrs	Cre
CC-I	15PA101			I	4

### Objectives:

- To understand Internet and WWW
- To learn the mark up languages
- To create web pages with HTML and CSS
- To familiar with client side scripting language

### Unit - I:

Internet and WWW: Introduction to internet and its applications, Email, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address. World Wide Web (WWW) : World Wide Web and its evolution, uniform resource locator (URL), browsers - internet explorer, Netscape navigator, Opera, Firefox, Chrome. Search engine - web server: apache, IIS, proxy server, HTTP Protocol. (10)

### Unit - II:

**HTML:** Structure – Comments –Formatting Tags - Block level formatting tags – lists – Hyperlinks– Link . (12)

### Unit - III:

Layout Technology: Table tags with elements and attributes - Frame elements and attributes – Forms.- Introduction to Dreamweaver . (12)

### Unit - IV:

**Cascading Style Sheet (CSS):** The need for CSS, Introduction to CSS – Basic syntax and structure -Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds – Manipulating text - Margins and Padding - Positioning using CSS. (14)

### Unit - V:

**JAVASCRIPT:** Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements -Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling- Controlling Windows & Frames and Documents - Form handling and validations. (14)

### Books for Study

1. Material will be provided for Unit I by the Department
2. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, “**Internet & World Wide Web: How To Program**”, Fifth Edition, Pearson Education (2006) . ISBN-10: 8131701123 ISBN-13: 978-8131701126
3. Achyut S Godbole and AtulKahate, “Web Technologies”, Second Edition, Tata McGraw Hill, 2012.
4. Thomas A Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition, Tata McGraw Hill, 2013.

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Course	Code	Operating System	Sem	Hrs	Cre
CC-II	15PA102		I	4	4

**Objectives:**

- To introduce the concepts of operating system and its services.
- To elaborate the concepts of Processes and threads .
- To introduce the concept of concurrency.
- To imbibe the concepts of memory management, I/O and File Management.
- To introduce the concepts of Network operating system.

**Unit - I:**

**INTRODUCTION TO OS AND ITS SERVICES:**

Objectives and functions of Operating System: Batch Processing System – Time Sharing System – Multiprogramming – Distributed Operating System and Parallel System  
Operating System Interface – System calls- System Structure. (5)

**Unit -II:**

**PROCESS DESCRIPTION AND CONTROL:**

Process States – Process Description – Process Control – Processes & threads.  
Principles of Concurrency: Mutual Exclusion – Semaphores. Principles of Deadlock: Prevention – Avoidance – Detection & Recovery. (20)

**Unit -III:**

**MEMORY MANAGEMENT:**

Partitioning – Paging – Segmentation – Virtual Memory - Demand Paging – Page Replacements. Scheduling: Uniprocessor scheduling – types of scheduling – Scheduling Algorithms- Multiprocessor scheduling. (15)

**Unit -IV:**

I/O Organization – Evolution of I/O function- DMA – Design objectives – I/O Buffering – Disk Scheduling – Disk Cache – File Organization – File Directories-File sharing – Record Blocking – Secondary Storage Management. (10)

**Unit -V:**

Introduction to Networking Operating System: Distributed Operating System- Protection – Goals of protection – Domain of protection – Access Matrix – Security – Authentication. (10)



**Books for Study:**

1. William Stallings, "*Operating System*", 4th Edition, Prentice Hall Of India. (Unit – I, II, III, IV Chapters – 2,3.1-3.3,4,5.1 to 5.4,6.1-6.4,7-7.4,9,10, 11,12).
2. Silberschatz - Galvin ,"*Operating System Concepts*", 5th Edition, Addison Wesley, ISBN: 8-7808-503-8.

**Books for Reference:**

1. M. Milancovic, "*Operating System Concepts and Design*", 2nd Edition, McGraw Hill International Edition.

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Course	Code	Digital Design and Architecture	Sem	Hrs	Cre
CC-III	15PA103		I	4	4

### Objectives:

- To learn the various data types and its representation.
- To learn about various digital components .
- To learn the diverse instruction codes existing in different computer registers CPU Organization.
- To learn about various peripheral devices, I/O interface, asynchronous and serial communication interface.
- To focus on effective memory organization.

### Unit - I :

Data Representation - Data Types - Complements - Fixed-Point representation- Floating Point representation- Other Binary Codes- Error Detection codes. (10)

### Unit - II:

Logic Gates - Boolean Algebra - Map Simplification - Combinational Circuits: Half-Adder, Full Adder- Flip Flops - Sequential Circuits. ICs - Decoders - Multiplexers - Registers - Shift Registers - Binary Counters - Memory Unit . (12)

### Unit - III :

Instruction Codes - Computer Registers - Computer Instructions - Timing And Control – Instruction Cycle - Memory Reference Instructions –Input-Output and Interrupt. CPU: General Register Organization –Control Word - Stack Organization - Instruction Format - Addressing Modes - Data Transfer And Manipulation- Program Control. (14)

### Unit - IV:

Peripheral Devices - Input-Output Interface - Asynchronous Data Transfer - Modes of Transfer -Priority Interrupt - DMA - IOP - Serial Communication. (12)

### Unit - V:

Memory Hierarchy - Main Memory - Auxiliary Memory - Associative Memory - Cache Memory -Virtual Memory - Memory Management Hardware. (10)

### Book for Study:

1. M.Morris Mano, "*Computer System Architecture*", 3rd Edition, Prentice Hall of India,2005.

**Books for Reference:**

1. William Stallings, "*Computer Organization and Architecture*", 5th Edition, Pearson Education, 2001.
2. Malvino A. P. and Donald P. Leach, "*Digital Principles and Applications*", 7th Edition, McGraw Hill Publications, 2002
3. John P. Hayes, "*Computer Architecture and Organization*", 3rd Edition, Tata McGraw Hill, 1998.

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Course	Code	Software Lab-1[Web Design]	Sem	Hrs	Cre
CC-IV	15PA104L		I	4	2

**Objectives:**

To provide depth knowledge in designing web pages

**Cycle - I**

Html basic tags with attributes(H1-h6,p, background, text Formatting)

List and Image tags

Table, anchor and frame tags

Simple static web page creation

**Cycle - II**

Web Pages with forms

Inline Style sheet

Internal Style sheet

External style Sheet

**Cycle - III**

Web Pages with HTML and CSS

Working with Dreamweaver

Client Side Scripting with Java script

Event handling

Dynamic Web Page creation

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Course	Code	Software Lab-2[System Administration]	Sem	Hrs	Cre
CC-V	15PA105L		I	4	2

### Objectives:

To learn Unix commands , System calls and administration programs.

### Cycle - I

- System calls of UNIX operating system: fork, exec,cgetpid, exit, wait, close, stat, opendir, readdir
- I/O system calls of UNIX operating system (open, read, write, etc)

### Cycle - II

- Simulate the UNIX commands like ls, grep, etc using C Language
- Given the list of processes, their CPU burst times and arrival times, display/print the Ganttchart for FCFS and SJF. For each of the scheduling policies, compute and print the averagewaiting time and average turnaround time. (2 sessions)
- Given the list of processes, their CPU burst times and arrival times, display/print the Ganttchart for Priority and Round robin. For each of the scheduling policies, compute and printthe average waiting time and average turnaround time. (2 sessions)

### Cycle - III

- Developing Application using Inter Process Communication (using shared memory, or message queues)
- Implement the Producer – Consumer problem usingsemaphores (using UNIX system calls).

### Cycle - IV

- Implement some memory management schemes – I
- Implement some memory management schemes – II
- Implement any file allocation technique (Linked, Indexed or Contiguous)

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Course	Code	Mathematical Foundations for Computer Applications	Sem	Hrs	Cre
SC1	15PA106		I	4	4

### Objectives:

- To learn about the matrix algebra
- To learn Mathematical logic
- To familiar with Set theory
- To study the concepts of Boolean Algebra

#### Unit - I:

Definition of Matrix – Rank of a Matrix – Consistency Equations – Eigen values and Eigen vectors – Cayley Hamilton theorem (Statement only) Problems. (12)

#### Unit - II:

Mathematical Logic: Statements and Notations – Connectivity's – Statement Formula and Truth tables – Tautologies – Equivalence of Formulas – Duality law. Disjunctive Normal Form – Conjunctive Normal form. The theory of inference – validity using truth tables – Rules of inferences. (12)

#### Unit - III:

Basic concepts of set theory: Inclusion and Equality of sets – Power set – Operations on Sets – Venn diagrams – Cartesian Products. Relations and ordering – Binary & Equivalence relations – Partial ordering. Functions – Composition of functions, inverse functions, Binary & n-ary operations. (12)

#### Unit - IV:

Lattices as partially ordered sets – Hash Diagrams – properties of lattices – Distributive & Modular inequalities – Special lattices – Complete, Bounded, Complemented and Distributive lattices. Properties of Boolean algebra. (12)

#### Unit - V:

Boolean Algebra – Boolean functions – Representation and Minimization of Boolean functions. (12)

#### Books for Study:

1. A.Abdul Rasheed, "*Allied Mathematics*", Vijay Nicole Inprints private Limited 2006. ISBN: 81-8209-144-6. (UNIT I: Chapter 3: 3.1-3.4)
2. J.P.Tremblay&R.Manohar, "*Discrete Mathematical Structures with Applications to Computer Science*", McGraw Hill International Edition, 1987. ISBN: 0-07-463113-6. (UNIT II: Chapter 1:1.1-1.3,1.4.1,1.4.2)

UNIT III: Chapter 2: 2.1.1-2.1.5,2.1.9, 2.3.1,2.3.8, 2.4.1-2.4.4

UNIT IV : Chapter 4: 4.1

UNIT V : Chapter 4: 4.2-4.4)

**Books for Reference:**

1. T.K.ManicavasagamPillay& Co, "*Algebra Volume-II*", S.Viswanathan(Printers & Publishers)Pvt Ltd, 1999
2. M.K.Venkataraman, N.Sridharan and N.Chandrasekar,"*Discrete Mathematics*", The National Publishing Company, 2000.

Course	Code	Human Resource Management	Sem	Hrs	Cre
SC2	15PA107		I	4	4

**Objectives:**

- To understand the functions of Human Resource Management
- To know about Human Resource planning process
- To be aware of employees training and development
- To understand the purposes of performance measurement and appraisal

**Unit - I:**

HRM: Nature and Scope-HRM as a Profession- objectives – Importance— Functions of HRM – Role of HR Manager – Recent Trends. (12)

**Unit - II:**

HR Planning – Concept and Objectives – Need – Importance – Process – Problems and Guidelines for HR Planning – Recruitment – Selection – Placement – Induction. (12)

**Unit - III:**

Training and Development – Concept – Importance – Objectives – Methods of Training – Executive Development – Career Planning and Development. (12)

**Unit - IV:**

Compensation – Concept, process and Objectives of Job Evaluation – Advantages and Limitations – Methods – Wages and Salary Administration. (12)

**Unit - V:**

Performance Appraisal – Concept and Objectives – Methods and techniques of Performance Appraisal. (12)

**Book for Study:**

1. C.B.Gupta, "*Human Resource Management*", Sultan Chand & Sons, New Delhi, 2012.

**Books for Reference:**

1. S.S.Khanka, "*Human Resource Management*", Sultan Chand & Sons, New Delhi.
2. Biswajeet Pattanayak, "*Human Resource management*", Prentice Hall of India, New Delhi.
3. L.M.Prasad, "*Human Resource Management*", Sultan Chand & Sons, New Delhi-2013.



Course	Code	Soft Skill	Sem	Hrs	Cre
CBP I	15PASSA		I	2	—

**Objectives:**

- To teach students the four basic communication skills – Listening, Speaking, Reading and Writing
- To sensitive students to the nuances of the four basic communication skills – Listening, Speaking, Reading and Writing

**Unit-I:**

**Listening Skill :** Comprehending – Retaining – Responding – Tactics – Barriers to Listening – Overcoming listening barriers – Misconception about listening.

**Unit -II:**

**Reading Skill :**Acquiring reading – Reading Development -- Reading difficulties.

**Unit -III:**

**Writing skill :**Note-making – CV's – Report writing, copy writing, Agenda – Minutes – Essay writing on any current issues – paragraph writing.

**Unit - IV:**

**Speaking Skill:** Formal and Informal Conversation – Conversation in the work place – Interviews.

**Unit -V:**

**Business Correspondence**

Different types of business letters – cover letter, thank you letters, message through email and Fax, Acceptance letters, rejection letters, and withdrawal letters.

**Books for Reference:**

1. Minippally, Methukutty. M. 2001. Business Communication Strategies. 11<sup>th</sup> Reprint. Tata McGraw – Hill. New Delhi.
2. SasiKumar. V and P.V. Dharmija. 1993. Spoken English: A Self-Learning Guide Conversation Practice. 34<sup>th</sup> reprint. Tata McGraw – Hill. New Delhi.

**Marks: 50**

Course	Code	Programming in C	Sem	Hrs	Cre
CC-VI	15PA208		II	4	4

**Objectives:**

- To familiarize the basic concepts of computer programming and developer tools.
- To present the syntax and semantics of the “C” language as well as data types offered by the language.
- To allow the trainee to write their own programs using standard language infrastructure regardless of the hardware or software platform.

**Unit - I :**

Introduction to C Programming – Operators and Expressions – Data Input and Output – Preparing and Running a Complete C program. (08)

**Unit - II:**

Control Statements: The IF-ELSE statement – Looping : The While Statement, The Do-While Statement, The For Statement – Nested Control Structures - The Switch Statement – The Break Statement – The Continue Statement – The Comma Operator – The Goto Statement. (12)

**Unit - III:**

Functions: Defining a function – Accessing a Function – Function Prototypes – Passing Arguments to a Function – Recursion. Program Structure: Storage Classes – Automatic Variables – Global Variables – Static Variables – Multi file Programs – More about Library Functions. (12)

**Unit - IV:**

Arrays: Defining an Array – Processing an Array – Passing Arrays to Functions – Multidimensional Arrays – Arrays and Strings. Pointers: Fundamentals – Pointer Declarations – Passing Pointer to a Function – Pointers and One-dimensional Arrays – Dynamic Memory Allocation – Operation on Pointers – Pointers and Multidimensional Arrays – Arrays of Pointers – Passing Functions to other Functions – More about Pointer declarations. (14)

**Unit - V:**

Structures and Unions: Defining a Structure – Processing a Structure – User-defined Data Types – Structures and Pointers – Passing Structures to Functions – Self-referential Structures – Unions. Data Files: Opening and Closing a Data File – Reading and Writing a Data File – Processing a Data File – Unformatted Data Files – Concept of Binary Files – Preprocessor. (14)

**Book for Study:**

1. Byron.S. Gottfried, "**Programming with C,Schaum's Outlines**", Second Edition, Tata McGraw-Hill, ISBN-13: 978-0070240353 ISBN-10: 0070240353.

**Book for Reference:**

1. YashawantKanetkar, "**Let Us C**", Seventh Edition, BPB Publications, 2007.

**./RJ**

Course	Code	Data Structures and Algorithms	Sem	Hrs	Cre
CC-VII	15PA209		II	4	4

**Objectives:**

- To understand the basic concepts of data structures, its usage in memory management.
- To learn about trees, its implementation and its operations.
- To know Graph and its applications.
- To learn various sorting and searching techniques.

**Unit - I:**

Design and analysis of algorithms: From problems to programs – Abstract data types – Data types, data structures and abstract data types- Basic data types: The data type 'list' – Implementations of lists – Stacks – Queues. (10)

**Unit -II:**

Trees: Basic terminology – The ADT tree- Implementation of trees- Binary trees- Basic operations on sets - Introduction to sets – Bit-vector implementation of sets- Linked-list implementation of sets- Hash table data structures- Priority queues – Implementation of priority queues. (15)

**Unit - III:**

Directed Graph: Basic definitions- Representation of directed graph - The Single Source shortest path problem – The All-pairs shortest path problem- Traversals of directed graphs – Directed acyclic graphs – Strong components. Undirected Graph: Definitions – Minimum cost spanning trees- Traversals- Articulation and bi-connected components. (15)

**Unit -IV:**

Sorting: Sorting arrays-Sorting by straight insertion, selection & exchange- Insertion sort by diminishing increment - Tree sort - Partition sort - Sorting sequential files - Straight merging- Natural merging. (10)

**Unit - V:**

Recursive Algorithms - Introduction – two examples of recursive programs – Backtracking Algorithms – The knight's tour problem - The eight queen's problem - The optimal selection problem -Searching Techniques. (10)

**Books for Study:**

1. Alfred V.Aho, John E.Hopcroft and Jeffrey D.Ullman, "**Data structures and Algorithms**", Addison Wesley Longman private limited, New Delhi, Fourth Indian Reprint 2001, (Chapters: 1.1 – 1.3, 2.1 – 2.4, 3.1 – 3.4, 4.1 – 4.11 except 4.2, 4.8 & 4.9, 6.1 – 6.7, 7.1 – 7.4. **Unit I, II, III**).ISBN: 81-7808-102-4.
2. Niklaus Wirth, "**Algorithms + Data structures = Programs**", Prentice Hall of India Limited, New Delhi, 1999, (Chapters: 2.1,2.2.1-2.2.6,3.1,3.3,3.4,3.5,3.7. **Unit IV, V**). ISBN: 81-203-0569-8.

**Books for Reference:**

1. Ellis Horowitz and SartajSahni, "**Fundamentals of Computer Algorithms**", Galgotia Publications, New Delhi, 1985.
2. Trembley and Soreson, "**An Introduction to data structures with Applications**", Second Edition, McGraw Hill, New Delhi, 1985.

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Course	Code	<b>Data Base System</b>	Sem	Hrs	Cre
CC-VIII	15PA210		II	4	4

**Objectives:**

- To understand various data models.
- To develop and refine the conceptual data models, entities, attributes.
- To apply normalization techniques.
- To learn database system architecture.

**Unit - I:**

Introduction: Data base system verses file system – View of data – Data Models – Database Languages – Database users and Administrators – Database system structure.

Entity: **Basic concepts – Constraints – Keys – Design Issues – ER Diagram** – Weak entity

Relationship Model: Sets – Design of an ER Database schema – Reduction of an ER schema to tables. **Relational Model:** Structure – Relational Algebra – Extended Relational Algebra – Algebraic operations – Modification. (15)

**Unit - II:**

SQL: **Structure of SQL -Set operations** – Aggregate functions – Null values – Nested sub queries – Views – Complex queries – Joined Relations – Embedded SQL - Dynamic SQL – QBE – Domain Constraints – Referential Integrity – Assertions – Triggers. (10)

**Unit - III:**

**Database Design:** Relational – First normal form – Functional dependencies – Decomposition – Boyce-codd normal form – Third Normal Form – Fourth normal form - More normal form. (10)

**Unit - IV:**

Transactions concepts: Transaction state – concurrent execution – serializability – recoverability – testing for serializability. **Concurrent control:** Lock based protocols – timestamp based protocols – validation based protocols – Deadlock Handling. (15)

**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.** (10)

**Books for study:**

1. Henry F.Korth and Abraham Silberschatz, "***Database System concepts***",4th Edition, McGraw Hill publication, 2002,(unit I,II,IV,V) ISBN: 0-07-120413-X.
2. C.J.Date, "***An Introduction to Database system***",7<sup>th</sup>edition, Addison Wesley publication,year2000,(Chapter10.2,10.3,11.3,11.3,11.5,12.2,12.3,12.4,12.7) ISBN:81-7808-231-4

**Books for Reference:**

1. Bepin C.Desai, "***An Introduction to Data base system***", Galogotia publications Private limited.
2. Ivan Bayross, "***SQL and PL/SQL***", BPB Publications, New Delhi.

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Course	Code	<b>Software Lab-3[C]</b>	Sem	Hrs	Cre
CC-IX	15PA211L		II	4	2

**Objectives:**

To provide in depth practical knowledge in C Language.

**Preliminaries(2 Labs)**

**C Basics**

**Variables and Keywords**

**Constants**

**Data Types**

**Operators**

**Looping Statements**

**Cycle I: Programs Using**

**Functions**

**Storage Classes**

**Arrays**

**Cycle II: Programs Using**

**Structure**

**Union**

**Preprocessor**

**Cycle III: Programs Using**

**Pointers**

**File Management**

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Course	Code	Software Lab-4[RDBMS]	Sem	Hrs	Cre
CC-X	15PA212L		II	4	2

**Objectives:**

To provide depth programming knowledge in RDBMS.

**Cycle - I**

1. DDL Commands
2. DML Commands
3. DCL Commands
4. TCL Commands
  - Queries using key constraints

**Cycle - II**

1. Queries using operators: Logical Operators and Set Operators
2. Nested Sub Queries: Sub query and Join
3. Built in functions of SQL
4. Creating views and querying in views
5. Sequence
6. SQL Reports

**Cycle - III**

1. Cursors : Implicit and Explicit
2. Triggers
3. Procedures
4. Functions
5. Package

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Course	Code	Graph and Automata Theory	Sem	Hrs	Cre
SC3	15PA213		II	4	4

**Objectives:**

- Be aware of various types of graphs and its usage.
- To understand the concepts of tree structures, matrices and directed graphs.
- To learn finite state systems, context free grammars and convert from one to another.
- To acquire the knowledge about normal forms.

**Unit - I:**

**Graph Introduction:** Paths and Circuits - isomorphism, Connected & Disconnected Graphs, Euler graphs - Operations on Graphs- Hamiltonian Paths & Circuits. (10)

**Unit - II:**

**Trees and Fundamental Circuits:** Properties of Trees, Rooted Binary Trees, Spanning trees. Matrix representation of Graphs –Incidence Matrix, Adjacency Matrix, Circuit Matrix –Fundamental Circuit Matrix. (10)

**Unit - III:**

**Directed Graphs:** Some types of digraphs, trees with directed edges. Graph Theoretic Algorithms - Computer representation of a Graph. Algorithms for connectedness & components, spanning tree, shortest path. (12)

**Unit - IV:**

**Finite State Systems:** Basic definitions - Non-Deterministic Finite Automata – Finite Automata with epsilon moves-Regular Expressions Applications of Finite Automata. **Context Free Grammars:** Motivation and Introduction - Context- Free Grammars – Derivation Trees – Simplification of Context free grammar - Chomsky Normal Form - Griebach Normal Form -The Pumping Lemma for CFL's. (14)

**Unit - V:**

**Push Down Automata:** Definitions – Pushdown automata and context free languages. Turing machines: The turing machine model – Computable languages and functions. The Chomsky Hierarchy: Regular Grammars – Unrestricted grammars – Context Sensitive languages – Relation between classes of languages. (14)

**Books for Study:**

1. NarsingDeo, "**Graph Theory with applications to Engineering and Computer Science**", Prentice-Hall of India Limited, New Delhi,1995.  
(UNIT I: Chapter 2: 2.1,2.2,2.4-2.9  
UNIT II: Chapter 3: 3.1,3.2,3.5,3.7; Chapter 7: 7.1,7.3,7.4,7.9  
UNIT III: Chapter 9: 9.1,9.2,9.6; Chapter 11: 11.1,11.2,11.4-11.4.1,11.4.2,11.5)
2. John E.Hopcroft& Jeffery D.Ullman, "**Introduction To Automata Theory, Languages and Computation**", Narosa Publishing House .  
(UNIT IV: Chapter 2; Chapter 4:4.1-4.6; Chapter 6:6.1  
UNIT V: Chapter 5; Chapter 7:7.1-7.3; Chapter 9 )

**Books for reference:**

1. John E.HopCroft& Jeffery D.Ullman, "**Formal Languages and Their Relation to Automata**", Addison - Wesley Publishing Company, London, 1969.
2. Bernard Kolman& Robert C.Busby, "**Discrete Mathematical Structure for Computer Science**", Prentice Hall of India, New Delhi, 1987.

<b>Course</b>	<b>Code</b>	<b>Financial &amp; Management Accounting</b>	<b>Sem</b>	<b>Hrs</b>	<b>Cre</b>
SC4	15PA214		II	4	4

### Objectives

- To learn about accounting concepts and conventions
- To study the preparation of Journal, Ledger and Trial Balance
- To learn about various types of accounts
- To understand Budgeting and its control.
- To study about capital Management

### Unit - I:

Introduction to Accounting – Book Keeping – Definition – Advantages – Accounting concepts and conventions – Double Entry Book – Differences between double entry system and single entry system – Classification of Accounts. (12)

### Unit - II:

Journal – Accounting Cycle – Practical approach to journal – Ledger – Format of Journal to Ledger – Trial Balance. (12)

### Unit - III:

Trading Account – Profit and Loss Account – Balance Sheet – Definition – Objectives – Difference between Trial balance and Balance sheet – adjustment entry (Closing Stock, Outstanding, Prepaid, Depreciation). (12)

### Unit - IV:

Budgeting and Budgetary control – Definition – Advantages – Limitation – main steps - objective- functions of budget controller – type of budgets – preparation of various functional budgets – preparation of production budget – cash budget – flexible budget only. (12)

### Unit - V

Capital Budgeting – meaning, need and importance – methods – payback period method – Accounting Rate of Return (ARR) – Discounted Cash Flow method, NPV – IRR – Merits and Demerits. (12)

**(80% Theory, 20% Problem)**

### Books for Study:

1. T.S.Ready and A.Murthy, "**Financial Accounting**", Margham Publication-2011
- 2.
3. Dr.S.N.Maheswari, "**Principles of Management Accounting**", Sultan Chand & Sons, 5<sup>th</sup> Edition, 2010

**Books for Reference:**

1. M.C.Shukla, T.S.Grewal-S.C.Gupta, "**Advanced Accounts**", (Volume-I) Sultan Chand & Sons, New Delhi-2002
2. R.L.Gupta, M.Radhasamy, "**Advanced Accountancy**", Sultan Chand & Sons, New Delhi, 2011
3. R.S.N.Pillai & Bagavathi, "**Fundamentals of Advanced Accounting**", Sultan Chand & Sons, New Delhi, 2007
4. M.Y.Khan & P.K.Jain, "**Management Accounting**", Tata McGraw Hill Education Private Ltd, 5th Edition
5. Prof.Jawaharlal, "**Advanced management Accounting**", Sultan Chand & Sons, New Delhi, Third Edition-2013

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Course	Code	Aptitude	Sem	Hrs	Cre
CBP I	15PASSA		II	2	2

### Objectives:

To train the students to prepare for written tests

#### PART I:

Problems on Numbers & ages, Ratio & proportion, Partnership,

Simple interest & Compound Interest,

Percentage, Profit & Loss, Mixture

Times & Works, Times & Distance

Permutations & Combinations

#### PART-II

**Mathematical Reasoning:** Relationship or analogy test – Series Completion test – Coding and decoding test – Mathematical ability test - Problems on Blood Relation.

**Logical Reasoning:** Venn diagram and chart type test - Analytical reasoning: Word analogy – applied analogy.

**Data Interpretation:** Sources, acquisition and interpretation of data – Quantitative and qualitative data – Graphical representation and mapping of data.

#### TEXT BOOK :

1. R.S.Aggarwal, "Quantitative Aptitude for competitive Examinations", S.Chand, 7<sup>th</sup> Revised Edition- 2007.[**UNIT 1:** Chapter 7, 8,12,13; **UNIT 2:** Chapter 14; **UNIT 3:** Chapter 10,11,20 **UNIT 4:** Chapter 15,17; **UNIT 5:** Chapter 30]
2. Dr. Lal, Jain & Dr. K. C. Vashistha , "Teaching and Research Aptitude ", Upkar Prakashan,Agra - 2013. [**UNIT 1:** Section I-1,3,4,6 & 9 ; **UNIT 2:** Section I – Sections: 16 & A; **UNIT 3:** Section III]

#### REFERENCE BOOK:

1. Abhijit Guha ,"Quantitative Aptitude for Competitive Examinations" Tata McGraw Hill- 1999.
2. Sajit Kumar & M. Gagan, "Teaching and Research Aptitude", Danika Publishing Company, New Delhi - 2009.

Marks: Part I : Test I: 25 ; Part II: Test II: 25

Total Marks: 50

Course	Code	Programming in JAVA	Sem	Hrs	Cre
CC-XI	15PA315		III	4	4

### Objectives:

- To familiarize the basic concepts of Object Oriented Programming.
- To Study the fundamentals of JAVA
- To understand Applet Architecture, Network programming, Database connectivity and JAVA swing programming

### Unit-I:

An overview of Java - Java language fundamentals - Class and objects - Constructors - Garbage collection - The finalize method - method overloading - Recursion - this, static and final usage - Nested and Inner classes - Arrays - Inheritance - Method overriding - abstract methods and abstract classes - final methods and final classes. (12)

### Unit-II

Packages-Interfaces-Exception Handling-String Handling-Object class - Exploring Java.lang package: Wrapper classes-String -StringBuffer (12)

### Unit-III:

Util packages- ArrayList-Calender-Date-HashTable-LinkedList-Vector-Enumset-Stack- Multithreading - Thread priorities - Inter Thread communications - Synchronization - Dead locks. (12)

### Unit-IV:

I/O Streams: Byte Stream class-Character stream class-Serialization - JDBC-Data Manipulation-data navigation. (12)

### Unit-V:

Java Swing and Networking: JLabel-JList-JComboBox-Jslider-JMenu-JButton-Socket Programming- Proxy server - TCP/IP Sockets - Net address- datagrams. (12)

### Books for Study:

1. Herbert Schildt, *"Java 2 complete Reference"*, Tata McGraw Hill, Ninth Edition, 2001.
2. Ivan Bayross, *"Java 2.0 (Web Enabled Commercial Application Development)"* - BPB Publications India, Edition 2000, ISBN: 81-7656-356-0.

### Books for Reference:

1. Peter Norton & William stanck, *"Guide to Java programming"*, First Edition, 1997, Techmedia Publications, New Delhi.
2. Laura Lemay, Charles I, Perkins, *"Teach Yourself Java 1.1"*, First Edition, 1998, Techmedia Publications, New Delhi.
3. Lay S. Horstmann, Gray Cornell. *"Core Java 2 - Fundamentals"* 2nd Edition, 2000.
4. Scott daks & Henry *"Java threads"*, 2nd Edition, , Shroff Publishers & Distributors Pvt Ltd.
5. Elliotte Rusty Harold, *"Java Network Programming"*, First Edition, 2000, Shroff Publications & Pvt Ltd.

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Course	Code	Network Management and Security	Sem	Hrs	Cre
CC-XII	15PA316		III	4	4

**Objectives:**

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Learn network devices functions and configurations Bridges, switch and routers.
- Be familiar with LAN and TCP/IP services.
- Learn to analyze network Management and protocols
- Understand network security concepts.

**Unit -I:**

**Basic Concepts:** Line Configuration – Topology – Transmission Mode – Categories of Network – Internetworks – OSI Model – Layered Architecture – Functions of the Layer – TCP/IP Protocol suite. (08)

**Unit - II:**

**Transmission Media:** Guided Media – Unguided Media – Transmission impairment – Performance. **Networking and internetworking devices:** Repeaters – bridges – routers – gateways – other devices. (10)

**Unit - III:**

**LAN Technologies:** LAN overview – Protocol & Standards – LAN Services – LAN Operating Systems. **TCP/IP and the Internet Architecture:** Internet Architecture - Internet Protocol (IP) and Datagrams – Routing Protocols – UDP – TCP – Internet Standard Services – DNS – TCP/IP for PCS –Internet Applications. (14)

**Unit - IV:**

**Network Management:** SNMP – RMON and RMONV2 – TMN – Directory services and network management – web-based network management. (14)

**Unit - V:**

**Communication and Network Security:** Cryptography – Digital certificate and public key – Firewalls – Kerberos – Secure socket layer (SSL) and Virtual private network (VPN) – New Technologies in network security applications. (14)

**Books for Study:**

1. BehrouzA.Forouzan, “Data Communication and Networking”, 4th edition, McGraw Hill International , 2007 (Unit I & II). ISBN : 978-0-07-296775-3.
2. YouluZheng, Shakil Akhtar, “Networks for Computer Scientists and Engineers”, Oxford University Press, 2002 .(Unit III,IV & V) ISBN : 0195113985

**Book for Reference:**

1. Andrew S Tannebaum, “Computer Networks”,Prentice Hall of India, New Delhi, 1999.  
./VP



Course	Code	Platform Based Development-1 [Web Development]	Sem	Hrs	Cre
CC-XIII	15PA317		III	4	4

### Objectives:

- To study the basics of web technology
- To learn the Server side technology and its OOP concepts
- To understand MySql database and its connectivity with PHP
- To impart knowledge in Web applications with Ajax

### Unit - I:

**Web Medium:** Core web technologies – web browsers – Markup Languages – Style sheet technologies – programming technologies – client side, server side – network and related protocols – Introduction to static, dynamic and active web pages. (12)

### Unit-II:

**Programming in PHP** – Structure and syntax of PHP and integrating the same with HTML – Comments – Variables – data types – operators – Control structures - Arrays and functions - Passing information between pages – Strings. (12)

### Unit-III:

OOP in PHP: Introduction- Objects - Declaring a class - The new keyword and constructors - Destructors - Accessing methods and properties - class constants - cloning object- Polymorphism - parent and self - instance of operator - Inheritance and interfaces - toString() and autoload() method. (12)

### Unit-IV:

PHP / MySQL Functions. **Apache & MySQL:** Using PHP with MySQL – using tables – form design – editing the data base – validation – using Apache Web Server – handling and avoiding errors – creating an interactive web page using AMP technology. (12)

### Unit - V:

Ajax and Future Web Applications : Functionality - Advantages of Web Applications - HTTP and HTML - PHP and server side Technologies - Javascript and Client side technologies - Understanding Ajax - Building Simple Application with Ajax and PHP - Introduction to JQuery. (12)

**Books for Study:**

1. Thomas A Powell, "**Web Design – The complete Reference**", Tata McGraw-Hill, Second Edition, 2003
2. Michael K Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer,Jeremy Stolz, Jason Gerner, "**Beginning PHP, Apache, MySQL Web Development**", Wiley dream-tech press, 2004 edition.
3. Andi Gutmans, Stig Sæther Bakken and Derick Rethans, "**PHP5 Power Programming**", Prentice Hall (Unit II: Chapter 3)
4. Cristian Darie, Bogdan Brinzarea, Filip Cherecheş-Toşa, Mihai Bucica, "**Building Responsive Web Applications with Ajax and PHP**", Packet Publishing(Unit V)

./KP

Course	Code	Software Lab-5[JAVA]	Sem	Hrs	Cre
CC-XIV	15PA318L		III	4	2

### Objectives:

To provide depth programming knowledge in JAVA.

### Preliminaries(2 Labs)

Basic concepts

Control structures

Arrays

String Manipulation

### Cycle - I

Classes and objects

Constructors

Method Overloading

Abstract class

Inheritance

Method overriding

'static', 'This', 'Final' and 'super' keyword

### Cycle - II

Packages

Interfaces

Exception handling

Thread

Streams

### Cycle - III

AWT

Applet

Database connectivity(queries)

./JS

Course	Code	Software Lab-6 [Web Development]	Sem	Hrs	Cre
CC-XV	15PA319L			III	4

### Objectives

To gain knowledge of developing interactive web pages

### Preliminaries

Static Web page Creation

### Cycle - I:PHP Programs

1. Usage of echo, operators, control structures
2. Arrays and loops
3. Functions, passing information between pages
4. OOPs based programs
5. Simple Applications with HTML&PHP

### Cycle - II

1. Mysql Commands & constraints
2. php-mysql(connection establishment, table creation, insertion,query)
3. Simple dynamic web sites using html-php-mysql
4. Interactive Web Pages

### Cycle - III

Interactive Web Page using Ajax and JQuery.

Course	Code	Operation Research	Sem	Hrs	Cre
SC5	15PA320		III	4	4

### Objectives

- To provide the basic concepts in Operations Research
- To understand and solve mathematical model of linear programming problems
- To Understand network modeling for planning and scheduling the project activities
- To learn and solve Inventory decision making problems.

### Unit - I:

Linear Programming Problem: Formulation and Graphical Solutions, Simplex method, Degeneracy, Unbounded and infeasible solution, Method of penalty, Two Phase method. (12)

### Unit - II:

Linear Programming (Continued): Duality – Primal and Dual Computations, Dual simplex method. Transportation problem – Assignment Problem – Hungarian method. (12)

### Unit- III:

PERT / CPM: Arrow (Network) Diagram Representation, Time estimates, Critical path, Floats, Construction of time Chart and Resource Leveling, Probability and cost considerations crashing of networks. (12)

### Unit - IV:

Queuing: Queuing System, Characteristics of Queuing System, Classification of queues, Definition of Transient and Steady states, Poisson Queues, M/M/1 and M/M/C Queuing models. (12)

### Unit -V:

Inventory : The inventory decisions – Deterministic model, EOQ, finite and infinite delivery rates without back ordering, EOQ problems with price breaks, multi item deterministic problem, Inventory problems with uncertain demand. (12)

### Book for Study:

1. KantiSwarup, P.K.Gupta, ManMohan, "**Operation Research**", 7<sup>th</sup> Edition, Sultan Chand & Sons 1994. (UNIT I: Chapters 2,3,4  
UNIT II: Chapter 5, Chapter 11: 11.1-11.3  
UNIT III: Chapter 25    UNIT IV: Chapter 21    UNIT V: Chapter 19)

### Book for Reference:

1. Sundaresan, K.S. Ganapathy Subramanian, K.Ganesan, "**Resource Management Technique**", New Revised Edition, A. K. Publications, June 2000.

Course	Code	Data Mining & Ware housing	Sem	Hrs	Cre
CEC-I a	15PA321a			III	4

**Objectives:**

- To introduce the basic concepts of data mining and preprocessing techniques
- To imbibe the knowledge on Association Rule Mining
- To elaborate the importance of classification and prediction techniques through various methods.
- To introduce the concepts and importance of clustering technique.

**Unit – I:**

**DATA MINING & DATA PREPROCESSING:** Introduction to **KDD process** – Knowledge Discovery from Databases - Data Preprocessing: An Overview – **Data Cleaning** – Data Integration – **Data Reduction –Data Transformation and Data Discretization.** (10)

**Unit – II:**

**ASSOCIATION RULE MINING:** Mining Frequent Patterns: Basic concepts - Frequent Itemset Mining Methods: **Apriori Algorithm:** Finding Frequent Itemsets using Candidate Generation-Generating Association Rules from Frequent Itemsets- **A Pattern-Growth Approach for Mining Frequent Itemsets .** (10 Hrs.)

**Unit – III:**

**CLASSIFICATION:** Basic Concepts - Decision Tree Induction -**Bayes Classification Methods- Rule-Based Classification** - Model Evaluation and Selection- Techniques to Improve Classification Accuracy. (13 Hrs.)

**Unit – IV:**

**CLUSTERING:** Cluster Analysis - Partitioning Methods: **k-means and k-medoids** – **Hierarchical methods:** Agglomerative and Divisive Hierarchical Clustering - BIRCH – Density-Based Methods: DBSCAN – Grid-Based Methods: STING and CLIQUE - Evaluation of Clustering (15 Hrs.)

**Unit – V:**

**DATA WAREHOUSE:** Data Warehousing - Operational Database Systems vs. Data Warehouses - Data Warehouse Multitier Architecture - **Data Warehouse Models: Enterprise Warehouse, Data Mart and Virtual Warehouse** - Multidimensional Data Model: Data Cube, Stars, Snowflakes, and Fact Constellations – Online Analytical Processing: Introduction - **OLAP Operations** (12 Hrs.)

**Book for Study:**

1. Jiawei Han and MichelineKamber, “**Data Mining Concepts and Techniques**” Second Edition, Elsevier, Reprinted 2008.

**Books for Reference:**

1. K.P. nSoman, ShyamDiwakar and V. Ajay, “**Insight into Data mining Theory and Practice**”, Easter Economy Edition, Prentice Hall of India, 2006.
2. G. K. Gupta, “**Introduction to Data Mining with Case Studies**”, Easter Economy Edition, Prentice Hall of India, 2006.
3. A Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “**Introduction to Data Mining**”, Pearson Education, 2007

Course	Code	<b>Ruby On Rails</b>	Sem	Hrs	Cre
CEC-I b	15PA321b		III	4	4

**Objectives:**

- To study the basic structure and syntax.
- To develop the programming capability in functional programming.
- To know about the implementation of classes and objects.
- To learn Ruby platform, Interpreter and its environment.

**Unit - I**

Introduction – Structure and Execution ruby programs – data types and objectives – expressions and operators. (12)

**Unit - II**

Statement and control structures – loops – blocks – exception handling – methods – Procs, Lambdas & closures – functional programming. (12)

**Unit - III**

Classes and modules – defining the class – method – object creation – modules – reflection and meta programming – types – classes and modules – methods – hooks – alias chaining. (12)

**Unit - IV**

Ruby – Platform – Strings – Regular expression – collection – files and directories – Input output - networking – threads and concurrency. (12)

**UNIT V**

Ruby environment invoking ruby interpreter – top-level environment – calling the wires - security – applications of ruby languages. (12)

**Books for Study:**

1. David Flanagan & Yukihiro Matsumoto, “*The Ruby Programming Language*”, O’Reilly.

Course	Code	<b>Software Testing</b>	Sem	Hrs	Cre
CEC-I c	15PA321c		III	4	4

**Objectives**

- To study the principles of testing and Life cycle models
- To understand various testing techniques
- To learn about Test automation

**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. (12)

**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 Partitioning – State Based or Graph Based Testing – Compatibility Testing – User Documentation Testing –Domain Testing. (12)

**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. (12)



#### **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.** (12)

#### **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.** (12)

#### **Book for Study:**

1. Srinivasan Desikan and Gopalswamy Ramesh, "**Software Testing: Principles and Practices**", Pearson Education Publication

#### **Books for Reference:**

1. Ron Patton, "**Software Testing**", 2nd Edition, Pearson education , 2004
2. RenRajani, Pradeep Oak, "**Software testing – effective methods tools, techniques**" TMH, 2004

Course	Code	<b>Debugging</b>	Sem	Hrs	Cre
CBP II	15PADPS		III	2	--

**Objectives:**

The main objectives of this course is to train the students to locate or identify the bugs in the program.

**Methodology:**

Training will be provided to the students to identify the following types of errors.

- Compiler Errors
- Linker Error
- Runtime Error
- Logical Error

**Compiler Errors:**

Every language has got set of rules. If you make a mistake while using the language, then it is called **syntax error/compiler error**

**Linker Error**

The *linker* is a program that links object files and libraries together to create an executable program. The linker matches up functions and global variables used in object files to their definitions in other object files. The linker uses the *name* (often the term *symbol* is used) of the function or global variable to perform the match.

**Run time Error**

Runtime Errors: Exceptions due to insufficient memory and Segmentation fault, stack over flow, etc. A runtime error occurs when the program is running and usually results in the program aborting. There are several types of runtime errors:

- Illegal memory access
- Division by zero

**Logical Error /Semantic Error**

You are writing program to solve a problem. So, there is a set of input and you expect some output. If there is difference between the expected o/p and actual o/p, then your program logic is wrong. This is called **Logical Error**.

Language to be used: C Multiple training sessions shall be conducted to identify errors in C program snippets.

Duration: 10 weeks:

Evaluation:

Test1 : 25 questions - 25 marks ( 5<sup>th</sup> week)

Test 2 : 25 questions - 25 marks (10<sup>th</sup> week)

Tests will be conducted and evaluated internally; passing minimum 50 %

Failed candidates can reappear in the 11<sup>th</sup> or 12<sup>th</sup> week

## **Programming concepts**

### **Unit - I**

Basic concepts – Data types - Type casting - Input and Output statements – escape sequences -Control strings - User defined data types : enum - Usage of operators: unary, binary and ternary - Control structures - Dealing with logical values

**[ week 01 - 02 ]**

### **Unit - II**

Functions - Call by value and call by reference - Usage of string functions and mathematical functions – Usage of static, auto, register and extern. **[ week 03 - 04 ]**

### **Unit - III**

Arrays - Usage of character arrays- recursion - Usage of structures and union

**[ week 05 - 06 ]**

### **Unit - IV**

Pointers - constant pointer and pointer to a constant- usage of far pointers - usage of character pointers**[ week 07 - 08 ]**

### **Unit - V**

Macros – preprocessor directives–memory allocation and de allocation functions: malloc, realloc, calloc, free**[ week 09 - 010 ]**

### **Books for reference**

C: Test Your Aptitude By Venugopal & Chandrakan

Test Ur C Skills By Yashavant Kanetkar

Programming with ANSI and Turbo C By Kamthane

Working with C By Yashavant Kanetkar  
Understanding Pointers in C By Yashavant Kanetkar

Interview Questions in C Programming - Yashavant Kanetkar & Asang Dani

C Under DOS Test – Vijay Mukhi's Series

### **Web references:**

<http://www.faq-c.com>

<http://www.techpreparation.com/aptitude-questions/c-aptitude-questions1.htm>

<http://www.softinterview.com>

Course	Code	<b>Distributed Programming using J2EE</b>	Sem	Hrs	Cre
CC-XVI	15PA422		IV	4	4

**Objectives:**

- To understand the architecture of Distributed Hardware.
- To learn the methods of developing distributed applications using RMI, Java, Servlets and JSP
- To impart knowledge in Struts Frame work.
- To give exposure in developing distributed applications & Component programs (EJB).

**Unit - I:**

Distributed Hardware Architecture: 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. (14)

**Unit - III:**

Java Server Pages: JSP Basic Concepts – JSP Elements – Expressions – Scriplets – 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. (12)

**Unit - IV:**

The Struts Framework: Introduction – Building a simple Struts Application. J2EE Platform: **J2EE Architecture – Containers** – **J2EE Technologies:** Component – Service – Communication Technologies – **Developing J2EE Application.** (12)

**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.** (12)

### **Books for Study:**

1. Ivan Bayross, "**Web Enabled Commercial Applications Development using Java 2**", Edition 2000, BPB Publications.
2. Jason Hunter with William Crawford, "**Java Servlet Programming**", Shroff Publishers & Distributors Pvt. Ltd.
3. Phil Hanna, "**JSP 2.0 TheComplete Reference**", Tata McGraw Hill Publishing Company Limited.
4. James Holmes,"**Struts: The Complete Reference**", Second Edition, Tata McGraw Hill Publishing Company Limited.
5. SubrahmanyamAllamaraju, "**Professional Java Server Programming - J2EE Edition Volume 1**", Shroff Publishers & Distributors Pvt. Ltd.
6. SubrahmanyamAllamaraju, "**Professional Java Server Programming - J2EE 1.3 Edition**", Shroff Publishers & Distributors Pvt. Ltd.

./KSD

Course	Code	Software Engineering	Sem	Hrs	Cre
CC-XVII	15PA423		IV	4	4

**Objectives:**

- To learn the basic concepts of software engineering
- To know various phases of software development life cycle
- To understand the concepts of software reuse and Quality Issues.

**Unit - I:**

Introduction to Software Engineering: Software – The changing nature of software – A generic view of Process: Software Engineering : A Layered Technology – A process framework - Process Models: Perspective Models – The Waterfall Model – Incremental Process Models – Evolutionary Process Models - Specialized Process Models. (12)

**Unit - II:**

Requirements Engineering: Requirements Engineering Tasks – Initiating the Requirements Engineering Process – Eliciting Requirements – Developing use – cases. Building the Analysis Model: Requirement Analysis – Analysis Modeling approaches – Data Modeling concepts – Object Oriented Analysis – Scenario Based Modeling – Flow Oriented Modeling – Class based Modeling – Creating a behavioural modeling. (12)

**Unit - III**

Design Engineering: Design within the context of Software Engineering – Design Process and Design Quality – Design Concepts –The Design Model – Pattern Based Software Design. Creating an Architectural Design – Software Architecture – Data Design– Mapping Data flow into a software Architecture. (12)

**Unit - IV**

Estimation: The project planning process – software scope and feasibility – Resources – Software Project Estimation – Decomposition Techniques – Empirical Estimation Models – Estimation for object – oriented projects – The Make/Buy Decision. Testing Strategies: Unit testing – Integration testing-Validation Testing – System Testing - White Box Testing-Basic Path Testing-Control Structure Testing-Black Box Testing. (12)

**Unit - V**

Reengineering : Business Process Reengineering – Software Reengineering – Reverse Engineering – Restructuring – Forward Engineering. Quality Management: Quality concepts – Software Quality Assurance – Formal Approaches to SQA. (12)

**Book for Study:**

1. Roger S. Pressman, "*Software Engineering - A Practitioner's Approach*", 7th Edition, McGraw - Hill International Edition, ISBN: 007-124083.

**Book for Reference:**

1. Richard Fairley, "*Software Engineering concepts*" McGraw Hill Publication

./JS

Course	Code	Platform Based Development-II (Game Development )	Sem	Hrs	Cre
CC-XVIII	15PA424			IV	4

### Objectives:

- To learn the basic concepts of Python
- To understand sequencing structures
- To familiar with files and exceptions
- To study OOPs concepts
- To study the pygame module and its functionalities

### Unit-I:

Using python: Installing python- The python Interpreter – Interactive mode – IDLE programming environment – Basics of Python Language: comment – variables Strings and String literals - Getting input and Displaying output (input, raw\_input& print)- Operators and Expressions – **Control Flow Statements:** Decision structures and loop control structures-Guess the number game. (12)

### Unit-II:

**Data Structures: List, Tuples, Dictionaries, Set and Strings – Functions – Modules - The hang man game.** (12)

### Unit-III:

File Handling – Errors and Exception Handling – Python Standard Library. (12)

### Unit-IV:

**Regular Expression** - Object Oriented Programming: Objects and Classes – Inheritance - The Blackjack game. (12)

### Unit-V

**Game development using Pygame:** Installing pygame – importing the pygame module-pygame.init()-pygame.display.set\_mode() and pygame.display.set\_caption() – colors in pygame – fonts – drawing functions- fill and blit method – pygame.display.update() – events and game loop – pygame.event.get()- pygame.quit(), pygame.time.Clock and tick () Method.Case studies : pong game and tic-tac-toe. (12)

### Books for Study:

1. Guido van Rossum, “ *Python Tutorial – Release 2.3.3*” 2003, Python Software Foundation Ltd.
2. Tony Gaddis, “*Starting out with python*”, 2<sup>nd</sup> edition, Addison Wesley, Pearson
3. Michael Dawson, “*Python programming for the absolute beginner*”, Premier press, 2003
4. Jennifer Campbell, Paul Gries, Jason Montojo and Greg Wilson, “*Practical programing, An Introduction to computer science using Python*”,2009

### Books for Reference:

1. Al Sweigart, “*Invent your own computer games with python*”, 2<sup>nd</sup> edition, 2008



Course	Code	Software Lab-7[J2EE]	Sem	Hrs	Cre
CC-XIX	15PA425L		IV	4	2

**Objectives:**

- To learn the usage and implementation of distributed application development packages.

**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**

Web based distributed application in J2EE platform with Java Servlets

Web based distributed application in J2EE platform with JSP

**Cycle - III**

Enterprise Java Beans

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

./KSD

Course	Code		Sem	Hrs	Cre
CC-XX	15PA426L	Software Lab-8[Game Development]	IV	4	2

## Objectives

To gain depth knowledge in developing games using Python

### Cycle - I

Operators

Decision making statements

Loops

Game using above concepts

### Cycle - II

Data Structures

Functions

Modules

Game using above concepts

### Cycle - III

Classes and Objects

Inheritance

Overloading

Game using OOP

Game using PyGame

./KP

Course	Code	Service Oriented Architecture	Sem	Hrs	Cre
CEC-II a	15PA428a		IV	4	4

**Objectives:**

- To understand software architecture and technologies related to SOA
- To learn Service oriented Analysis and Design
- To know about SOA implementation
- To understand metadata management
- To know about SOA in mobile research

**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. (12)

**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. (14)

**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. (12)

**Unit - IV:**

Meta data management – XML security – XML signature – XML Encryption – SAML – XACML – XKMS – WS-Security – Security in web service framework – advanced messaging. (12)

**Unit - V**

Transaction processing – paradigm – protocols and coordination – transaction specifications – SOA in mobile – research issues. (10)

**Books for Study:**

1. Shankar Kambhampaly, “Service –Oriented Architecture for Enterprise Applications”, Wiley India Pvt Ltd, 2008.
2. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education.
3. Mark O’ Neill, et al. , “Web Services Security”, Tata McGraw-Hill Edition, 2003

Course	Code	Human Computer Interaction	Sem	Hrs	Cre
CEC-II b	15PA428b		IV	4	4

**Objectives:**

- To provide necessity for human computer interaction
- To understand the basics of HCI
- To learn the design rules of HCI
- To know the necessary technologies used for interaction.

**Unit - I:**

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. (12)

**Unit - II:**

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. (12)

**Unit - III:**

Design rules: Introduction - Principles to support usability - Standards - Guidelines - Golden rules and heuristics - HCI patterns - Implementation - Support: Introduction - Elements of windowing systems - Programming the application - Using toolkits - User interface management systems. (12)

**Unit - IV:**

Evaluation techniques: What is evaluation - Goals of evaluation - Evaluation through expert analysis - Evaluation through user participation - Choosing an evaluation method - Universal Design: Introduction - Universal design principles - Multi-modal interaction - Designing for diversity. (12)

**Unit - V:**

User Support: Instruction - Requirements of user support - Approaches to user support - Adaptive help system - Designing user support systems. (12)

**Book for Study:**

1. Alan Dix, "*Human-computer Interaction*", Pearson Education – 2004

Course	Code	<b>Business Intelligence</b>	Sem	Hrs	Cre
CEC-II c	15PA428c			IV	4

**Objective:**

- To study the basic concepts and architecture of warehouse
- To learn the applications of data mining and its techniques
- To know the Business Intelligence process
- To familiar with knowledge management.

**Unit - I:**

Introduction to business intelligence and business decisions – Data warehouses and its role in Business Intelligence – Creating a corporate data warehouse – Data Warehousing architecture – OLAP vs. OLTP - ETL process – Tools for Data Warehousing – Data Mining – KDD Process. (13)

**Unit II:**

Applications of Data Mining in Business – Data Mining Techniques for CRM – Text Mining in BI - Web Mining – Mining e-commerce data – Enterprise Information Management - Executive Information Systems. (12)

**Unit III:**

Business Intelligence – Function, Process, Services & Tools - Application in different domains – Operational BI - Customizing BI – Managing BI projects vs. Traditional IS projects – Managing BI projects – Best Practices in BI Strategy. (12)

**Unit IV:**

Knowledge Management – Definition – Data Vs. Information Vs. Knowledge – The ten key principle of KM – Knowledge Management Architecture – Knowledge Management Vs. Knowledge Processing – KM approaches – KM Tools – KM Infrastructure – KM models - KM Strategies. (13)

**Unit V:**

Web Analytics and Business Intelligence – eCRM - Case Study: Web Trends – Boeing – Ever Bank – China Eastern. (10)

**Books for Study:**

1. M.Raisinghani, "*Business Intelligence in the Digital Economy - Opportunities, Limitations and Risks*", Idea Group publications, 2004.
2. Sumathy, Sivanandam, "*Introduction to Data Mining and its Applications*", Springer Verlag, 2006.
3. Yogesh Malhotra, "*Knowledge Management and Business Innovation*", Idea Group, 2001.

Course	Code	Programming Skill Development	Sem	Hrs	Cre
CBP II	15PADPS			IV	2

**Objectives:**

To train the students to write the programme by their own

Languages Used: C/JAVA/ Python

Evaluation:

Test I: 25 Marks

Test II: 25 Marks

Total: 50 Marks

Sample Questions to test Programming Skill

1. Print the following.

```
1
2 2
3 3 3
```

2. Write a C program to display Floyd's Triangle as follows.

```
1
2 3
4 5 6
8 9 10
```

3. Write a C program to draw Pascal's triangle.

```
1
    1 1
  2 1
1 3 3 1
```

4. Write a C program to display reverse pyramid.

```
* * * * *
* * * *
* * *
* *
*
```

5. Write a code to copy string manually without using any function.

6. Write a program to copy string manually without using any function.

7. Write a program to concatenate two strings manually without using any function.

8. Write a code to check if number entered by user and its reverse number is equal or not.

9. Write a code to check whether a number entered by user is Armstrong or not.

10. Write a code to display all prime numbers between two interval entered by user.

11. Count and display the number of positive and negative numbers from the list.

25, -10, 15, 0, -12, 8, 9

12. Print the length of the string without using string functions.

Ex. NMC- Input

- Output

13. Pick out and print initials from the string.

15. Convert upper case input into lower case without using string functions.  
Ex. NMC – Input  
nmc - Output
16. Consider the following numbers and find the sum of square root of even numbers.  
25, 16, 15, 64, 9
17. Find and display the sum of odd digits of a number 123456789.
18. Find the sum of upper diagonal elements of any 2X2 matrix.
19. Check the sum of diagonal elements of a 3X3 matrix is odd or even.
20. Substitute \$ symbol in place of space on the string specified and copy to another string.  
String: 98 45 67 231

Course	Code	<b>Distributed Programming using .NET</b>	Sem	Hrs	Cre
CC-XXI	15PA529		V	4	4

**Objectives:**

- To understand the architecture and frame work of .NET
- To study the concepts of VB
- To familiar with the concepts of C#
- To impart knowledge in ASP .NET and Ado .NET

**Unit-I:**

The NET Architecture: The vision and goals of . NET – The building blocks of NET – An Overview of . NET framework: The NET Evolution – Design goals of the NET frame work – The NET framework Architecture – An Overview of .NET application. (12)

**Unit-II:**

Features of VB: Fundamentals – classes and Objects – Inheritance and Polymorphism – Operator Overloading – Structures-Interfaces – Arrays – Indexers and Collections – Strings and Regular Expressions – Handling Exceptions – Delegates and Events. (12)

**Unit-III:**

Features of C# : Fundamentals – classes and Objects – Inheritance and Polymorphism – Operator Overloading – Structures-Interfaces – Arrays – Indexers and Collections – Strings and Regular Expressions – Handling Exceptions – Delegates and Events. (12)

**Unit-IV:**

ASP .NET Overview of ASP .Net Frame work – Overview of CLR – Class Library – Overview of ASP .Net Control – Understanding of HTML Controls – Study of Standard Controls – Validation Controls – Rich Controls – Adding controls to forms – Handling events and using various Tools. (12)

**Unit-V:**

ADO .NET Fundamentals – Component Object Model – ODBC – OLEDB and SQL Connected mode – Disconnected Mode – Data Set – Data Reader – Data Access Control – Grid View Control – Other controls. (12)

**Books for Study:**

1. Stephen C. Perry, AtulKahate, Stephen Walther, , Joseph Mayo," *Essentials of .Net and Related Technologies: With a focus on C# , XML, ASP .NET and ADO .NET*", First Edition, Pearson Education., 2009.
2. Matt Telles, Kogent Solutions Inc.Telles, "*C# 2005 Programming, Black book*", Dreamtech press, 2007.
3. Schildt, Herbert, "*C#: The Complete Reference*", Second Edition, McGraw-Hill,2008.
4. Kevin Hoffman & Jeff Gabriel, "*Professional .NET Framework*", Shroff Publishers and Distributors Pvt. Ltd.

./RA



Course	Code	Compiler Design	Sem	Hrs	Cre
CC-XXII	15PA530		V	4	4

**Objectives:**

- To introduce the various phases of a compiler
- To inculcate thorough knowledge in Parsers
- 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. (12)

**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. (14)

**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. (12)

**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 – Peep hole optimization. (12)

**Book for Study:**

1. A.V.Aho and J D Ullman, "**The Principles of Compiler Design**", Narosa Publishing House, 1987, ISBN: 81-85015-61-9.(Chapters: 1, 3, 4, 5, 6, 7, 9, 10, 11, 12, 15)

**Book for Reference:**

1. Alfred Aho, Ravi Sethi, Jeffy D. Ullman, "**Compilers – Principles, Techniques and Tools**", Pearson Education Asia, 2003

./JS

Course	Code	Platform Based Development-III [ Mobile Apps Development]	Sem	Hrs	Cre
CC-XXIII	15PA531			V	4

### Objectives:

- To provide thorough introduction to Android.
- To learn the basic concepts of Android Development tools and Life cycle.
- To impart knowledge about user interfaces
- To have an exposure about databases and content providers
- To understand the principles of graphics, messaging, sound , video and publishing the application

### Unit - I:

Android Introduction: An Open Platform for Mobile Development – Native Android applications – Android SDK features – Evolution- development of android for mobile – Development framework. (12)

### Unit - II:

Android application development: installation – Creating application – Types of Applications – Android development tools. Creating Applications and activities: Application Manifest file – Manifest editor – Externalizing the resources – Android application life cycle – Android application class- android activities. (12)

### Unit - III:

Building user interfaces: Fundamental UI Design – Layouts – Fragments – Widget Tool box – Creating new views – introducing adapters. (12)

### Unit - IV

Databases and content providers: Android databases – working with SQLite databases – Creating content providers – Native android content providers - Introducing the Action Bar – Creating and Using Menus and Action bar action items – Introducing Dialogs – Introducing notifications. (12)

### Unit - V

Supporting and optimizing for different screen sizes- creating scalable graphic assets - Working with animations-Audio, Video and using the Camera - introducing SMS and MMS – signing and publishing application. (12)

### Books for Study

1. Reto Meier, “Professional Android 4 Application Development”, WROX Publication – Wiley – India, 2012

### Books for Reference:

1. Pradeep Kothari &Kogent Learning Solutions Inc, “Android Application Development Black Book”, Dreamtech Press, Edition 2014, ISBN: 978 – 93 – 5119 – 409 – 5
2. W.FrankAbleson, RobiSen, Chris King, C.Enrique Ortiz, “Android in Action”, Manning Publications Co,Third Edition, ISBN 9781617290508
3. Lauren Darcey, Shane Conder, “SAMS Teach Yourself Android Application Development in 24 Hours”, Second edition.

./KP

Course	Code	Software Lab-9[.NET]	Sem	Hrs	Cre
CC-XXIV	15PA532L		V	4	2

**Objectives:**

To provide in depth practical knowledge in .NET

**Cycle - I**

Working with Forms

**Cycle - II**

ASP.NET Programs

Using with Web Controls

Using with Validators

**Cycle - III**

Web Applications development

Session Tracking

Course	Code	Software Lab-9[.NET] Software Lab-10[Mobile Apps Development]	Sem	Hrs	Cre
CC-XXV	15PA533L		V	4	2

**Objectives:**

To provide in practical knowledge in developing mobile apps.

**Cycle - I**

Layouts

Views

Events

Files

Preferences

Notifications

**Cycle - II**

Programs using SQLite

Audio and Video Applications

**Cycle - III**

Repeating Alarms

Long Running background

Course	Code	Big Data Analytics	Sem	Hrs	Cre
CEC-III a	15PA534a		V	4	4

### Objectives:

- To know the basics of Big data
- To understand mining of Data
- To study Hadoop, map reduce and its environment
- To understand the framework of Big Data Analytics

### UNIT I

INTRODUCTION TO BIG DATA: Introduction to BigData 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. (12)

### 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. (12)

### 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 . (12)

### 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 (12)

### 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 Info Sphere Big Insights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications. (12)

### Book for Study

1. AnandRajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
2. Tom White “Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.
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

### 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.

Course	Code	Haskell Programming	Sem	Hrs	Cre
CEC-III b	15PA534b		V	4	4

**Objectives:**

- To study evaluation and applications of Haskell
- To know about functional programming
- To understand Type classes and file processing
- To gain knowledge about data structures in Haskell

**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. (12)

**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. (12)

**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. (12)

**Unit – IV:**

File processing – Regular Expressions – Pattern matching – Writing Lazy Function – I/O case study – Find – Naïve finding system – Predicates. (12)

**Unit – V:**

Data Structures – Association Lists – maps – Monads – Monad type class using new monad – State Monad. (12)

**Book for Study:**

1. O’Sullivan, “*Real World Haskell*”, O Reilly, ISBN-10: 8184046480  
ISBN-13: 978-8184046489

Course	Code	Software Project Management	Sem	Hrs	Cre
CEC-III c	15PA534c		V	4	4

### Objectives:

- To study the importance and evolution of Software Project Management
- To understand the Framework and architectures
- To know about planning and automation
- To learn risk management concepts

### Unit-I

Software Management Renaissance: Conventional Software Management –Evolution of Software Economics - Improving Software Economics - The Old Way and the New. (12)

### 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. (12)

### Unit-III

Software Management Disciplines: Iterative Process Planning –Project Organizations and Responsibilities - Process Automation. (12)

### Unit-IV:

Software Management Disciplines: Project Control and Process Instrumentation - Tailoring the Process. (12)

### 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. (12)

### Books for Study:

1. Walker Royce, *“Software Project Management”*, First Edition, Pearson Education. ISBN-10: 8177583786, ISBN-13: 978-8177583786
2. Joel Henry, *“Software Project Management”*, Pearson Education
3. Roger S. Pressman, *“Software Engineering”*, TMH Publications

Course	Code	<b>Cloud Computing</b>	Sem	Hrs	Cre
CEC-IV a	15PA535a		V	4	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. (10)

**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. (10)

**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. (15)

**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. (10)

**Books for Study:**

1. RajkumarBuyya, James Broberg, and AndrzejGoscinski. "**Cloud Computing Principles and Paradigms**" 2011edition (UNIT I, II, V)
2. Michael Miller, "**Cloud Computing: WebBased Applications that change the way You work and collaborate online**", Pearson Education, 2009 edition. (UNIT III,IV) , ISBN: 9788131725337

**Bok for Reference:**

1. George Reese" **Cloud Application Architectures**" Shroff/O' Reilly,2009.edition  
ISBN: 8184047142

./DJ

Course	Code	Graphics and Multimedia	Sem	Hrs	Cre
CEC-IV b	15PA535b		V	4	4

**Objectives:**

- To study the graphics techniques and algorithms.
- To study the multimedia concepts and various I/O technologies.
- To enable the students to develop their creativity using Output Primitives.

**Unit-I:**

Output Primitives: Introduction - Line - Curve and Ellipse Drawing Algorithms - Attributes - Two-Dimensional Geometric Transformations. (12)

**Unit-II:**

Two-Dimensional Clipping and Viewing-Three-Dimensional Concepts - Three-Dimensional Object Representations - Three-Dimensional Geometric and Modeling-Transformations. (12)

**Unit - III:**

Three-Dimensional Viewing -Color models and Color Applications - Computer Animation. (12)

**Unit-IV:**

Multimedia Systems Design - An Introduction - Multimedia applications -Multimedia System Architecture - Evolving technologies for Multimedia -Multimedia Databases. (10)

**Unit-V:**

Multimedia File Handling - Compression & Decompression: Types of Compression - Binary Image Compression Scheme - Audio and Fractal Compression - Data & File Format standards: Rich Text Format - TIFF file Format - RIFF and MIDI File Format - Multimedia I/O Technologies. Hypermedia - Multimedia Authoring and User Interface - Hypermedia messaging. (14)

**Books for Study:**

1. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.
2. Prabat K Andleigh and KiranThakrar, "Multimedia Systems and Design", PHI, 2003.

**Book for Reference:**

1. Judith Jeffcoate, "Multimedia in practice technology and Applications", PHI, 1998.
2. Foley, Vandam, Feiner, Huges, "Computer Graphics: Principles & Practice", Pearson Education, second edition 2003.

./RJ

Course	Code	Machine Learning	Sem	Hrs	Cre
CEC-IV c	15PA535c		V	4	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. (12)

**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. (12)

**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. (12)

**Unit - IV:**

INSTANT BASED LEARNING : K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning. (12)

**Unit -V :**

ADVANCED LEARNING : Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning (12)

**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	Professional Skill Development	Sem	Hrs	Cre
PSD	15PAPS		V	2	2

**Objectives:**

To motivate the students to sharpen their creativity, logical thinking and Professional approach in solving the problems.

**Methodology:**

The Student shall undergo a professional skill oriented courses which will create employability, inculcate entrepreneurship and converting a trainee into a trainer.

The Courses may be offered by the college or by the University or Any Recognised Institute or through Massive Open Online Courses (MOOC). The student shall submit a certificate and grading awarded by the institute concern to earn the credit.

## Changes Made

S No	Course Type	Title	Remarks
1	CC-I	Web Design Using HTML & CSS	Web Programming Course is bifurcated into Web Design using HTML and Web Development
2	CC-II	Operating System	Removed CASE STUDIES from the existing syllabus . Moved to Semester I
3	CC-III	Digital Design and Architecture	Digital Electronics & Microprocessor and Computer Organization and Architecture is Combined into single course.
4	CC-IV	Software Lab-1[Web Design	Exercises are given based on the concepts
5	CC-V	Software lab-2[Syatem Administration]	Exercises are given based on System Calls
6	CC-VI	Programming in C	Text Book Changed & the syllabus updated accordingly. Shifted to Semester II
7	CC-VII	Data Structures and Algorithms	Removed Dictionary & its implementation
8	CC-VIII	Data Base System	Maintained Normal forms alone in UNIT III. Remaining are all removed from that Unit.
9	CC-IX	Software Lab-3[C]	Exercises are given based on the concepts
10	CC-X	Software Lab-4[RDBMS]	SQL Commands, Queries, Report generation and PL/SQL based exercises
11	CC-XI	Programming in JAVA	Added Swing and Network
12	CC-XII	Network Management and Security	New Course
13	CC-XIII	Platform Based Development -I [Web Development]	Added OOP in PHP and Ajax & Jquery
14	CC-XIV	Software Lab-5[JAVA]	Concept based Exercises with Swing, Networking & Database connectivity programs
15	CC-XV	Software Lab-6[Web Development]	Exercises based on concepts and developing web based application

<b>S No</b>	<b>Course Type</b>	<b>Title</b>	<b>Remarks</b>
16	CC-XVI	Distributed Programming Using J2EE	No Change
17	CC-XVII	Software Engineering	Removed Software Test strategies for OO Software and Statistical SQA
18	CC-XVIII	Platform Based Development-II[Game Development]	New Course
19	CC-XIX	Software Lab-7[J2EE]	Exercises based on concepts
20	CC-XX	Software Lab-8[Game Development]	Game should be developed based on the concepts in all the cycles
21	CC-XXI	Distributed programming using .NET	Elective Course in Existing syllabus moved to Core course in Proposed syllabus
22	CC-XXII	Compiler Design	Removed implementation of Stack allocation scheme from Unit IV
23	CC-XXIII	Platform Based Development-III[Mobile Apps Development]	New Course
24	CC-XXIV	Software Lab-9[.NET]	Exercises based on concepts
25	CC-XXV	Software Lab-10[Mobile Apps Development]	Exercises based on concepts

## Comparison of Structures

2011-2012		2015-2016
11PA101	Programming in C	Web Design using HTML & CSS
11PA102	Digital Electronics and Microprocessor	Digital Design and Architecture
11PA103	Web Programming	Operating System
11PA104L	Software Lab 1 [C]	Software Lab 1 [Web Design]
11PA105L	Software Lab 2 [Web Design]	Software Lab 2[Operating System]
11PA208	Object Oriented Programming using C++	Programming in C
11PA209	Data Structures and Algorithms	Data Structures and Algorithms
11PA210	Data Base Systems	Data Base System
11PA211L	Software Lab 3[C++]	Software Lab 3[C]
11PA212L	Software Lab 4[RDBMS]	Software Lab 4[RDBMS]
11PA315	Programming in JAVA	Programming in JAVA
11PA316	Operating System	Network Management and Security
11PA317	Computer Organization and Architecture	Platform Based Development-I[Web Development]
11PA318L	Software Lab 5[JAVA]	Software Lab 5[JAVA]
11PA319L	Software Lab 6[Data Structures]	Software Lab 6[Web Development]
11PA422	Windows Programming using WIN 32 API & MFC	Distributed Programming using J2EE
11PA423	Computer Networks and Security	Software Engineering
11PA424	Software Engineering	Platform Based Development-II [Game Development]
11PA425L	Software Lab 7[Windows Programming]	Software Lab 7[J2EE]
11PA426L	Software Lab 8[Distributed Programming]	Software Lab 8[Game Development]
11PA529	Principles of Compiler Design	Distributed Programming using .NET
11PA530	Computer Graphics and Multimedia	Compiler design
11PA531	XML and Web Services	Platform Based Development-III [Mobile Apps Development]
11PA532L	Software Lab 9[Web Services]	Software Lab 9[.NET]
11PA533L	Software Lab 10[CASE TOOLS]	Software Lab 10[Mobile Apps Development]
11PA636	Comprehensive Course	Project
11PA637P	Project	

## Comparison of Structures-Supportive Courses

### Mathematics Stream

<b>Discrete Mathematics and 11PA106 Numerical Methods</b>	<b>Mathematical Foundations for Computer Applications</b>
<b>11PA213 Probability and Statistics</b>	<b>Graph and Automata Theory</b>

### Commerce Stream

<b>11PA107</b>	<b>Human Resource Management</b>	<b>Human Resource Management</b>
<b>11PA214</b>	<b>Accounting and Financial Management</b>	<b>Accounting and Financial Management</b>
<b>11PA321</b>	<b>Organizational Behaviour</b>	<b>Removed</b>