Parvatibai Chowgule College of Arts and Science
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE
COURSE STRUCTURE
Post Graduate Diploma in Computer Applications(PGDCA)

Semester I (20 credits)

Paper Code	Paper Type	Paper Name	Credits	Student (hrs/week)	
				L	P
DCA11	Core – I	C Programming	4	3	1
DCA12	Core – II	DataBase Management Systems	4	3	1
DCA13	Core – III	Client Side Technologies	4	3	1
DCA14	Elective – I	Elective Paper I	4	3	1
DCA15	Elective - II	Elective Paper II	4	3	1

Semester II (20 credits)

Paper Code	Paper Type	Paper Name	Credits	Student (hrs/week)	
				L	P
DCA21	Core – IV	Computer Networking	4	3	1
DCA22	Core – V	Software Engineering	4	3	1
DCA23	Elective III	Elective Paper III	4	3	1
DCA24	Elective – IV	Elective Paper IV	4	3	1
DCA25	Elective V	Elective Paper V	4	3	1

L – Lectures ---> 1 Hour Duration

P – Practicals --->2 Hours Duration

List of Elective Papers

1. Multimedia
2. E-Learning
3. Python Programming
4. HCI
5. E-commerce
6. Digital Marketing
7. Network Administration
8. Object Oriented Programming
9. Software Testing
10. Server Side Programming
11. Data Structures
12. Accounting and Financial Management

Parvatibai Chowgule College of Arts and Science
(Autonomous)
Margao, Goa

Semester I & Semester II Syllabi for

PGDCA

(2016-2017)

Paper Title : C Programming

Paper Code : DCA11

Marks : 75

Credits : 3

Course Prerequisites : Nil

Course Objectives:

- To make the student understand the concept of computer algorithm and use the algorithm for various problem solving.
- To implement algorithms using high level programming language.
- To understand basic principles of structured programming using C

Learning Outcomes:

On completion of the course students will learn the following:

- Designing algorithm for a given problem
- Writing C Programs to implement algorithms

Syllabus

1. Introduction to Computer Problem Solving: [7L]

Algorithm, Flowchart, The Problem Solving Aspect, General problem solving strategies, Top-Down Design, Implementation of Algorithms, Efficiency of Algorithms, Analysis of Algorithm, Recursive algorithms.

2. Basic Algorithms: [3L]

Exchanging the values, Summation of a set of numbers, factorial computation, generation of the Fibonacci series, reversing the digits of an integer, base conversion.

3. Factoring Methods : [3L]

Finding divisors of an integer, finding the Greatest Common Divisor of two integers, generating prime numbers, computing prime factors of an integer.

4. Sorting and Searching algorithms : [2L]

Bubble sort, Insertion Sort, Sequential Search and Binary Search.

5. **Introduction to 'C':** [4L]

History, Structure of a C program, Keywords, Identifiers, variables, constants, data types, Arithmetic Operators & Expressions, Logical operators and Relational Operators, Precedence and Associativity rules.

6. Conditions and Iterations : [4L]

Conditions and Actions, Condition statement, Simple control statement (*if*, *if-else*, *switch*), Iterative control statements (*for*, *while*, *do-while*)

7. Functions: [6L]

What is a function, Advantages of functions, Standard library functions, User defined functions – declaration, definition, function call, parameter passing, return keyword. Scope of variables, Storage classes, Recursion.

8. Arrays: [5L]

One and Two dimensional arrays: Array declaration, initialization, accessing the values

9. Strings : [5L]

Declaration and initialization, standard library string functions, array of strings.

10. Structures: [4L]

Creating structures, accessing structure members, array of structures, passing structure to functions, nested structure

11. Preprocessing: [2L]

Format of Preprocessor directive, File Inclusion directive, Macro substitution, conditional compilation

Text Books:

1. Dromey R.G., How to solve it by computer, Prentice Hall of India, 2nd Edition, 2004.
2. Yeshwant Kanetkar, Let us C, BPB Publications, 13th Edition, 2012.
3. Behrouz Forouzan, Richard Gilberg, Computer Science: A Structured Programming Approach using C, Cengage Learning, 3rd Edition, 2013.

Reference books:

1. Horowith Ellis, Sahni Satraj, Sanguthevar Rajasekaran , Fundamentals of computer algorithm, Orient Longman, 2nd Edition, 2008.

2. Gottfried Byron, Programming with C, Tata McGraw Hill, 3rd Edition, 2010.

3. Brain W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall India, 2nd Edition, 1988.

Lab : C Programming

Credit : 1

Marks : 25

Programs using C language that covers the following concepts :

1. Program to compute a given formula.
2. Conditions
    - if..else
    - nested if
3. Iterative Control Statements
    - for
    - while
    - do…while
4. Functions.
    - Standard Library functions
    - Call by Value
5. Recursive functions.
6. Arrays.
    - One Dimensional Arrays
    - Two Dimensional Arrays
7. Sorting
    - Bubble sort
    - Insertion sort
8. Searching.
    - Sequential search
    - Binary search
9. Strings.
    - Standard Library string functions
    - String Processing

10. Array of Strings.
11. Structure.
    - Array of structures
    - Passing Structure to functions
    - Nested structure
12. C Preprocessing.
    - Macro expansion
    - Conditional compilation

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Paper Title: Data Base Management Systems
Paper Code: DCA12
Marks: 75
Credits: 3

Course Prerequisites: -
--Nil—

Course Objectives:
It provides basic knowledge of a database management system. It helps to understand importance of ER diagram. It introduces SQL to query a database.

Learning outcome:

- On completion of the course students will learn Database concepts and structures. They will be able to explain terms related to database design and management. Students will understand data modeling and database development process.
- Students will be able to construct and normalize data models and implement the same using any Relational Database Management System.
- Students will become proficient in using database query language, i.e. SQL.

Syllabus

1**. Overview of database management** [7L]

Data, information, database, database management system; Managing data; File systems versus a DBMS, advantages of a DBMS; Data abstraction, instances and schemas, data models; Data manipulation language, data definition language; Architecture of a DBMS; Users of a DBMS, database administrator

2**. Database design and the ER model** [10L]

Design phases – conceptual design, logical design, physical design; ER model – entities, attributes, and relationships, mapping cardinalities, keys; ER diagrams –

strong entities, weak entities, generalization, specialization, aggregation; Converting ER diagram to relational schemas

3. **Relational model** [9L]

Relation, properties of relational model; Entities, integrity constraints, referential integrity constraints; Relational algebra – select, project, cross product, set operations, rename operation; Other relational operations – natural join, outer join

4. **SQL** [10L]

Basic structure of SQL query – Create, select, where, from, rename operation; Set operations; Aggregate functions; Group by, having clauses; Nested queries; Views; Insert, delete, update.

5**. Functional dependency and normalization** [6L]

Atomic domain, nested relation; Key, super key, primary key, candidate key; Functional dependency, axioms, closure of a set of attributes, closure of a set of functional dependencies; Purpose of normalization; 1NF; 2NF; 3NF; BCNF

6. Introduction to Transactions [3L]

Transaction concept, Transaction state, ACID properties, Concurrent Transactions, Serializability.

Text Book:

- A Silberschatz, H F Korth, S Sudarshan, *Database system concepts*, McGraw-Hill ,sixth Edition

Reference Books:

- Ramakrishan, J Gehrke, "*Database management systems"*, McGraw-Hill , 3rd edition
- R Elmasri, S B Navathe, "*Fundamentals of database Systems"*, Pearson Education , 5th Edition

Lab : Database Management Systems
Credit : 1
Marks : 25

List of Practicals

1. ER diagram
2. ER diagram with specialization/generalization and aggregation.
3. Converting ER diagram to Schemas
4. Converting ER diagram with generalization/specialization, aggregation into schema
5. Studying RDBMS
    a. Understanding Client server architecture
    b. Creating tables
6. SQL

7. SQL
8. Introduction of .NET Framework, Advantages of .Net Framework, Components of .NET Framework, Data type & Operators with examples.
8. Loops, Control Statements, Operators, Data Types
9. Controls : Label, Button, Textbox, Picture Box
10. Controls : Radio button, Checkbox, Timer Control, Scroll Bars
11. Controls : List box, Combo Box, Dropdown list etc.
12. Working on Database
13. Working on Database
14. Normalization
15. Report Writing

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Paper Title: Client Side Technologies

Paper Code: DCA13

Marks: 75

Credits: 3

Course Prerequisites : Nil

Course Objective:

To develop a high degree of competence as a web designer by learning the client-side techniques.

Learning Outcome:

On completion of the course students will be able to

- Understand basics of Internet.
- Design simple static and dynamic websites.

Syllabus

1. The Internet [8L]

Computer Networks: LAN, MAN, WAN, etc., Layout (Ring, bus, star, etc.), IP address: public, private, static, dynamic, Internet protocols and services: http, https, ftp, smtp, nntp, etc, Telnet, dns, dhcp, Intranet & Extranet, Internet Infrastructure, Search Engines, Web Browser, Web server

2. Basic HTML: [14L]

Introduction, importance, Basic: HTML Tag, HEADER Tag, META Tag, TITLE Tag, BODY Tag, Text Formatting: PRE Tag, FONT Tag, entities, Image: IMG tag, image maps, Hyperlinks: Anchor tag, Lists: Unordered Lists, Ordered Lists, Definition Lists, Table tags: TABLE, TR and TD Tags, Cell Spacing and Cell Padding, Colspan and Rowspan, Frames: Frameset, FRAME Tag, NOFRAMES Tag, End user Interaction: FORM and INPUT Tag, Text Box, Radio Button, Checkbox, SELECT Tag and Pull Down Lists, TEXTAREA, Hidden, Submit and Reset, Special Tags : COLGROUP, THREAD, TBODY, TFOOT, blank, self, parent, top, IFRAME, LABEL, Attribute for <SELECT>.

3. HTML5: [6L]

The <canvas> element for 2D drawing, The <video> and <audio> elements for media playback, Support for local storage, New content-specific elements, like <article>, <footer>, <header>, <nav>, <section>, New form controls, like calendar, date, time, email, url, search.

4. CSS: [4L]

Introduction to CSS, Advantages, Types of style sheets: Inline, Internal, External, Multiple Style sheets and Cascading order, Grouping or nesting, Syntax, ID and Class, Pseudo-class, Pseudo-element, CSS units of measurement, Colors.

5. New features in CSS3: [5L]

Selectors, Box Model, Backgrounds and Borders, Image Values and Replaced Content, Text Effects, 2D/3D Transformations, Animations, Multiple Column Layout, User Interface.

6. Client side scripting: [8L]

Introduction to Javascript, HTML DOM, Core Javascript, form validations, introduction to XML, AJAX and JQuery

Text Book:

- Elisabeth Robson, Eric Freeman, *"Head First HTML with CSS & XHTML A Learner's Companion to HTML, CSS and XHTML",* O'Reilly Media, 1st Edition, 2005.

References:

- Eric Freeman, "*Head First HTML5 Programming",* O'Reilly Media, 1st Edition, 2011
- Jennifer Niederst, "*Web Design in a Nutshell*", O'Reilly Media, 3rd Edition, 2006

Lab : Client Side Technologies

Credit: 1

Marks: 25

HTML:

1. Text formats.
2. Image formats.
3. Hyperlink and Listings
4. Table formats (2 practical)
5. Forms

Cascading Style Sheet:

6. Internal and External style implementations
7. Creating Dynamic pages using CSS. (2 practical)

Javascript:

8. Implementing functions in javascript (alert( ); confirm( ); prompt( ))
9. Form Validations using Javascript
10. Creating Dynamic pages using Javascript.

HTML5:

11. Web site design using HTML5.
12. Implementation of canvas.
13. Embedding Audio and Video in a Webpage.
14. Implementation of additional form controls.

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Semester II Syllabus for

PGDCA

(2016-2017)

Paper Title : Computer Networks

Paper Code : DCA21

Marks : 75

Credits : 3

Course Prerequisites : Nil

Course Objectives:

- To provide a strong background of network concepts.
- To create a good foundation covering the physical layer, data link layer, network layer and the transport layer.

Learning Outcomes:

On completion of the course students will be able to understand

- Basic types of networks.
- Set up the Local Area Network.
- Network software layers and their functions.
- IP address and their need.
- Internet subnet structure, working principles and protocols.

1. **Basics of Computer Networks** **[7L]**

Networking of Computer.- Advantages and disadvantages of computer networking. Types of Networks - LAN, MAN, WAN, Wireless; Network Topology – Star, Ring, Bus, Tree, Complete, Irregular; Reference Models - The OSI reference model, the TCP/IP reference model.

Telephone System: Structure of telephone system, the local loops, trunks and multiplexing (FDM and TDM); Switching - Circuit switching, message switching, Packet Switching.

2. **Transmission Media** **[6L]**

Transmission media - Magnetic media, twisted pair, co-axial cable (baseband and broadband), fiber optics principle, transmission of light through fiber, fiber cables, fiber optics network, comparison of fiber optic and copper wire. Wireless Transmission (The electromagnetic spectrum, Radio Transmission, Microwave Transmission, Infrared and Millimeter Waves, Light wave Transmission)

3. **Data Communication Components** **[6L]**

Modem, Repeaters, Hubs, Bridges, Switches, Routers, Gateways. Data Link Protocols: Asynchronous, Synchronous, Character Oriented and Bit Oriented Protocols. Error Control, Internet.

4. **Medium Access Control Sublayer (MAC): [8L]**

Multiple Access Protocols, CSMA Protocols, Collision-Free Protocols (Bit Map protocol, Binary countdown), 802.3 Frame Header, Ethernet: Ethernet Cabling, Manchester Encoding, The Ethernet MAC sublayer protocol, The Binary exponential backoff algorithm, Switched Ethernet, Fast Ethernet, Gigabit Ethernet.

5. **IP Addressing [14L]**

IP Address class, Network and Host Addressing, Subnet, Subnet Mask. TCP/IP Protocol Suite:

Network Layer: Services, Static vs Dynamic address, Shortest Path Routing Algorithm, IP Protocol Header, Address resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Internet Control Message Protocol (ICMP).

Transport Layer: User Datagram Protocol (UDP), UDP Header, Transmission Control Protocol (TCP), Segment Header, Connection Establishment and Release.

6. **Application Layer [4L]**

Telnet (TErminaL NETwork), HTTP, File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP).

Text Book:

- Behrouz A. Forouzan, "*Data Communications and Networking*", McGraw Hill Education (India) Pvt. Ltd., 4th Edition, 2006.

Reference Books:

- Andrew S. Tanenbaum, "*Computer Networks"*, Prentice Hall of India, 4th Edition, 2002.
- James F. Kurose & Keith W. Ross, "*Computer Networking: A Top-Down Approach, Pearson India"*, 5th Edition, 2012

Lab : Computer Networks

Credit: 1

Marks: 25

1. Installing OS and drivers
2. Cable colour code and crimping, Demonstration of structured cabling
3. Setting up of network (TCP/IP configuration)
4. Sharing resources (files, printer etc)
5. Study of Network Commands
6. Setting up of wireless network (Adhoc and Infrastructure mode)

7. Network monitoring tool
8. Wireshark Tool
9. Network simulator tool1 (2 practical)
10. Network simulator tool2
11. Simulation of Network Protocols using programming language (2 practical)
12. Simple client-server socket program. (2 practical)

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Paper Title : Software Engineering

Paper Code : DCA22

Marks : 75

Credits : 3

Course Prerequisites: Nil

Course Objectives:

On completion of the course the students will develop specific skills and competencies to use various software engineering tools and methods to develop software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications.

Learning Outcomes:

- Gain knowledge of concepts & principles, methods and tools used in software engineering with an emphasis on object oriented analysis & design using UML
- Appreciate the role of software engineering in the software development industry.
- Be enabled to use various software engineering methods and tools employed during analysis, design, programming, testing and project management

Syllabus

SOFTWARE PROCESS: [5L]

Characteristics of software process.

Software Development Processes and Methodologies: waterfall, prototyping, iterative, spiral, unified process.

Benefits of iterative and incremental approach with emphasis on Unified process, CASE Tools, Agile methodologies.

PROJECT MANAGEMENT: [7L]

Planning a Software Project – Cost estimation, Project Scheduling, Software configuration management plans, Quality Assurance plans, Project Monitoring plans and Risk Management. Techniques such as Interviewing , Requirement Workshop, brainstorming, prototyping. Characteristics of SRS

OOAD and UML: [10L]

OOAD: Definition; object oriented analysis; object oriented design and modeling; Assigning responsibilities.

UML: Main UML diagrams – Class diagram , sequence diagram, activity diagram, use case diagram. Use case model – use case diagram , use case descriptions, use case realization using sequence and activity diagrams. Supplementary requirements. Advanced use case model features.

Requirements: Functional and non-functional

System Design : Class diagram, sequence diagram, activity diagram, state chart diagram, deployment diagram. Brief introduction to other UML diagrams.

SOFTWARE ARCHITECTURE PATTERNS: [5L]

Major Architectural Styles (patterns) like Layered Architecture, Pipe and Filter, Shared (Central) Data Store, Event Driven, Model-View-Controller (MVC), "Distributed & Emerging" Service Oriented Architecture (SOA) and Elementary GRASP Patterns.

HUMAN COMPUTER INTERACTION: [4L]

HCI Definition; User categories, Interface Design-Internal & External Interface design, user interface design, Interface design guidelines

CODING: [2L]

Coding styles, standards, peer reviews, checklist,

TESTING: **[4L]**

Testing Fundamental, Functional Testing, Structural Testing, Testing Object-Oriented Programs, Testing Process and Metrics.

DOCUMENTATION and MAINTENANCE: [4L]

Need for Software Documentation. Types of documentation

Need for Maintenance; Types of Maintenance

REENGINEERING: [4L]

Business Process Reengineering, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering, The Economics of Reengineering

Text Books:

- Roger Pressman, Software Engineering: A Practitioners Approach, McGraw Hill, (6th Edition), 1997.
- Craig Larman, Applying UML and patterns, Addison Wesley, 2nd Edition, 2003

References :

- Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publishing House, 2nd Edition
- Glenford J.Myers, " The Art of Software Testing ", John Wiley & Sons, 1979.
- Sommerville, Software Engineering, Adison Wesley, 7th edition, 1996.
- Martin Fowler, UML Distilled, Addison Wesley, 2nd Edition, 2003
- Thomas T. Barker , "Writing s/w documentation - a task oriented approach", Allyn & Bacon Series of Technical Communication , 1998.
- Steve Mc Connell, Code Complete, Microsoft Press, ISBN 978-0-7356-1967-8 Second Edition (June 2004)

Lab : Software Engineering

Credit : 1

Marks : 25

List of suggested **PRACTICALS** using UML (the numbers in brackets indicate number of practicals) :

1) SRS using IEEE format**[2]**
2) Draw a USE Case diagram and write Use Case descriptions for the Use Cases**[2]**
3) Draw a Class Diagram**[2]**
4) Draw a Sequence Diagram**[2]**
5) Draw an Activity Diagram**[2]**
6) Draw a State Chart Diagram**[2]**
7) Draw a Gantt Chart for a project**[1]**
8) Develop a mini project/ Case Study**[2]**

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Syllabus for Elective Papers for

PGDCA

(2016-2017)

Paper Title: Multimedia

Marks: 75

Credits: 3

Course Prerequisites: Nil

Course Objectives:

To learn the basic Multimedia concepts and develop skills and competencies to design graphical images, Audio and Video Capture and Editing using Software tools.

Learning Outcomes:

- Understand the building blocks of Multimedia.
- Develop creativity and publish a self-contained Multimedia Application using multimedia authoring tools in various application areas.

Syllabus

I. Introduction to Multimedia: [4L]

Overview of multimedia, Multimedia building blocks, Digital representation, Interaction techniques and devices, Stages of a Multimedia Project: Planning and Costing, Designing and Producing, Testing and Delivering. The Multimedia team and their roles: Project Manager, Writer, Video specialist, Audio specialist and Multimedia programmer.

Multimedia architecture: **[4L]**

Introduction to multimedia architectures, User interfaces, Windows multimedia support, Windows API for Multimedia, Multimedia Database Systems, Media streaming, Multimedia authoring tools, Multimedia OS.

II. Multimedia Building Blocks:

Text: **[4L]**

Visual representation of text, Digital representation of text, Text file formats: TXT, DOC, RTF, PDF, ODT Conversion to and from of various text formats, Hypermedia and Hypertext.

Image: **[4L]**

Basic Image fundamentals, Importance of graphics in multimedia, Vector and Raster graphics, image capturing methods – scanner, digital camera and its types, etc. various attributes of Images – size, color, depth, resolution, etc, Image data types, image file formats (BMP, JPEG, GIF, TIFF, PNG, DIB, EPS, CIF, PEX, PIC), their features and limitations, graphic file formats conversions.

Sound: **[5L]**

Sound and it Attributes, Mono V/s Stereo sound, Sound channels, Sound and its effect in multimedia, Analog V/s Digital sound, Basics of digital sound-Sampling, Frequency, Sound Depth, Creation of Digital Audio files – recording & editing. Overview of various sound file formats on PC – WAV, VOC, AVI, MP3, MP4, Ogg, Verbose etc. Digital audio vs MIDI and MIDI File format, CD and DVD formats.

Animation: **[6L]**

Basics of animation, Principle and use of animation in multimedia, Effect of resolutions, pixel depth, Images size on quality and storage. Overview of 2-D and 3-D animation techniques and software. Animation on the Web – features and limitations, creating simple animations for the Web. Animation file formats.

Video: **[8L]**

Analog and Digital Video, Video on PC. Introduction to graphics accelerator cards, DirectX Introduction to AV/DV and IEEE1394 cards, Video Broadcast Standards - NTSC, PAL, SECAM, HDTV. Introduction to video capturing, Media & Instrument – Videodisk, DVCAM, Camcorder.

Recording Formats like S-VHA Video, Component (YUV), Component Digital, Composite Digital, Video Hardware Resolutions.

Integrating Computers and Television like Video Overlay Systems, Digitized Video Playback, Differences between Computer and Television Video. Video Tips like shooting platforms, Lighting, Chroma Key or Blue Screen

III. Data Compression: [4L]

Types of compression: Lossy & Lossless, Symmetrical & Asymmetrical, Intraframe & Interframe, Hybrid. Study of different compression techniques for Text (Huffman coding, LZ & LZW), Image, Audio, Video (MPEG and AVI).

IV. Multimedia on the Web: [4L]

Bandwidth relationship, broadband technologies, Text in the web – Dynamic and embedded font technology, Audio on the Web – Real Audio and MP3/MP4, Audio support in HTML, Graphics – HTML safe color palate, Interlaced V/s Non interlaced model, Graphics support in HTML, Image Map, Video on the Web – Streaming video, Real Video, MPEG and SMIL, Virtual Reality on the Web.

V. Assembling and Delivering a Project: [2L]

The four primary navigational structures used in multimedia like linear, hierarchical, non-linear and composite.

Text Book:

Vaughan Tay, "Multimedia: Making it Work", 8th edition, Tata McGraw-Hill

Reference Books:

1. Ralf Stainntetz, Katra Nahrstedt, "Multimedia Computing, communications and application", Pearson Education Services.
2. James E Shuman, "Multimedia In Action", Vikas Publishing House.
3. Jeffcoate Judith, "Multimedia in Practice, Technology and Applications", Prentice Hall India.
4. Buford, J.F. K, "Multimedia Systems", Pearson Education
5. Elson-Cook, "Principles of Interactive Multimedia", McGraw Hill Higher Education.
6. Andreas Holzinger, "Multimedi Basics – Volume – 1 Technology", Firewall Media (Laxmi Publications Pvt. Ltd) New Delhi

Laboratory: Multimedia

Credit : 1

Marks : 25

Multimedia Software Tools like GIMP, Audacity, Windows Movie Maker, Blender. iMovie (the numbers in brackets indicate number of practicals):

1. Image Handling: Cropping an image, adjusting image size, increasing the size of the work canvas, saving an image. **[2]**

2. Layers: Adding layers, dragging and pasting selections on to layers, dragging layers between files, viewing and hiding layers, Editing layers, rotating selections, scaling an object, preserving layers transparency, moving and copying layers, duplicating layers, deleting layers, merging layers, using adjustment layers. **[2]**

3. Channels and Masks: Channel palette, showing and hiding channels, splitting channels in to separate image, merging channels, creating a quick mask, editing masks using quick mask mode **[1]**

4. Painting and Editing: Brushes palette, brush shape, creating and deleting brushes, creating custom brushes, setting brush options, saving, loading and appending brushes, Options palette **[2]**

5. Opacity, pressure, or exposure, paint fade-out rate, making selections, using selection tools, adjusting selections, softening the edges of a selection, hiding a selection border, moving and copying selections, extending and reducing selections, pasting and deleting selections. **[2]**

6. Recording Sound using Sound Recorder (Capture), Sound capture through sound editing software , Sound editing, Noise correction, Effect enhancement ; Voice Recognition; Importing audio and saving audio from Audio CD. Sound Quality types: CD Quality, Radio Quality, Telephone Quality. **[2]**

7. Video: Record video from video capture devices, webcams, screen capture or even streaming video and Video Editing. **[2]**

8. Mini Project/Problem Statement/Case Study (integrating the above experiments) like E-Book Design, Product Design. **[2]**

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Paper Title : E-Learning

Marks : 75

Credits : 3

Course Prerequisites: Nil

Course Objectives:

- This course is an introduction to ICT (Information Communications Technology) in education.
- It aims at exploring the Instructional Design principles, developing and applying the various concepts of Instructional Design skills learnt wrt E-Learning and develop E-content in various application areas related to ICT and Education.

Learning Outcomes:

On Completion of this course the student will:

- Understand the working of an E-learning module
- Be aware of the various Instructional Design Principles.
- Develop own course material and upload it using an appropriate LMS
- Evaluate and Apply appropriate Assessment techniques to the e-content

Syllabus

1. INTRODUCTION TO E-LEARNING : (7L)

1.1 What is E-learning
1.2 Scope and form of E-learning.
1.3 Role of an E-learning project
1.4 Phases in an E-learning project

2.COURSE DEVELOPMENT FOR E-LEARNING: (12L)

2.1 Instructional Design.
2.2 The process of Designing Instruction.
2.3 Developing Materials. (Story Boarding, Content Integration, and SCORM Compliance).
2.4 Working with L.M.S. (Learning Management System)- Installation and use of the administrator, teacher and student interface. Course Definition, Registration and upload, tracking of results).

3. E-LEARNING AND PEDAGOGICAL APPROACHES: (12L)

3.1 The Behaviorist School of learning and its implications on E-learning.
3.2 The Cognitive School of Learning and its Implication on E-learning.
3.3 The Constructivist School of Learning and its implications on E-learning.
3.4 Blooms Taxonomy of Educational Objectives.
3.5 Types of Learning Objectives.
3.6 Content Analysis (Types- Facts, concepts, process, procedure, principles)
3.7 The Teaching of concepts, procedure, principles, understanding.
3.8 Enabling a motivated Learning Environment.

4. E-LEARNING STRATEGIES: (8L)

4.1 Simulation.
4.2 Drill.
4.3 Interactive Learning.
4.4 Problem Solving.
4.5 Tutorials.

5. ASSESSMENT DESIGN: (6L)

5.1 Rubrics for Assessment- Analytic and Holistic Rubrics.
5.2 Rubrics for Assessment.
5.3 Security and Authentication.

Text Book

Teachers Discovering Computers, Integrating Technology in the Classroom, Second Edition by Shelly Cashman Gunter, (ISBN: 0-7895-6492-0).28

Reference Books:

(1) Smith, P. L. & Ragan, T. J. (2004). Instructional design. 3rd edition. New York: John Wiley & Sons. ISBN: 0471393533
(2) M.D. Roblyer, Aaron H. Doering, Integrating Educational Technology into Teaching,
Student Value Edition (6th Edition), Publisher: Pearson; 6 edition (February 25, 2012) ISBN-10: 013289680X, ISBN-13: 978-0132896801.

(3) Dick, W., Carey, L., & Carey, J. O. (2009). The systematic design of instruction (7th ed.). Boston: Allyn and Bacon.
(4) Wiggins, G. P., & McTighe, J. (2005). Understanding by design (2nd ed., p. 370). Alexandria, VA: Association for Supervision and Curriculum Development.
(5) Christensen, C. M., Horn, M. B., & Johnson, C. W. (2008). Disrupting class: How disruptive innovation will change the way the world learns. New York: McGraw-Hill.

Laboratory: E-Learning
Credit: 01
Marks: 25

List of suggested **PRACTICALS** using any Multimedia Software (the numbers in brackets indicate number of practicals):

(1) Installing, Creating and Running a complete course using LMS **[3]**
Course Administration: Creation and using Resources and Planning Activities
Case Study: Create a complete course and work on all the resources and activities. Also the various grade book options etc.

(2) Creating Storyboards (using Movie Maker/PPT or similar FOSS) **[1]**

(3) Construct a Mindmap (using Freemind or any other FOSS) **[1]**

(4) Prepare a 10-minute Video tutorial on some system (e.g. how to search for free images in Google) using screen cast. Example tool that can be used: screencast-o-matic).
[**2]**

(5) Study a virtual world system like Whyville, and make a 10 slide presentation (using PPT or FOSS on it). **[2]**

(6) Create a fully tagged 10-question QB on a topic and load onto Moodle. **[2]**

(7) Build a course using WISE **[2]**

(8) Design Rubrics (for a given scenario) **[2]**

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Paper Title : Python Programming

Marks : 75

Credits : 3

Course Prerequisites: Nil

Course Objectives : To provide skills of data analysis using Python programming language

Learning Outcome:

Students will learn Python programming, and apply it in data analysis & visualization.

Syllabus

Introduction to Python [3L]

Motivation, programming paradigms, What Python can do, Python's technical strength, Python interpreter, Program execution, Execution model variations, How to run programs

Basic Syntax [6L]

Variable and Data Types, Operator, Conditional Statements - if, if- else, Nested if-else. Looping – For, While, Nested loops. Control Statements – Break, Continue, Pass.

String Manipulation [5L]

Accessing Strings, Basic Operations, String slices, Function and Methods.

Lists [3L]

Introduction, Accessing list, Operations, Working with lists, Function and Methods

Tuple [4L]

Introduction, Accessing tuples, Operations, Working, Functions and Methods

Dictionaries [4L]

Introduction, Accessing values in dictionaries, Working with dictionaries, Properties, Functions

Functions [6L]

Defining a function, Calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables

Modules [5L]

Importing module. Math module. Random module. Packages. Composition

Input-Output [5L]

Printing on screen, Reading data from keyboard, Opening and closing file, Reading and writing files, Functions

Exception Handling [4L]

Exception. Exception Handling - Except clause, Try ? finally clause. User Defined Exceptions

Text Book:

1. Mark Lutz, Learning Python, O'Reilly Media, Third Edition, 2008

Reference Books:

1. Alex Martelli, Python – A Nutshell, O'Reilly Media, Second Edition, 2006

2. Wes McKinney, Python for Data Analysis, O'Reilly Media, 2012

Laboratory: Python Programming

Credit: 01

Marks: 25

List of Experiments using Python Language

1) Program to compute a given formula

2) if else

3) nested if else

4) loop

5) loop

6) string manipulation

7) string manipulation

8) list

9) tuple

10) dictionary

11) function

12) module

13) Input-Output

14) Input-Output

15) exception handling

****

Paper Title: Human Computer Interface

Marks: 75

Credits: 3

Course Prerequisites: Nil

Course Objectives:

To study the different aspects of human computer interaction and the computer interface design concepts.

Learning Outcomes

- To understand the intricacies of human interaction with a computer System
- To understand the concept of a graphical user interface, and its design characteristics
- To recognize the human element its strengths and weakness for computer interaction
- To know the principles of good screen design and layouts
- To know the different navigation schemes on windows based interface; learn the different types of selection devices and components of a window based interface
- To know the different types of interaction devices and media

Syllabus

1. Introduction: Human-Computer Interaction, Evaluating Designs, The Birth of HCI. Importance of user Interface, Importance of good design, Benefits of good design, principles & heuristics of good design (4L)
2. Human interaction with computers, Importance of : Human characteristics, Human consideration, Human interaction speeds, Understanding business functions. User centred design- Need-finding: Participant Observation, Interviewing, Additional Need finding, contextual inquiry & persona. (6L)
3. Rapid Prototyping: story boarding. Paper Prototyping and Mockup, Video Prototyping, Creating and Comparing Alternatives (5L)
4. Direct Manipulation and Representations: various user interaction models-command, menu, Direct Manipulation. Mental Models. Heuristics (guidelines) for design. (7L)
5. Graphical Interface Design: Graphical user interface, standards such as Microsoft windows HCI guidelines, Windows: Navigation schemes selection of window; Selection of devices based and screen based controls,

Components, Text and messages, Icons, Multimedia, Colors., controls, Help & error messages design. (8L)

6. Web user interface design – jessy James Garette five layers of user experience. (4L)
7. Heuristic Evaluation: Heuristic Evaluation — Why and How? (4L)
8. visualization, Amount of information, Focus and emphasis, Presentation information simply and meaningfully, Information retrieval on web, Statistical graphics (7L)

Text books:

1. Alan Cooper & Robert Reimann, About Face 2.0: The Essentials of Interaction Design, Wiley
2. Alan Dix, Janet Finlay, Gregory D. Abowd, and Russell Beale, Human-Computer Interaction, Pearson, 3rd Edition, 2004.
3. Ben Shneiderman and Catherine Plaisant, Designing the User Interface: Strategies for Effective Human-Computer Interaction Pearson Addison-Wesley, 5th Edition, 2009
4. Donald A. Norman, The Design of Everyday Things, Basic Books, 2002

Lab : Human Computer Interface

Credit : 1

Marks : 25

Suggested list of practical (Numbers in brackets indicate number of practicals)

1. Paper Prototyping using templates (1)
2. Conducting survey interview and summarizing the result(1)
3. Persona- conducting contextual interview and developing persona(1)
4. GUI design- form design, menu design, help, error messages(2)
5. Web UI design- pages, navigation, controls, Page submission – Asynchronous (2)
6. Report designs (2)
7. Visualization and info graphics (1)
8. Heuristic evaluation(2)
9. Story boarding (1)

****

Paper Title: E-Commerce
Marks: 75
Credits: 3

Course Prerequisites: Nil

Course Objectives:

This course aims to study the working of E-Commerce website and the various background processes involved. As part of the course the student will study the activities associated with e-commerce like buying, selling and payment, understand the various technologies used in e-commerce websites and security mechanisms involved in e-commerce websites.

Learning Outcomes:
On Completion of this course the student will:

- Understand the working of an E-Commerce website
- Be aware of the various E-Commerce Strategies.
- Develop own E-commerce website and operate it.
- Evaluate and Apply appropriate Payment mechanisms to the e-commerce website

1. INTRODUCTION TO ELECTRONIC COMMERCE: (3L)

1.1: The Scope of Electronic Commerce

1.2: Definition of Electronic Commerce

1.3: Electronic Commerce and the Trade Cycle

1.4: Electronic Markets

1.5: Electronic Data Interchange

1.6: Internet Commerce

1.7: Electronic Commerce in Perspective

2. THE VALUE CHAIN: (2L)

2.1: Supply Chains

2.2: Porter's Value Chain Model

2.3: Inter Organisational Value Chains

3. COMPETITIVE ADVANTAGE: (3L)

3.1: Competitive Advantage

3.2: Porter's Model

3.3: First Mover Advantage

3.4: Sustainable Competitive

3.5: Competitive Advantage using e-commerce

4. BUSINESS STRATEGY: (6 L)

4.1: Introduction to Business Strategy: Michael Porter's 5 force analysis

4.2: Strategic Implications of IT

4.3: Technology

4.4: Business Environment

4.5: Business Capability

4.6: Existing Business Strategy

4.7: Strategy Formulation and Implementation Planning

4.8: e-Commerce Implementation - technical and business

4.9: e-Commerce Evaluation

4.10: Auction methods

5. ELECTRONIC DATA INTERCHANGE (EDI): (3L)

5.1: EDI Definition

5.2: EDI Technology

5.3: EDI Standards

5.4: EDI Communications

6. ELECTRONIC PAYMENT SYSTEMS: (8 L)

6.1 Overview of the electronic payment technology; limitations of traditional payment instruments.

6.2 Electronic or Digital Cash-Properties of Electronic Cash, Digital Cash in action.

6.3 Electronic Checks-benefits of electronic checks, electronic checks in action,

NetCheck: A Prototype Electronic Check System.

6.4 Online Credit Card-Based Systems- types of credit card payments, Secure Electronic Transactions (SET)

6.5 Other Emerging Financial Instruments: POS (Point of Sale), E-Cash, Net Banking, Credit/Debit Cards and Electronic Benefits and Security Issues.

6.6 Case Studies of the various modes of electronic payment of various types of websites

7. E-BUSINESS: **(6 L)**

7.1 EDI Application in business, E- Commerce Law, Forms of Agreement, Govt. policies and Agenda.

7.2 Case Study of Internet bookshops, Grocery supplies, software supplies and support, electronic newspapers, Internet banking, Virtual auctions, online, share dealing.

7.3 Business to Legal issues: Risks involved; Paper Document vs. Electronic document, Authentication of Electronic document, Laws, Legal issues for Internet Commerce: Trademarks and Domain names, Copyright, Jurisdiction issues, Service provider liability, Enforceable online contract.

8. FIREWALLS AND TRANSACTION SECURITY: (8L)

8.1: Firewalls and Network Security: Types of firewalls, Firewall Security Policies,

Emerging Firewall Management Issues.

8.2: Transaction Security: Types of Online Transactions, Requirements for Transaction Security.

8.3: Encryption and Transaction Security: Secret-Key encryption, Public-Key

Encryption, Implementation and Management Issues.

8.4: Digital Certificate

8.5 Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI

9. CONSUMER E-COMMERCE: (3L)

Consumer trade transaction, Internet, Page on the Web, Elements of E-Commerce with VB, ASP, SQL.

10. M-COMMERCE: (3L)

Basic concept and applications, difference with E-Commerce, benefits of integration with ERPs.

BOOKS RECOMMENDED FOR MAIN READING AND REFERENCE:

- e-COMMERCE Strategy, Technologies and Applications by David Whiteley; TataMcGraw Hill

- Electronic Commerce A Manager's Guide by Ravi Kalakota and Andrew B. Whinston. Published by Pearson Education.

- E-Commerce The Cutting Edge of Business by Kamlesh K Bajaj and Debjani Nag. Second Edition; Tata McGraw Hill

Laboratory: E-COMMERCE
Credit: 01
Marks: 25

List of suggested **PRACTICALS** (the numbers in brackets indicate number of practicals):

ECOMMERCE PLATFORMS: (10)

1. **WORDPRESS:** Primarily designed for creating blogs but can be used to create online store by adding appropriate themes & plugins. Basic Programming Knowledge in PHP may be required in later stages. (http://www.wordpress.com)
2. **WIX:**Wix is a drag & drop website builder which can also be used to build an ecommerce website without any programming experience. (http://www.wix.com)
3. **SHOPIFY:** Made specially to create online stores, add products, categories & handle payments all without Any Programming knowledge required. (http://www.shopify.com)
4. **BLOGGER** : Similar to WordPress but a blogging service provided by google which again can be customized to create an online store. (http://www.blogger.com)

TOOLS USED TO FACILITATE ECOMMERCE (5)

1. **GOOGLE ANAYLITICS:** Present in most ecommerce platforms and can be integrated in almost any application, giving the owner insights of the customer base visiting the website. Can also be fine-tuned to give more detailed analysis like how many visits actually got converted into leads etc. (https://www.google.co.in/analytics)
2. **MAIL CHIMP:** A service to send emails to customers. Useful in marketing. (http://www.mailchimp.com)
3. **ZENDESK :**Zendesk is used to setup a support centre for your application users . Users can open a ticket and get their issues resolved. Useful in issue tracking and management. (https://www.zendesk.com/)
4. **APPOINTLET :** A Service integrated with google calendar and helps manage all appointments. Useful in applications where an appointment is required. (https://www.appointlet.com/)
5. **UNBOUNCE :**Used to create landing pages for an application . A good landing page sometimes defines whether a user will visit the site or turn away. (http://www.unbounce.com/)

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Paper Title: Digital Marketing

Marks: 75

Credits: 3

Course Prerequisites: Client Side Technologies

Course Objectives:

- To Build Accessible Websites that is optimized for the Search Engines.
- To study various online Marketing Strategies.
- Analyze and research Internet to improve the quality and marketability of the Websites.

Learning Outcomes:

On completion of the course students will learn the following:

- Optimize the website for various search engines.
- Market the company/product using Search Engine and Social Media.
- Analyze the Web for improving the marketing strategy.

I. Search Engine Optimisation (SEO): [10L]

Introduction to Online Search; Function of Search Engines Google Page Rank; Introduction to Search Engine Optimisation; Building Accessible Site; Keyword Research and Optimisation; Link Building Strategies; Useful Tools for SEO; The Past, Present and Future of SEO.

II. Search Engine Marketing (SEM): [9L]

Introduction to Internet and Search Engine Marketing; Google Adwords; Adwords Account Structure; Navigating in Google Adwords; Working with Keywords; Creating Ads in Google Adwords; Creating and Managing your First Ad Campaign; Adwords Reporting and Account Performance Reports.

III. Social Media Marketing (SMM): [9L]

Introduction to the World of SMM; Why Social Media?; Getting Started with Social Media; Building Relationships via Facebook, Twitter, LinkedIn, YouTube; Handling Positive and Negative Comments; Social Media Content Base Creation.

IV. Email Marketing: [5L]

Importance of Email marketing; Email Marketing Software's; Subscriber List; Email Marketing Campaign; Newsletters; Measuring the results.

V. WEB Analytics: [9L]

Web Analytics and Intelligence Tools; Basic Metrics Demystified; Introduction to Google Analytics; Goals and Actionable Insights; Data Management; Social Media Analytics; Social Media Goals and KPI's; Tools for Social Media Analytics.

VI. Marketing Automation: [3L]

Introduction to Marketing Automation; Advantages of using Marketing Automation Software; Issues with Marketing Automation.

Text Books:

- Damian Ryan, *"Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation",* Kogan Page Publisher, 3 edition, 2014.

Reference Books:

- **Calvin Jones and Damian Ryan, "The Best Digital Marketing Campaigns in the World:**
- Nick Smith, *"Successful SEO and Search Marketing in a Week",* Teach Yourself Publisher, 2013.
- Lee Odden , *" Optimize: How to Attract and Engage More Customers by Integrating SEO, Social Media, and Content Marketing"*, Wiley Publishing, 1st edition, 2012.
- Avinash Kaushik, *"Web Analytics 2.0: The Art of Online Accountability & Science of Customer Centricity (Sybex)",* Wiley Publishing, 2nd edition 2013

Practical: Digital Marketing

Credit: 1

Marks: 25

1. Using Search Engine Optimization tools (like google & bing search console, hubspot, webceo, google page speed) (3)

2. Using Search Engine Marketing tools (like google adwords, google adwords certifications, search, display, remarketing formats, facebook marketing, linkedin advertising) (3)

3. Using Social Media Marketing tools (like hootsuite, buffer, sproutsocial, klear, twitonomy, socialmention, google alerts, mention) (2)

4. Using Email Marketing tools (like mailchimp, campaign monitor, mailgun, mandrill, phplist, amazon ses (2)

5. Using Web Analytics tools (like google analytics, compete.com, crazyegg, facebook insights, twitter insights) (3)

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Paper Title: Network Administration

Marks: 75

Credits: 3

Course Prerequisites: Nil

Course Objective:

To be able to understand the working principle of network, setting up of network, Configuring network and administration of network.

Learning outcome:

On completion of the course students will be able to

- Set up and manage networks
- Configure servers and firewall

Syllabus

1. **Introduction:** **[15L]**

Basics of TCP/IP, IP address (IPv4 and IPv6), Internet Architecture, peer to peer and client server networks, subnetting, supernetting , and basic Network commands.

2. **Administration**: **[6L]**

Managing users and Groups, adding/removing software/hard ware, display settings, folder options, setting up mail client, Device manager, Resource sharing. Basic Data recovery concepts : Disk repair tools, recovering files and directories, correcting errors reported by Scandisk

3. **Routing:** **[8L]**

Overview of routing, static and dynamic routing, adding and deleting static routes, routing protocols, RIP, OSPF and IGP

4. **Application Layer:** **[12L]**

DHCP (Dynamic host control protocol): Overview of DHCP , DHCP protocol, features of DHCP, Monitoring and troubleshooting, using DHCP in non routed and routed network. DNS (Domain Name Service): Overview of DNS protocol, DNS name space, Zone of authority and name resolutions, features of DNS server, Reverse lookup, Placement of DNS server, Installation and Configuring of DNS server and client.

WWW: Architectural overview: server side and client side technology. Mail server: Electronic mail, architecture and services, user agent, message transfer, Final delivery.

5. **VLAN:** **[2L]**

Introduction, basics of VLAN, uses of LANs, working principle, types of VLANs, frame processing.

6. **Firewall**: **[2L]**

Overview of firewall, types of firewall, working principles of firewall, filters.

Text book:

Craig Hunt, "*TCP/IP Network Administration*", O'Reilly; 3rd edition, 2002

Reference Books:

1. Man pages of linux

2.Andrew S. Tanenbaum, Computer Networks, Prentice Hall of India, 4th Edition, 2002.

Lab: Network Administration

Credit: 1

Marks: 25

1. Managing users: creating/Deleting groups, users, setting passwords, setting permissions to groups and users, Device Manager
2. Setting up client server network (Installing server OS)
3. Configuring Telnet and ftp server.
4. Remote desktop connection
5. Router (2 practical)
6. DHCP server Configuration
7. Web server Installation
8. DNS server configuration
9. Firewall Configuring
10. Samba server
11. VLAN configuration

****

Paper Title : Object Oriented Programming

Marks : 75

Credits : 3

Course Prerequisites: Nil

Course Objectives:

- To teach the basic concepts and techniques which form the object oriented programming paradigm
- To introduce object oriented programming (OOP) using Java.

Learning Outcome:

- Understand the concept and underlying principles of Object-Oriented Programming.
- Understand how object-oriented concepts are incorporated into the Java programming language.
- Develop problem-solving and programming skills using the OOP concept.

Syllabus

1. Principles of OOP: [6L]
Programming Paradigms, Basic concepts, OOP: major principles - encapsulation, abstraction, inheritance, polymorphism. Benefits of OOP, Applications of OOP.

2. Introduction to Java: [6L]
Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, java.Math class, Arrays in java.

3. Objects and Classes: [8L]
Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference.

4. Inheritance and Polymorphism: [9L]
Inheritance in java, super and sub class, Overriding, java.lang.Object class, Polymorphism, Dynamic binding, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, java.util package.

5. Event and GUI programming [9L]
Design patterns – what and why? It's classification. Introduce the Observer design pattern. Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text

Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing.

6. Exception Handling: [4L]
Exception handling – what and why? Try and catch block. Multiple catch blocks. Nested try, finally block, throw keyword, throws keyword. Custom Exception.

7. Introduction to the Collections Framework. **[3L]**

Text Book:

Mahesh Matha, **"**Core Java, A Comprehensive Study ", PHI, India

Deitel & Deitel, *Java - How to Program*, Prentice Hall Publications

Reference Books:
1) Patrick Naughton, Herbert Schildt, *Java 2 – The Complete Reference*, McGraw Hill Education (India) Pvt. Ltd., 2002.

2) Patrick Naughton, *The Java Handbook*, McGraw Hill Education (India) Pvt. Ltd., 1996.

3) Balaguruswamy E, *Programming with Java – A Primer*, McGraw Hill Education (India) Pvt. Ltd., 2009.

4) Flanagan David, *Java Examples in a Nutshell*, Spd/O'Reilly Reprint, 2nd Edition.

5) Gosling J, Arnold K, & Holmes D, *The Java Programming Language*, Addison-Wesley Professional, 3rd Edition, 2008.

Lab: Object Oriented Programming
Credit: 1
Marks: 25

Programs using Java language that covers the following concepts:
1) Classes and instances

2) Working with the java.Math class

3) Inheritance (2 P)

4) Polymorphism, abstract classes and interfaces (3P)

5) Utilising the java.util package

6) Event handling and GUI

7) Applets

8) Exception handling

9) Collections framework

****

Paper Title: Software Testing

Marks: 75

Credits: 3

Course Prerequisites: Nil

Course Objectives:

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- To learn how to plan a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.

Learning Outcomes:

On Completion of this course the student will:

- Have an ability to understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
- Have an ability to use software testing methods and modern software testing tools for their testing projects.

Syllabus

Software testing principles - Software Testing- Need for testing, Psychology of testing**,**Testing economics**,** SDLC and Testing**,**Verification & Validation**.**Quality Assurance, Quality Control (2L)

Testing strategies and types - White box testing techniques - Statement coverage, Branch Coverage , Condition coverage, Decision/Condition coverage , Multiple condition coverage ,Dataflow coverage, Automated code coverage analysis, Inspections, Walkthroughs Code Review (4L)

Black box testing techniques - Boundary value analysis**,**Robustness testing **,**Equivalence partitioning**,**Syntax testing**,**Finite state testing**,**Levels of testing**,**Unit, Integration and System Testing**,**Compatibility Testing**,**Domain Testing**,**Adhoc Testing **,**Use of Requirement,Traceability Matrix (5L)

Integration Testing Waterfall - Top-down ,Bottom up ,Big bang,Sandwich (2L)

System and Performance Testing - Types of system testing ,Functional and non-functional testing Acceptance Testing ,Setting entry and exit criteria for phases and typical product release scenarios ,Basic factors governing performance testing, Methodology for performance testing ,Tools for performance testing (4L)

Regression Testing - Purpose **,**Timinng,Choice of tests **,**Smoke tests **,**Best practices (2L)

Internationalization and Localization testing - Preliminary concepts,Adhoc testing,Pair testing, Extreme testing, Agile testing, Exploratory testing,Defect seeding (3L)

Usability Testing - Factors in usability testing ,Aesthetics testing ,Accessibility testing ,Tools for usability testing (2L)

Testing object oriented software - Definitions and Challenge differences from testing non-OO Software,Class testing strategies Class Modality,State-based Testing,Message Sequence Specification (3L)

People and organizational issues in testing - Common people issues and myths in testing, Providing career paths in testing,Organizational structures for testing teams,Geographically distributed testing teams and success factors (5L)

Test Management and Automation- Test Planning,Test Management,Test Process,Test Reporting,Test Automation,Factors to consider in automation,Challenges in test automation,Test Metrics,Product Metrics,Process Metrics,Progress Metrics Use of metrics in ascertaining product release (5L)

Importance of documentation-, Need for Software Documentation,Different types of documentation,Understanding task orientation,Analyzing users ,Writing user scenarios ,User informational needs ,Document goals , User work motivations ,User analysis checklist (3L)

Maintenance- The Context Of Maintenance- Definitions, Economics of Maintenance, Evolution of Software Products,Maintaining systems effectively, categorizing Software products, Deployment Models, types of maintenance (3L)

Software Configuration Management – Baseline, Identification,Accounting, control, Audit, Source and Version Control (2L)

References:

1.Software Testing- Principles and Practices ,Srinivasan Desikan and Gopalaswamy Ramesh

2. Integrated Approach to Software Engineering , Pankaj Jalote, Narosa Edition

3. Software Engineering – A Practitioners Approach, Roger Pressman

Laboratory: Software Testing
Credit: 01
Marks: 25

List of suggested **PRACTICALS** using any testing tool such as QuickTest Professional or equivalent :

1. Planning Test Cases (1)
2. Generating Test Cases/Test Suite(2)
3. Enhancing Tests (3)
4. Debugging Tests (2)
5. Running Tests (2)
6. Analyzing Results
7. Reporting Defects

****

Paper Title : Server Side Programming

Marks : 75

Credits : 3

Course Prerequisite : Cient Side Technologies

Course Objective:

To give an understanding the web software development: how it is different, issues involved in it.

Learning Outcomes:

Students will be able to develop dynamic web pages.

Syllabus

Principles of OOP: [4L]
OOP: major principles - encapsulation, abstraction, inheritance, polymorphism. Benefits of OOP, Applications of OOP.

Web Technologies: [3L]

Introduction to Web technology, Web pages and Browsing, Dynamic Web Pages,Java script, Dynamic web document technologies - PHP, JSP, ASP, Active web pages and Active Web technologies.

Tags, Escaping from HTML, Types: [4L]

Resources, NULL, Callbacks, Type juggling.

Variables: [4L]

Basics, Predefined variables and Scope, Constants: Syntax, Magic constants,Expressions.

Operators, Control structures, Functions, Predefined exceptions [4L]

Security: [9L]

Introduction, General considerations, Installed as CGI binary, Installed as an Apache module, File system Security, Database Security, Error Reporting, Using Register Globals, User Submitted Data, Hiding PHP

Features: [12L]

HTTP authentication with PHP, Cookies, Sessions, Handling file uploads, Connection handling, Persistent Database Connections, DTrace Dynamic Tracing

Ajax : [5L]

request object creation, forwarding the request, accepting response object and display on webpage

Reference Books

1. Steven Holzner, "PHP: The Complete Reference", Tata Mcgraw Hill
2. Timothy Boronczyk , Martin E. Psinas, "PHP and MYSQL: Create - Modify – Reuse", Wiley India Private Limited
3. Tim Converse, "PHP 5 and MySQL Bible", Wiley India Private Limited
4. Meloni J.C., "Teach yourself PHP, MySQL and Apache all in one", Pearson Education
5. Stephen J. Schrader, "AJAX", imported edition.

Web Reference:

1. http://in1.php.net/manual/en/index.php for PHP v 5.5 and above

Lab : ServerSide Programming

Credit : 1

Marks : 25

Suggested list of practical (Numbers in brackets indicate number of practicals)

1. Creating dynamic web pages with PHP (3P)
2. Authentication, Cookies, Session management
3. Error handling
4. Database connectivity
5. Using framework like CodeIgniter
6. Ajax implementation
7. File uploading
8. Uploading and images to and from server

****

Paper Title: Data Structures
Marks: 75
Credits: 3

Course Prerequisites: Knowledge of Programming Language

Course Objectives:
To understand different methods of organizing data and efficiently implement different data structures.

Learning outcome:
On completion of the course student will learn:

- Different data structures like Stack, Queues, Linked Lists, Graphs and their applications.
- Implementation of data structures.

Syllabus

1. **Introduction to data structures:** **[3L]**
Concept, Data type, Data object, ADT, Need of Data Structure, Types of Data Structure

2. **Algorithm analysis:** **[3L]**
Algorithm – definition, characteristics, Space complexity, time complexity, Asymptotic notation (Big O)

3. **Linked List:** **[8L]**
Introduction to List, Implementation of List – static & dynamic representation, Types of Linked List, Operations on List, Applications of Linked List, polynomial manipulation, Generalized linked list – concept & representation.

4. **Stacks:** **[8L]**
Introduction, Representation-static & dynamic, Operations, Application - infix to postfix & prefix, postfix evaluation, Simulating recursion using stack.

5. **Queues:** **[5L]**
Introduction, Representation -static & dynamic, Operations, Circular queue, priority queue (with implementation), Concept of doubly ended queue.

6. **Trees:** **[10L]**
Concept & Terminologies, Binary tree, binary search tree, Representation – static & dynamic, Operations on BST – create, Insert, delete, traversals (preorder, inorder, postorder), counting leaf, non-leaf & total nodes, non recursive inorder traversal, Expression Tree.

7. **Graph:** **[8L]**
Concept & terminologies, Graph Representation – Adjacency matrix, adjacency list, Traversals – BFS & DFS, Application of BFS, DFS – Shortest path, Backtracking.

Text Book:
Horowitz Ellis, Sahni Sartaj, *Fundamentals of Data Structures in C*, University Press, 2nd Edition, 2008.

Reference:
1. Langsam Yedidyah, Augenstein J. Moshe, Tenenbaum M. Aaron , *Data Structures using C,* Pearson Education, Second Edition ,2009

2. Gilbeg Richard, Forouzan Behrouz, Data Structures: A Pseudocode Approch with C, Cengage Learning, Second Edition

3. Goodrich Michael, Tamassia Roberto, *Algorithm Design Foundations, Analysis and Internet Examples.* John Wiley and sons

Practical: Data Structures
Credit: 1
Marks: 25

Programs using C language that covers the following concepts:
1. Stack: Static/Dynamic stack implementation.
2. Stack: infix to postfix.
3. Stack: Evaluation of Postfix expression.
4. Queues: Static and Dynamic Queue Implementation
5. Queues: Circular queue
6. List: Singly Linked List,
7. List: Doubly Linked List
8. List: Circular Linked List
9. Linked List: Polynomial addition
10. Trees: Binary Search Tree: create, add, delete, display nodes.
11. Trees: BST traversal.
12. Graph: Representation of Graphs, Graph Traversals.
13. Graph: DFS, BFS.

****

Paper Title: Accounting and Financial Management
Marks: 75
Credits: 3

Course Prerequisites: Knowledge of Accounting

Course Objectives:

This course aims to produce knowledge, skills and understanding of accounting and financial management. It gives detail knowledge about the most important components of accountancy i.e. financial statements and Budgeting.

Learning outcome:
On completion of the course:

1. Student will develop the skills of accountancy and book keeping with the help of software.
2. Student will be independently able to prepare budget and business plan for the firms.

Syllabus

Financial Accounting: An Introduction [4L]

Meaning and Nature of Accounting, Accounting as language of Business and Accounting as information system. Accounting processes and final output of Accounting system. Principles of Accounting and double entry system. Recording of Transaction in Journal, Posting of transaction to Ledger and preparation of Trial Balance.

Preparation of Final Financial Statement [6L]

Preparation of Final Accounts – Profit and Loss account and Balance Sheet. Preparation of statement of changes in Financial Statements – Funds Flow Statement and Cash flow statement.

Analysis of Financial Statements [4L]

Horizontal (Trend) analysis and Vertical (Common-Size) analysis. Ratio Analysis – Liquidity ratio, Turnover ratio, Profitability ratio.

Cost Accounting: An Introduction [7L]

Meaning, nature and importance of cost Accounting system in an Organization. Elements of Cost and various cost Concept – Direct and indirect cost, Fixed and Variable costs, Sunk Cost Opportunity Cost, Out of Pocket and Imputed cost, Preparation of cost sheet. Understanding the nature of variable cost and fixed cost (total as well as per unit). Contribution, P/V ratio, Break Even Point. Assumptions of Cost-Volume - Profit Analysis and studying the relationship between Cost, Volume and Profit.

Budgeting [2L]

Meaning, Importance and Objective of budgeting in an Organization, Different types of Budgets including preparation of cash Budget, fixed and flexible budget, Zero based budgeting.

Financial Management: An Introduction [4L]

Nature, Objective and Scope, Financial decision making and type of financial decision. Role of Finance Manager in Organization. Basic axioms of Financial Management. Risk-Return framework for financial decision making.

Time Value of Money and Mathematics of Finance [4L]

Time Value of Money and Opportunity cost of Money, Present value and future value and Interest rate and discount rate Annuities and their types, Numerical related to the calculation of present values and future values.

Capital Budgeting Decisions [4L]

Nature and kinds of Capital budgeting decisions. Techniques of evaluating Capital budgeting decisions – Payback Period, Accounting rate of return, NPV, IRR and Profitability Index.

Cost of Capital and Sources of Finance [4L]

Basic valuation Model, Concept of Cost Capital – Weighted average Cost and Marginal Cost, Cost of debt and cost of Equity, Various long term sources of funds for a Organization.

Capital Structure and Dividend Decisions [4L]

Concept of Capital Structure, Financial Leverage and Capital Structure, Determinants of Capital Structure, Dividend and its forms – cash dividend, right and bonus shares and buy-back of shares, determinants of Dividend Policy of firm.

Working Capital Management [2L]

Basics of Working Capital management: Meaning of Gross and Networking Capital, Components of Working Capital. Risk-Return framework for Working Capital Decisions.

Main Reading

1 Pandey I. M., "Financial Management", 7th Edition, 2002, Vikas Publishing Pvt Ltd.

2 M. Y. Khan and P.K. Jain, "Management: Accounting" 2nd Edition1995, Tata McGraw-Hill Publishing, New Delhi

3 Maheshwari S.N. "Accounts" 2002, Vikas Publishing Pvt. Ltd.

Practical: Accounting and Financial Management
Credit: 1
Marks: 25

1. Journal entry (1P)
2. Book keeping using software.(2P)
3. Balance sheet (2P)
4. Balance sheet using software.(2P)
5. Numerical related to the calculation of present values and future values (2P)
6. Preparation of budget of a hypothetical firm (2P)
7. Returns on share of a hypothetical firm (2P)
8. Dividend policy of a hypothetical firm (2P)

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