Syllabus for Academic Year 2025-26

Semester/ NSQF Level	General Education component	Credits		Skill Component	Credits	
		T	P		T	P
Skill Development Qualification Pack - Junior Software Developer(SSC/Q0508)						
1 / Level 4.5	Environmental Studies SD-G8	3	0	Web Designing CSD-SK2	2	1
	Business Communication SD-G9	3	0	Introduction to programming CSD-SK3	3	1
	Accounts for Non-Accounting SD-G10	4	0	Database Management System CSD-SK7	2	1
	Total credits	**10**			**7**	**3**
Semester I Total 20 credits						
After successfully completing the courses of **Semester-I**, the students are expected to acquire the skills to be employable as **Junior Software Developer.**						
Skill Development Qualification Pack - Web Developer (SSC/Q0503)						
2 / Level 4.5	Language Paper-1 SD-G1	3	0	Multimedia CSD-SK6	2	1
	Content Writing SD-G6	3	0	Object oriented programming CSD-SK7	3	1
	Entrepreneurship SD-G11	4	0	Server Side programming CSD-SK9	2	1
	Total Credits	**10**			**7**	**3**
Semester II Total 20 credits						
After successfully completing the courses of **Semester-II**, the students are expected to acquire the skills to be employable as **Web Developer**						
Skill Development Qualification Pack - Application Developer - Web & Mobile (SSC/Q8403)						
3 / Level 6	Reasoning Technique SD-G20	4	0	Object oriented programming CSD-SK4	3	3
	Personality Development SD-G13	4	0	Server Side programming CSD-SK9	3	3
	Mathematical foundation of Computer Science SD-G21	2	0	Computer networks CSD-SK8	3	3
	Internship	2				
	Total Credits	**12**			**9**	**9**
Semester III Total 30 credits						
After successfully completing the courses of **Semester-III & IV**, the students are expected to acquire the skills to be employable as **Web and Mobile Application Developer**						

Skill Development Qualification Pack - Application Developer - Web & Mobile (SSC/Q8403)						
4 / Level 6	E-Commerce SD-G17	4	0	Web Development Framework CSD-SK10	3	3
	Creative Thinking SD-G22	2	0	Software Engineering CSD-SK11	3	3
	Advance Quantitative Technique SD-G23	4	0	Mobile Application Development CSD-SK12	3	3
	Internship	2				
	Total Credits	**12**			**9**	**9**
Semester IV Total 30 credits						
After successfully completing the courses of **Semester-III & IV**, the students are expected to acquire the skills to be employable as **Web and Mobile Application Developer**						
Skill Develosetpment Qualification Pack - Application Architect - Web & Mobile (SSC/Q8402)						
5 / Level 7	Digital Marketing SD-G14	4	0	Software Testing CSD-SK14	3	3
	Organisational Behaviour SD-G15	4	0	Data Structures CSD-SK13	3	3
	Maths for Competitive Exams SD-G16	4	0	Project	6	
	Total Credits	**12**			**12**	**6**
Semester V Total 30 credits						
After successfully completing the courses of **Semester-V & VI**, the students are expected to acquire the skills to be employable as **industry *(software/application developer, Mobile and Application Architect & Developer)*, government, professionals, entrepreneurs and in professional education**						
Application Architect - Web & Mobile (SSC/Q8402)						
6 / Level 7	Human Computer Interface SD-G19	4	0	Network Security CSD-SK15	3	3
	Independent Studies SD-G18	4	0	Cloud Computing CSD-SK16	3	3
	Security in Web and Mobile Applications SD-G24	4	0	Project CSD-SK17	6	
	Total Credits	**12**			**12**	**6**
Semester VI Total 30 credits						
After successfully completing the courses of **Semester-V & VI**, the students are expected to acquire the skills to be employable as **industry *(software/application developer, Mobile and Application Architect & Developer)*, government, professionals, entrepreneurs and in professional education**						

Annexure II

B. Voc. in Software Development

Skill Development Qualification Pack - Junior Software Developer(SSC/Q0508)

Syllabus (Semester – I)

Course Title: Introduction to Programming
Course Code: CSD-SK3
Credits: 3
Marks: 75
Duration: 45 Hrs

Course Objectives:

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

Course Learning Outcomes:
Upon completion of the course students will be able to:

CLO1: Explain problem solving strategies.
CLO2: Draw a flowchart for a given problem.
CLO3: Write an algorithm for a given problem.
CLO4: Explain and Apply sorting and searching algorithms.
CLO5: Recognize and incorporate programming elements such as loops, decision making, functions, arrays, strings.
CLO6: Recognize and incorporate programming elements such as structures,pointers and files into applications that solve real world problems.

Syllabus

Unit 1 **[10 HRS]**

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

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

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

Sorting and Searching: Bubble sort, Insertion Sort, Sequential Search and Binary Search.

Unit 2 **[20 HRS]**

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

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

Functions: 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.

Arrays: One- and Two-dimensional arrays: Array declaration, initialization, accessing the values, passing arrays to functions.

Pointers: Pointer declaration, initialization, Pointer arithmetic, Pointer to Pointer, Arrays and

Pointers, Functions and Pointers – passing pointers to functions, function returning pointer, dynamic memory allocation.

Unit 3 **[15 HRS]**

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

Structure and Union: Creating structures, accessing structure members, array of structures, passing structure to functions, nested structure, pointers and structures, union, difference between structures and unions.

File Handling: FILE variable, file access modes, operations on files, random access to files, command line arguments.

Pre-processing: Format of Pre-processor directive, File Inclusion directive, Macro substitution, conditional compilation.

REFRENCES

Mandatory Reading:

1. Dromey, R. G. (1982). How to Solve it by Computer. Prentice-Hall, Inc.
2. Kanetkar,Y. (2012). Let us C, BPB Publications.
3. Forouzan, B. A., & Gilberg, R. F. (2000). Computer Science: A structuredprogramming approach using C. Brooks/Cole Publishing Company.
4. Handbook for Junior Software Developer Qualification Pack.

Supplementary:

1. Horowith,E.,Sahni ,S.,Sanguthevar,R. (2008). Fundamentals of Computer Algorithms, Orient Longman.
2. Gottfried,B. (2010). Programming with C, Tata McGraw Hill.

Web References:

1. GNU GCC (GNU Compiler Collection) @ http://gcc.gnu.org , with sourcecodes.
2. http://www.stroustrup.com/C +11FAQ.html .
3. https://www.tutorialspoint.com/cprogramming
4. https://www.javatpoint.com/c-programming-language-tutorial
5. https://www.w3schools.in/c-tutorial/
6. https://www.guru99.com/c-programming-tutorial.html

Course Title: Introduction to Programming Lab
Credit: 1
Marks: 25
Duration: 60 hrs

List of Practicals

Programs using C language that covers the following concepts:

1. **Conditions :** if..else, nested if

2. **Iterative Control Statements :** for, while, do…while

3. **Functions: Standard Library functions**, Call by Value, Call by reference, Recursive functions

4. **Arrays**: One Dimensional Arrays, Two Dimensional Arrays

5. **Sorting:** Bubble sort, Insertion sort

6. **Searching:** Sequential search, Binary search

7. **Pointers:** Arrays and Pointers, Function returning pointers, Dynamic memoryallocation

8. **Strings:** Standard Library string functions, Strings and Pointers, Array of Strings

9. **Structure and Union**: Array of structures, Passing Structure to functions, Nestedstructure, Structure and Pointer, Union

10. **File Handling:** Text file, Binary file, Random Access to a file, Command Linearguments.

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Course Title: Database Management System
Course Code: CSD-SK7
Credits: 02
Marks: 50
Duration: 30 hrs

Prerequisite : NIL

Course objectives:

- To develop database model and apply to medium scale application.

Course Learning Outcomes:
On successful completion of this course students will be able to:

CLO1: Model an application's data requirements using conceptual modeling tools like ER diagrams.
CLO2: Apply Normalization theory to normalization a database.
CLO3: Use a database management system to create, populate, maintain, and query a Database.
CLO4: Analyze a given problem and select an appropriate database.

Syllabus

Unit 1 **[15hrs]**

Introduction to database and ER models

File Systems versus DBMS,The Relational Model, Levels of abstraction in a DBMS, Data independence, Structure of DBMS, Advantage of DBMS, People who deal with Databases. Overview of Database Design –The ER model-features, Key Constraints, Participation Constraints, weak Entities, Class Hierarchies, Aggregation.

Unit 2 **[15hrs]**

SQL

Attributes and domains, Relations, Integrity Constraints, Key Constraints, Foreign Key Constraints, General Constraints, Query Languages SQL: The Form of Basic SQL query, Condition specification, SQL Join, Union, Intersect, Except, Nested queries - Aggregate Operators, updates, Null values, Embedded SQL, Triggers, Data Definition Language, Introduction to Database Security : views

Unit 3 **[15hrs]**

Schema Refinement, Normal forms, transactions and Latest trends

Introduction, Schema Refinement, Functional Dependencies, Closure of a set of FDs and Attribute closure, Normal Form 1NF, 2NF, Third Normal Form, BCNF, Decomposition Lossless-Join Decomposition, Dependency-Preserving Decomposition, Normalisation Decomposition into BCNF, Decomposition into 3NF, The concept of transaction, transaction and schedule, Notion of consistency, NOSQL databases, Spatial Databases, Multimedia Databases, Distributed databases.

REFERENCE

Mandatory Reading:

1. Silberschatz A,Korth H F, Sudarshan S (), *Database system concepts* (8th ed). India, McGraw-Hill.

Supplementary Reading:

1. Ramakrishan, Gehrke J (2013). *Database management systems* (3rd ed.),McGraw-Hill
2. Elmasri R, Navathe S (). *Fundamentals of database Systems* (6th ed.). India, Pearson Education

Web References:

1. https://www.tutorialspoint.com/sql/index.htm
2. https://www.w3schools.com/sql/
3. https://dev.mysql.com/doc/
4. https://www.guru99.com/sql.html

Practical: Database Management Systems
Credit: 1
Marks: 25
Duration: 60 hrs

List of Practicals

1. ER diagram (2P)
2. Create database and tables (2P)
3. Basic SQL queries (2P)
4. Joins (2P)
5. Transactions (2P)
6. Python Database API (2P)
7. Mini project (3P)

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Course Title: Web Design

Course Code: CSD-SK2
Marks: 50
Credits: 2
Duration: 30 Hours

Course objectives:

- How to design websites that are responsive.
- Create interactive web applications using javascript.

Course Learning Outcomes:
On successful completion of this course students will be able to:

CLO1: Demonstrate the use of various HTML and CSS elements
CLO2: Design responsive websites
CLO3: Implement frameworks used in web designing.
CLO4: Build interactive applications using Javascript
CLO5: Apply markup language for presenting of information in webpages

Syllabus

Unit 1 **[15 Hrs]**

HTML and CSS

HTML Introduction. The development process, basic HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, simple HTML forms, web site structure, Meta tags,Input types, form elements, form attributes, CSS Introduction – Syntax, Id & Class, Backgrounds, Text, Fonts, Box Model – Border,Outline, Margin, Padding. Advanced - Grouping/Nesting, Dimension, Display, Positioning, Floating, Align, Pseudo-class, Pseudo-element, Navigation Bar, Image Gallery, Image Opacity, Media Types, Transitions and Animations.

Web Design Basics : Introduction to industry and Job roles, SDLC models and DevOps Lifecycle, principles of WebDesign, Phases in web Development.

Unit 2 **[15 Hrs]**

Javascript

Introduction - What is JavaScript, Understanding Events, JavaScript Example, External JavaScript. Basic Elements – Comment, Variable, Global Variable, Data Types, Operators, If Statement, Switch, Loop: for and while, Function. JavaScriptObjects – objects, Array. Browser Object Model - Browser Objects, Window Object, Document Object – getElementById, getElementsByName, getElementsByTagName, innerHTML property, inner Text property. Validation- form validation, email validation.

Planning and Design : Planning Web Development, Web Designing Process,Web Application Development

Web Development Process : Developing reusable content, Designing Accessibleweb content, Evaluating Websites

Unit 3 **[15 Hrs]**

Bootstrap and jQuery Framework

JQuery Introduction - Syntax, Selectors, Events. Effects- Hide/Show, Fade, Slide, Animate, stop(), Callback, Chaining. HTML/CSS- Add, Remove, CSS Classes, css(), Dimensions, slider. aversing – ancestors, descendants, siblings, filtering, bootstrap components - alert, button, card, carousel. Forms, list groups, modal, navbar, pagination, progress

Web Information Security : Privacy Regulations, Data Security

UAT and deployment

REFERENCE

Mandatory Reading:

1. Elisabeth R, Eric F, (2012). *Head First HTML and CSS* (2nd ed). Canada,O'Reilly Media, Inc.
2. Handbook for Web Developer Qualification Pack.

Supplementary Reading:

1. Ivan B (2017), HTML5 and CSS3 Made Simple (1st ed). India, BPB publication
2. DT Editorial Services (2016), ―HTML5 Black Book: Covers CSS3, Javascript,XML, XHTML, Ajax, PHP and Jquery (2nd ed). India, Dreamtech Press.

Web References:

1. https://www.w3schools.com/html/
2. https://www.w3schools.com/css/
3. https://www.w3schools.com/jquery/
4. https://www.w3schools.com/bootstrap/
5. https://www.javatpoint.com/html5-tutorial
6. https://www.javatpoint.com/bootstrap-tutorial

Course Title: Web Design
Marks: 25
Credit: 1
Duration: 60 hrs

List of Practicals

1. Creating a webpage using the html tags (1P)
2. Creating a webpage styled using CSS (1P)
3. Embed Video and audio in an HTML page (1P)
4. Create a simple navigation bar (1P)
5. Replicate the footer of a website (1P)
6. Replicate a website (2P)
7. Using javascript validate (3P)
    A. Check whether a given email address is valid or not.
    B. Check whether a value is a number or not.
    C. Check whether a given credit card number is valid or not.
    D. Check whether a given credit card number is valid or not.

8. Using jQuery Show and hide html elements (3P)

9. Create a responsive website using bootstrap (2P)

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Course Title: Accounts for Non-Accounting
Course Code: SD-G10
Credits: 4
Marks: 100
Duration: 60 Hours

Course Objectives:

- The key objective of this course is to provide the students an exposure to theaccounting discipline and help them to understand the language of accounting.

Course Learning Outcomes:
On completing the course, the students will be able to:

CLO1 : Understand the accounting process, appreciate various issues in accounting,
CLO2 : Understand the nature of final accounts, and
CLO3 : Resolve the differences between financial accounting, cost accounting and management accounting.

Unit 1 **[15hrs]**

The Accounting Process

Theoretical Framework of Accounting; Generally Accepted Accounting Principles, Concepts and Conventions; Capital and Revenue transactions: capital and revenue expenditures, capital and revenue receipts; Measurement, Valuation and Accounting estimates; Double entry system, Books of prime entry, Subsidiary Books; Recording of Cash and Bank transactions; Preparation of Ledger Accounts; Preparation of Trial Balance- interpretation and usefulness; Rectification of Errors; Opening entries, Transfer entries, Adjustment entries, Closing entries.

Unit 2 **[10hrs]**

Issues in Accounting

Reconciliation Statements and Accounting for Depreciation: Bank Reconciliation Statement; Receivables / Payables Reconciliation Statement; Stock Reconciliation Statement. Depreciation Policy; Methods, Computation and Accounting treatment.

Unit 3 **[15hrs]**

Preparation of Final Accounts

Profit making concern: (for sole proprietorship concern and partnership firm only): Preparation of Trading Account, Profit & Loss Account and Balance Sheet; Accounting treatment of bad debts, reserve for bad and doubtful debts, provision for discount on debtors and provision for discount on creditors.Not-for- Profit making concern: Preparation of Receipts and Payments Account; Preparation of Income and Expenditure Account; Preparation of Balance Sheet.

Unit 4: **[12 Hrs]**

Fundamentals of Cost Accounting

Cost and Management Accounting – Generally Accepted Cost Accounting Principles; Accounting for Material cost (including Accounting of Inventory – LIFO, FIFO, Weighted, Average Cost Methods); Accounting for Labour costs, Direct Expenses and Overheads. Preparation of Cost Statements: Cost Data collection, Cost Sheet formats; Preparation of Cost Sheets (historical cost sheets and estimated cost sheets).

Unit 5: **[8 Hrs]**

Fundamentals of Management Accounting

Marginal Costing and Break- even analysis – basic knowledge; Application of Marginal Costing for decision-making.

REFERENCE

Mandatory Reading:

1. Wayne A. label, Accounting For Non accountants, source book publishing,3rd Edition
2. Dr. K.m Bansal and Dr. Ritu Gupta, Basic accounting, Taxmanns Publishing.

Supplementary Reading:

1. Class 11^{th} and 12^{th} std Textbook

Web References

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Course Title: Environmental Studies
Course Code: SD-G8
Credits: 3
Marks: 75
Duration : 45 Hours

Course Objectives:

- To provide students with basic knowledge of environment and its aspects.
- To sensitize students about environmental issues.

Course Learning Outcomes:

At the end of this course students will be able to

CLO1: Understand the interdependence of natural resources, ecosystems, and biodiversity in addressing environmental issues.
CLO2: Analyze environmental policies, pollution control laws, and global protocols related to sustainable development and climate change.
CLO3: Apply environmental and economic principles to support responsible environmental management and disaster mitigation strategies.

Syllabus

Unit 1 **[15hrs]**

Environment, Resources, and Sustainable Development

Environment and its Significance

Natural Resources: Types, Alternatives, Exploitation and Conservation Strategies

Current Environmental Issues: Global, National, Local **Sustainable Development**: Concept, Significance, Goals (SDGs), and Swachh Bharat Abhiyaan

Unit 2 **[15hrs]**

Ecosystems, Biodiversity, and Pollution

Ecosystem: Structure, Functions, Energy Flow, Succession, Niche

Biodiversity: Definition, Hotspots in India, Threats, Conservation, Biogeographical Classification

Environmental Pollution: Types (Air, Water, Soil), Sources and Effects

Environmental Laws: Wildlife Protection Act (1972), Water Act (1974), Soil Act (1980), Forest Conservation Act (1980), Air Act (1981), Environmental Protection Act (1986) Biosafety Protocol (2000), Biodiversity Rule (2004), Genetically Modified Foods

Unit 3 **[15hrs]**

Climate Change, Environment and Economy

Climate Change and Global Warming: Causes, Impacts, Human Role, Carbon and Ecological Footprints

Climate Protection Protocols: Kyoto Protocol, Doha Amendment

Environment and Economic Development: Environmental Kuznets Curve, Accounting, Pollution Costs (Ambient, Damage, Abatement), Externalities and Market Failure

Environmental Management: Concept, Significance, Disaster Management and Mitigation Public Sensitization Portals

REFERENCE

Mandatory Reading:

1. Asthana, D. K., Asthana M. (2009): A Text book of Environmental Studies. S Chand and Company Limited, New Delhi.
2. Bharucha E. (2013): Text Book of Environmental Studies. University Press(India) Private Limited, Hyderabad(A.P.) India.
3. Field, Berry and Field, Martha(2001), Environmental Economics. MacGraw Hill/Irwin
4. Mishra, D.D.(2009): Fundamental Concepts in Environmental Studies. S.Chand and Company Limited,New Delhi.
5. Rana, S.V.S. (2003): Essentials of Ecology and Environmental Science, Prentice Hall of India Private Limited New Delhi.
6. Sharma, P.D. (2011): Environmental Biology and Toxicology, Rastogi Publications, Meerut, India.

Supplementary Reading:

1. Shinde,P.G. , Pendse S., Dongre P. (2007): Environmental Education. Sheth Publishers Pvt. Ltd, Mumbai, India.
2. Titenberg Tom and Lynne , Lewis(2012), Environmental and Natural resources economics, 9th edition , Pearson Publishing House,

Web References

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Course Title: Business Communication
Course Code: SD-G9
Credits: 04
Marks: 100
Duration: 60

Course Objective:

- To develop and enhance communication skills that are required for the modern work-place
- To learn the dynamics involved in spoken communication, including non-verbal interaction
- To understand the essential elements of Written Communication as required in business activities.

Course Learning Outcomes:

CLO1: To apply creative thinking abilities necessary for effective communication in the modern workplace situation

CLO2: To demonstrate clarity, precision, conciseness and coherence in use of language
CLO3: To learn how to make one's writing better, faster and more successful
CLO4: To produce successful documents in any given situation in different formats, while considering the writer's objectives, the reader's needs, the reader-writer relationship and the context.
CLO5: To increase personal confidence in delivering speeches to small & large audiences
CLO6: To understand and gain non-verbal skills essential to effective oral communication.
CLO7: Make proper presentations that disseminate information, conduct negotiation and use persuasion.

Syllabus

Unit 1 **[14hrs]**

Overview of Business Communication – I
Process of Communication, Levels of Communication, Communication Networks (formal & informal)
Overview of Business Communication – II
Barriers to Communication, strategies to avoid miscommunication.

Unit 2 **[15 hrs]**

Non-verbal communication
Non-verbal communication, Interpretation & Effectiveness
Interpersonal communication
Small Talk & Group communication

Unit 3 **[16hrs]**

Rhetorical communication
Negotiation & Persuasion skills
Public Speaking & Presentation
Public Speaking: Preparation for Public Speaking, Speech Writing, Delivery of Speech, Types of Speeches, Professional Presentations, Anxiety Management.

Unit 4: **[15 Hrs]**

Written Communication
Effective Writing: Principles & strategies, Technical Writing
Business Writing
Business communication: Emails, Memos, Letters, Reports, Proposal

REFERENCE

Mandatory Reading:

1. K. K. Sinha - Business Communication - Galgotia Publishing Company, New Delhi.
2. C. S. Rayudu - Media and Communication Management - Himalaya Publishing House, Bombay.

Supplementary Reading:

1. Rajendra Pal and J. S. Korlhalli -Essentials of Business Communication - Sultan Chand & Sons, New Delhi.
2. Nirmal Singh - Business Communication (Principles, Methods and Techniques) Deep & Deep Publications Pvt. Ltd., New Delhi.
3. Dr. S.V. Kadvekar, Prin. Dr. C. N. Rawal and Prof. Ravindra Kothavade -Business Communication - Diamond Publications, Pune.
4. R. Sharma, Krishna Mohan Business Correspondence and Report Writing – Tata McGraw-Hill Publishing Company Limited, New Delhi

Web References

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Course Title: Content Management System
Course Code: CSD-SK5
Credits: 3
Marks: 75
Duration: 45 Hrs

Course Objectives:

- Use and manage different content management systems.
- Design and deploy websites developed using a content management system.

Course Learning Outcomes:
On successful completion of this Course students will be able to:

CLO1: Install and maintain content management systems.
CLO2: Develop websites using different content management systems.
CLO3: Make use of plugins to add more functionality
CLO4: Create users and manage them

Syllabus

Unit 1 **[15hrs]**

Wordpress

WordPress dashboard, Types of users, WordPress settings panel, Permalinks and RSS feeds, Creating and managing posts, Setting up post categories, Creating and managing pages, Managing comments, Installing and updating plugins, Customising WordPress themes, WordPress theme options, WordPress Security / backup / domain transfers, Migration From Different Platforms, Optimization of WordPress Website, SEO Plugin

Woocommerse

Introduction to Woocommerc, Woocommerce installation, Creating product: Creating your product - General data, Inventory data, Shipping data, Attributes, Advanced data, Grouped products, Virtual products, Downloadable products, External/Affiliate products, Setting up categories, tags, and product images

Unit 2 **[15hrs]**

Joomla

Joomla Global Configuration, Article Manager, Archive Manager, Frontpage Manager, Section Manager, Category Manager, Media Manager, Menu Manager, Component Manager, Content Manager, Extensions Manager, Module Manager, Plugin Manager, Template Manager, Understanding the concept of Joomla Positions, Changing the layout structure by changing the module position, Understanding Basic Joomla Template, Customizing Joomla Template, Building Custom Joomla Template, Understanding templateDetails.xml File, Creating templateDetails.xml File using tmpl_builder, Linking CSS, Linking Javascrpt, Understanding include, Displaying content in XHTML, Creating template, installation package, Creating Custom Forms, Changing the Form appearance using CSS.

Unit 3 **[15hrs]**

Drupal

Drupal Overview, Drupal Site Building, Introduction to Drush, Setting a New Site Title and Logo, Adding More Users, Assigning Roles and Permissions to Site Users, Creating a Blog, Working with Blocks, Working with Views, Changing Your Site's Theme, Installing New Add-on Modules, Working with the Drupal Docroot Directory, Creating a Basic Drupal Module, Adding JavaScript to Your Drupal.

Introduction to Server Side Programming using Object Oriented Paradigm forbuilding highly interactive Web Applications - PHP an overview, basic syntax,using php variables, constants and built in functions, using operators and conditions, explaining classes and objects in object oriented programming.

Moodle Course categories – an overview, Creating courses, Course requests, Managing courses in bulk, Forms of enrolment, User profiles, Standard user actions, Manual accounts, User authentication, Assigning roles, roles Capabilities, Customizing your front page, The Moodle editor, Module plugins.

REFERENCE

Mandatory Reading:

1. Douglass, R. T., Little, M., & Smith, J. W. (2006).
2. Building online communities with Drupal, phpBB, and WordPress. Apress.
3. Handbook for Junior Software Developer Qualification Pack.

Supplementary Reading:

1. Ravensbergen, R. (2015). Building E-Commerce Solutions with WooCommerce.Packt Publishing Ltd.
2. Barnett, J. (2015). Drupal 8 for Absolute Beginners. Apress.
3. Büchner, A. (2016). Moodle 3 administration. Packt Publishing Ltd.

Web References:

1. https://www.tutorialspoint.com/wordpress/index.htm
2. https://docs.moodle.org/22/en/Moodle_video_tutorials
3. https://www.tutorialspoint.com/drupal/index.htm
4. https://www.tutorialspoint.com/joomla/index.htm

Course Title: Content Management System Lab
Credit: 3
Marks: 75
Duration: 45 hrs

List of Practicals

1. Installing and creating a wordpress website [1P]
2. Installing themes and working with a wordpress editor [1P]
3. Plugins - Contact form and SEO [1P]
4. Creating a blog website using wordpress [1P]
5. Installing woocommerce plugin, add products to the site [1P]
6. Customizing products by setting the product attributes [1P]

7. Develop an ecommerce website [2P]
8. Installing drupal and building a website using a template [1P]
9. User management, Develop website using drupal [2P]
10. Installing moodle and setting up the home page [1P]
11. 11.Managing courses in moodle [1P]
12. 12.User management in moodle [1P]
13. PHP basic syntax and variables [1P]
14. Constants and Functions[1P]
15. Operators and Conditions[1P]

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B. Voc. in Software Development

Skill Development Qualification Pack - Web Developer (SSC/Q0503)

Syllabus (Semester – II)

Course Title: Multimedia
Course Code: CSD-SK6
Credits: 02
Marks: 50
Duration: 30 hours

Pre requisite : NIL

Course Objectives:

- Develop specific skills and competencies by making them proficient in Designing Graphical Images, Audio and Video Capture and Editing using Software tools

Course Learning Outcomes:

CLO1: Develop specific skills in designing Graphical Images, Audio and Video Capture and Editing using Software tools
CLO2: Explain the industrial standard of video, audio and image formats.
CLO3: Explain were and when to use image manipulation software tools.
CLO4: Describe the process of editing audio/video/image content.

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Unit 1 **[15hrs]**

Introduction to Multimedia :

Commonly used terms associated with multimedia like CDROM, Storyboard, Script and Authoring tools.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 Software. Multimedia Hardware.

Multimedia Authoring Tools:

Types of Authoring tools - card or page based tools, icon-based, event-driven tools, time-based and presentation tools and object-oriented tools.

Unit 2 **[15hrs]**

Multimedia Building Blocks:

Designing with Text, menus and buttons for navigation , Animating text , Hypermedia and Hypertext Basic Sound Concepts , Music , Speech , MIDI and Digital Audio Making still images, Bitmaps, Clipart, Capturing and Editing Images , Scanning Images , Vector, Drawing , 3D Drawing and Rendering.

Animation

Principles of Animation- persistence of vision, animation file formats Computer animation , kinematics and morphing , Making animations that work- a rolling ball, a bouncing ball and creating an animated scene.

Unit 3 **[15hrs]**

Video

Video Broadcast Standards- NTSC, PAL, SECAM, HDTV , Integrating Computers and, Television like Video Overlay Systems, Digitized Video Playback, , Differences between Computer and Television Video , Recording Formats like S-VHA Video, Component (YUV), Component Digital, Composite , Digital, Video Hardware Resolutions , Video Tips like Shooting platforms, Lighting, Chroma Key or Blue Screen , Video Compression methods like MPEG and DVI.

Assembling and Delivering a project

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

REFRENCES

Mandatory Reading:

1. Vaughan, T. (2011). *Multimedia: Making it work*. McGraw-Hill.

Supplementary Reading:

1. Vic, C. (2016). *Multimedia Foundations: Core Concepts for Digital Design.* Routledge

Web Refrences:

1. https://www.youtube.com/watch?v=aCisC3sHneM
2. https://www.gimp.org/tutorials/
3. https://www.infotrendnow.com/2018/08/openshot-tutorial.html

Practical: Multimedia
Credit: 01
Duration: 60 hrs
Marks: 25

List of of PRACTICALS

1. **Image Handling: [1P]**
   Cropping an image, adjusting image size, increasing the size of the work canvas, saving an image.
2. **Layers: [2P]**
   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.
3. **Channels and Masks: [2P]**
   Channel palette, showing and hiding channels, splitting channels in to separate image, merging channels, creating a quick mask, editing masks using quick mask mode
4. **Painting and Editing: [2P]**

Brushes palette, brush shape, creating and deleting brushes, creating custom brushes, setting brush options, saving, loading and appending brushes, Options palette.

5. **Image Editing Effects and Tools: [2P]**
   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.
6. **Sound : [2P]**
   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.
7. **Video: [2P]**
   Record video from video capture devices, webcams, screen capture or even streaming video and Video Editing.
8. **Mini Project/Problem Statement/Case Study (integrating the above experiments) [2P]**

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Course Title : Object Oriented Programming
Course Code : CSD-SK7
Credits : 3
Marks : 75
Duration: 45 hrs

Prerequisite : Basic Understanding of Programming

Course Objectives:

- To learn the basic concepts and techniques of object oriented programming paradigm
- To introduce object oriented programming (OOP) using Java.

Course Learning Outcomes:
On successful completion of this course students will be able to:

CLO1 : Explain the benefits of object oriented design and understand when it is an appropriate methodology to use.
CLO2 : Differentiate between the top-down and bottom-up approach.
CLO3: Develop problem-solving and programming skills using the OOP concept.
CLO4 : Apply the concepts of object-oriented programming using Java.
CLO5: Design object oriented solutions for small systems involving multiple objects.
CLO6: Develop GUI for an application.

Syllabus:

Unit 1 **[15hrs]**

Principles of OOP
Programming Paradigms, Basic concepts, OOP: major principles - encapsulation, abstraction, inheritance, polymorphism. Benefits of OOP, Applications of OOP

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

UNIT 2 **[15hrs]**

Objects and Classes

Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.

Inheritance and Polymorphism.

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.

UNIT 3 **[15hrs]**

Event driven and GUI programming

Windows and Layout Manipulation, Dialogs (Message, confirmation, input), Event Handling: Event sources, Listeners, Mouse and Keyboard Event Handling.

Exception Handling

Exception handling – what and why? Try and catch block. Multiple catch blocks. Nested try, finally block, throw keyword, throws keyword. Custom Exception.

Multithreading

Running and starting thread using Thread class. Thread priorities. Running multiple threads. The Runnable interface.Synchronization and inter thread communication.

REFERENCE

Mandatory Reading:

1. Matha, M. P. (2011). *Core Java: a comprehensive study*. PHI Learning.

Supplementary Reading:

1. Balaguruswamy, E. (2014). *Programming with Java-A Primer*. McGraw-Hill Professionals.

Web References:

1. www.tutorialspoint.com/java/index.htm
2. https://www.w3schools.com/java/java_intro.asp
3. https://www.geeksforgeeks.org/java/

Practical: Object Oriented Programming
Credit: 1
Duration: 60 hrs
Marks: 25

Programs using Java language that covers the following concepts:

1. Classes and instances (2P)
2. Working with the java.Math class (1P)
3. Inheritance (1P)
4. Polymorphism, abstract classes and interfaces (2P)
5. Utilising the java.util package (1P)
6. Collections framework (2P)
7. Event handling and GUI (2P)
8. Exception handling (2P)
9. Mini Project (2P)

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Course Title: Server Side programming
Course Code: CSD-SK9
Credits: 02
Marks: 50
Duration: 30hrs

Course Prerequisite: Object Oriented Programming

Course Objectives:

- Provide an in depth understanding of a server side language, and use it to develop applications
- Design and implement basic server-side scripts.
- Create responsive and interactive web applications using frameworks

Course Learning Outcomes:
On successful completion of this course students will be able to:

CLO1: Explain the core features and functionalities of PHP
CLO2: Design interactive web application using core PHP
CLO3: Develop basic server side script to interact with users and the database
CLO4: Build a web application using laravel framework
CLO5: Utilize MVC model

Syllabus

Unit 1 **[15hrs]**

Static vs. Dynamic web pages, Need for Server Side technologies, Multi Tier Web Architecture, file architecture of a web server, Variable Types, Constants, Decision Making- If...Else, ElseIf, Loop Types - For, while, do while, foreach, Array, string, functions, Object Oriented Concepts - Class, Object, member variable, member function, Inheritance, Polymorphism, overloading, Data Abstraction, Encapsulation. Constructor, Destructor.

Unit 2 **[15hrs]**

Use of PHP Tags, Tag Styles, Calling Functions, include, Processing GET and POST request, uploading files to server, cookies, sessions, Difference between MySQLi and PDO, database connection using PDO, CRUD - Create, Read, Update, Delete, records in database, pagination, login, difference between XML and AJAX, defining AJAX array, parse AJAX using JQuery, AJAX request, AJAX response.

Unit 3 **[15hrs]**

Introduction to Laravel, Routing in Laravel, MVC in Laravel, Caching in Laravel, Event subscribers in Laravel, Package Development, Templates, Creating an Application, Testing in Laravel, Database Configuration, Helpers in Laravel, Laravel Pagination, Laravel Security, Authentication Facade, Validation in Laravel, Eloquent ORM, Artisan Command Line Interface, Deploy Application using Laravel.

REFERENCE

Mandatory Reading:

1. Leon A, Zee S(2004), *Core PHP Programming* (3rd ed.).Prentice Hall Professional
2. Stauffer, M. (2019). *Laravel: Up & Running: A Framework for Building Modern PHP Apps.* O'Reilly Media.

Supplementary Reading:

1. Williams, H. E., & Lane, D. (2004). *Web Database Applications with PHP and MySQL: Building Effective Database-Driven Web Sites*. O'Reilly Media, Inc.
2. Brinzarea, B., & Hendrix, A. (2009). *Ajax and PHP: Building modern Web applications*. Packt Publishing Ltd.

Web References:

1. https://www.w3schools.com/php/
2. https://www.tutorialspoint.com/php/index.htm
3. https://laravel.com/docs/6.x
4. https://www.tutorialspoint.com/laravel/index.htm

Practical :Server Side programming
Marks: 25
Duration: 60hrs
Credits: 01

1. PHP Classes and instances,PHP Controls Structures [1P]
2. PHP Array Programming, Inheritance [1P]
3. CRUD using PHP database API's. [3P]
    a. Fetch data from a form, validate and insert in the database.
    b. Delete data in the database.
    c. Update data in the database
    d. Display data from the database.
4. Uploading files and session management. [1P]
5. Implementing MVC [2P]
6. Migrations in Laravel [1P]
7. Using Forms and Gathering Input in Laravel [1P]
8. Creating a registration & user login form in Larvael [1P]
9. Using Controllers and Routes for URLs and APIs in Laravel [1P]
10. Eloquent ORM in Laravel [1P]
11. Creating and Using Composer Packages [1P]
12. Security and Session [1P]

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Course Title: Content Writing
Course Code: SD-G6
Marks: **75**
Credits: 3
Duration: **45 hours**

Pre requisite : NIL

Course Objectives:

- This course introduces students to the principles and techniques of effective content writing for various digital platforms. Students will learn how to create engaging, informative, and persuasive content for websites, blogs, social media, and other online channels.

Course Learning Outcomes (CLO):

CLO-1: Understand the principles of effective content writing for digital platforms.
CLO-2: Identify and analyze target audiences to tailor content accordingly.

CLO-3: Create compelling and engaging content using appropriate tone, style, and voice.
CLO-4: Optimize content for search engines and maximize online visibility.

Syllabus:

Unit 1: Introduction to Content Writing **[20 HRS]**

Overview of content writing principles and practices Understanding the digital landscape and Discuss the importance of backlinks in the digital landscape and how they contribute to a website's authority and credibility Exploring different types of content: articles, blog posts, social media updates, etc.

Writing Techniques and Style. Explain how understanding backlinks can help writers tailor contentto attract quality inbound links from reputable sources. Explore strategies for creating content that naturally attracts backlinks from other websites within the same niche or industry. Developing a unique voice and tone for different platforms Crafting headlines, introductions, and call-to-actions Incorporating storytelling techniques to engage readers

Unit 2: Search Engine Optimization (SEO) **[10 HRS]**

Include a section on backlink acquisition strategies as part of the SEO principles and best practices. This could involve guest blogging, outreach campaigns, and creating link-worthy content.

Discuss the role of backlinks in SEO and how they influence search engine algorithms in determining a website's authority and relevance.Provide guidance on ethical and effective methods for building a diverse backlink profile while avoiding black hat SEO practices that could lead to penalties from search engines.

Unit 3 : Writing for Social Media **[20 HRS]**

Tailoring content for various social media platforms (e.g., Facebook, Twitter, Instagram) Understanding the role of visuals and multimedia in social media content Managing tone and voicein social media interactions. Touch upon the indirect impact of social media shares on backlinkgeneration. When content goes viral or gains significant traction on social media platforms, it oftenattracts backlinks from other websites interested in citing or referencing the content.

Unit 4: Content Strategy and Analytics **[10 HRS]**

Developing content calendars and editorial schedules Analyzing content performance using analytics tools (e.g., Google Analytics) Iterating and optimizing content based on performance metrics.

Highlight the importance of monitoring social media analytics to identify content that resonates with the audience and has the potential to attract backlinks from external sources. Encourage students to craft social media content that not only engages users but also encouragessharing and ultimately leads to the creation of backlinks.

REFERENCE

Mandatory Reading:

1. "Everybody Writes: Your Go-To Guide to Creating Ridiculously Good Content" by AnnHandley
2. "Content Rules: How to Create Killer Blogs, Podcasts, Videos, Ebooks, Webinars (and More)That Engage Customers and Ignite Your Business" by Ann Handley and C.C. Chapman
3. "Everybody Writes: Writing for the Web" by Barry Silverstein
4. "The Ultimate Guide to Content Writing: The Art of Writing Engaging Web Content, Blogs,Emails, and More" by Mehdi Khazendar

Supplementary Reading:

1. "Content Strategy for the Web" by Kristina Halvorson and Melissa Rach
2. "The Copywriter's Handbook: A Step-By-Step Guide To Writing Copy That Sells" by Robert W. Bly

Web References:

1. https://www.skillshare.com/en/browse/content-writing
2. https://www.udemy.com/course/content-writing-with-live-practical-project/
3. https://www.youtube.com/watch?v=J2h0Xb0WNwQ

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Course Title: Language Paper-1
Course Code: SD-G1
Marks: 75
Credits: 3
Duration: 45 hours

Prerequisit :

Students need to have a basic proficiency in Grammar to complete this course.

Pre-requisite to the course: Knowledge of Basic Grammar –Articles, Adjectives, adverbs, Conjunctions, Sentence Structures– SVO etc

The above can be revised briefly. Grammar component will be taught incidentally and in conjunction with Unit II.

Course Objectives:

- To help students develop proficiency in oral communication in English.
- To help students understand the importance of developing good listening skills.
- To help students become proficient in listening, writing and speaking skills

Course Learning Outcomes:

Upon completion of the course the student should be able:

CLO1: Build confidence while conversing and writing in formal English.
CLO2: Make use of the benefits of good communication skills.

CLO3: Agree on the profit of having a proficient grasp on written skills like letter writing, minutes of a meeting and agendas.

CLO4:Create a purposeful use of English with correct grammar and pronunciation.

Syllabus:

Unit 1 **[15hrs]**

Fun with Grammar

Parts of Speech, Reported Speech, Punctuation, Phrases and Clauses, Active and Passive, Basic Errors in English Language, Spotting Errors and correcting them, Revising and Editing

Note: The teacher concerned can make use of the following, to teach Grammar.

Reading a picture, Quiz, Wordplay, Dialogues,

Unit 2 **[15hrs]**

Spoken English

Individual Presentation Skills (5 hours)

Students are to be taught public speaking using Presentation skills through application based teaching; public speaking is to be taught and application of these skill in formal and informal settings.

a) Concepts:

i. Importance of Body Language and Eye Contacti n Spoken Communication
ii. Ways to Overcome Fear of Speaking
iii. Pace, Tone and Intonation
iv. Listening as an Essential Part of Communication. How to be a an Effective Listener

b) Applied:

Students will be given topics to present before the class. They can use a host of methods to do so

i. Presentation with material-Formal
ii. Oral presentation
iii. Formal/ Informal Speeches–Welcome, Introduction to a dignitary, Raising a toast, Farewell Speech, celebratory speeches

Pair Based Activities (5 hours)

a) Telephone Etiquette
b) Speaking and Listening Classroom Practice Exercises in Pairs and Groups.

Group Based Activities (5 hours)

a) Minutes of the meeting can be used as a group based activity.
b) Group Discussions of Formal and Informal nature.

Unit 3 **[15hrs]**

Written English

1. Letters

a) Formal Letters

i. Job Application Letters
ii. Enquiry Letters
iii. Orders and Complaints letters
iv. RTI
v. Representations
vi. Writing a resume

b) Social Letters

i. Invitation & Reply
ii. Condolence & Reply
iii. Congratulations & Reply
iv. Thank you & Reply

Unit 4 **[15 Hrs]**

Digital StoryTelling(DST)

Descriptive Writing– (Open to the Teacher to explore this writing in various areas Fiction and Non-Fiction and creative expression of personal writing)

REFERENCES:

Web References:

1. **https://www.gooverseas.com/blog/10-best-games-esl-teachers**
2. **https://www.englishgrammar.org/**
3. **https://www.grammarly.com/blog/how-to-write-a-letter/**
4. **https://byjus.com/english/letter-writing/**
5. **https://readygrad.com.au/blog-career/dos-and-donts-of-telephone-etiquette**
6. **https://www.mitel.com/articles/telephone-etiquette-tips**
7. **https://edtechteacher.org/8-steps-to-great-digital-storytelling-from-samantha-on-edudemic/**
8. **https://www.masterclass.com/articles/complete-guide-to-writing-a-good-story**
9. **https://www.grammarly.com/blog/how-to-write-a-story/**
10. **https://youtu.be/xcXRXwneFY0**
11. **https://youtu.be/YiS5kdrJhno**

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Course Title: Entrepreneurship
Course Code: SD-G11
Credits: 4
Marks: 100
Duration: 60 Hrs

Prerequisit : NIL

Course Objectives:

On Completion of this course students will be able to understand:

- How to do Analysis of Business Environment & Policies: Market, Resources& Competition. Use of SWOT Differentiate betweenEntrepreneurship & startups

Course Learning outcomes:

Upon completion of the course students will be able to:

CLO1: Identify and evaluate business opportunities
CLO2 : Evaluate risks
CLO3 : Pursue innovations
CLO4 : Production and marketing of goods to understand the economics ofentrepreneurship
CLO5 : Prepare/Create a business plan.

Syllabus

Unit 1 **[15hrs]**

Introduction to entrepreneurship

Entrepreneurship: meaning, definition, Types, qualities, skills and functions; Risk and uncertainty; Analysis of Business Environment & Policies: Market, Resources& Competition. Use of SWOT and Porter's Five Forces Analysis; Difference between Entrepreneurship & startups

Unit 2 **[15hrs]**

Risk & Innovations

Importance and management of risk; market/commercial risk, technological risk, financial risk, social risk, political risk, personal risk; Innovations: Concept & theory, Types and forms of innovations; innovation & imitation; Branding, Patents and Copyrights, Support for startups: Purpose of Incubators & Accelerators.

UNIT 3 **[15hrs]**

Sources of funds and Costing, Pricing and Marketing

Financial Resources - Sources of funds; Uses of funds; Fixed and Working Capital; Material Resources: Supply and distribution chains; Government and local resources; Human Resources. Costing Strategies – Absorption and marginal costing; Costing for inventories; Pricing and pricing strategies (skimming price, penetration price, mark-up, marginal-cost price); Break- even analysis and break- even chart; Marketing techniques and strategies.

Unit 4: **[15hrs]**

Preparing the Business Plan

Components and Uses of the Business Plan; Creating a Business Plan; Sources of funds; Marketing Plan Expenditures and Revenues; Profitability; Growth Rate of the business andthe Rate of Return.

Manage your work to meet requirements: Understanding Scope of work andworking within limits of authority, work and work environment, maintaining confidentiality.

Working effectively with colleagues : Effective communication, Working Effectively, Maintain a healthy, safe and secure work environment Provide data and information in standard formants, Develop knowledge, skill and competence.

REFERENCES:

Mandatory Reading:

1. Charantimath, Poornima M. (2014), Entrepreneurship Development and Small Business Enterprises, Pearson, Chennai.
2. Colombo Plan Staff College for Technical Education, Manila (1999), Entrepreneurship Development, Tata McGraw Hill, New Delhi.
3. Handbook for Web Developer Qualification Pack.

Supplementary Reading:

1. Chandra, Prasana (1995), Projects: Planning, Analysis, Selection, Implementation & Review, Tata McGraw Hill, New Delhi.
2. Kuriloff, Arthur H; Hemphill, John M. (1988), Starting and Managing the Small Business, McGraw-Hill, New York.
3. Mukherjee AbhikKumar;RoyShaunak, (2019)Entrepreneurship Development and Business Ethics,Oxford University Press,New Delhi

Web References:

1. https://up.startupindia.gov.in/content/sih/en/home-page.html
2. http://www.ciba.org.in/
3. https://www.goa.gov.in/wp-content/uploads/2017/09/Goa-IT-Start-up-Policy-201 7.pdf
4. https://www.forbes.com/pictures/mgj45fgmd/100-best-websites-for-entrepreneurs-
   https://www.india.gov.in/people-groups/community/entrepreneur
5. https://www.entrepreneur.com/magazine

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B. Voc. in Software Development

Skill Development Qualification Pack - Web Developer (SSC/Q0503)

Syllabus (Semester – II)

Course Title: Computer Organization And Operating System
Course Code: CSD-SK1
Credits: 3
Marks: 75
Duration: 45 Hrs

Course Objectives:

- To have a thorough understanding of the basic structure and operation of adigital computer.

Course Learning Outcomes:

On successful completion of this course students will be able to:

CLO1:. Explain Basic Structure, Function and Operation of a digital computer. Describe Von Neumann architecture

CLO2: Explain Memory Subsystem in a computer. Describe the function of a Processor, Memory, I/O and System Bus.

CLO3: State the difference between various types of Operating Systems.

CLO4: Explain the role an OS plays in Memory, Processor and StorageManagement.

Syllabus

Unit 1 **[15hrs]**

Computer System Function and structure of a computer, Interconnection of components, Performance of a computer. Computer Architecture – Princeton (Von Neumann) and Harvard architecture

Memory Subsystem: Characteristics of memory system, the memory hierarchy, Semiconductor memories, Types of ROM & RAM, Cache memory unit - Concept of cache memory, Organization of a cache memory unit, replacement algorithms, write policy, block size.

Input/ Output Subsystem: General block diagram of External device & I/O module, Programmed I/O,Interrupt driven I/O, DMA, I/O channels and I/O processors. I/O interfaces – Serial port, Parallel port, PCI bus, SCSI bus, USB bus, Firewire and Infiniband.

Unit 2 **[15hrs]**

Introduction to Operating System:

Basic elements of a computer system: Processor, Main Memory, I/O Modules, System Bus, Instruction Execution; Operating Systems: Definition, Operating system Structure, operating system operations, Relationship between Kernel, OS, and Hardware, Operating system services,System calls,Types of system calls,System programs.

Process Management:

Process Definition, Process Control Block, Process States, Operations on Process;Interprocess communication, Threads and Microkernels.

Unit 3 **[15hrs]**

Memory Management: Introduction, Swapping, Contiguous Memory Allocation, Paging, Page Table,Segmentation, Virtual

Memory: Introduction, Demand Paging, Page Replacement, Allocation of Frames, Thrashing Storage Management, File System, Concepts, File Organization and Access Methods, Directory and Disk Structure. Secondary Storage Structure - Overview, disk structure, Disk

attachment, Disk scheduling.

REFERENCES

Mandatory Reading:

1. William Stallings (2013). Computer Organization and Architecture (9th ed)Pearson
2. William Stallings (2019). Operating Systems: Internals and Design Principles (9th ed) Pearson

Supplementary Reading:

1. Andrew S. Tanenbaum (2016). Operating Systems: Internals and Design Principles (4th ed) Pearson Education India.

Web References:

1. https://www.tutorialspoint.com/operating_system/index.htm
2. https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/
3. https://en.wikipedia.org/wiki/Operating_system
4. https://www.javatpoint.com/computer-organization-and-architecture-tutorial
5. https://www.javatpoint.com/operating-system

Course Title: Computer Organization And Operating System
Marks: 75
Credit: 3
Duration: 45 hrs

List of Practicals

PART-I [5P]

1. Exploring the Functions and Components of a PC
    a) Identifying each components
    b) Learning their function.
2. Building a PC from Scratch.
    a) Installing the motherboard
    b) Identifying the CPU socket type and motherboard compatibility.
    c) Installation of and RAM and its comparability with the motherboard.
    d) Power Supply requirements and installation.
    e) Cable management.
3. BIOS ROM Setup.
    a) Changing the boot priority

b) Understanding UEFI and Legacy boot.

c) Setting a bios passwordPART-II [10P]

4. Partitioning and formatting disk
    1. Making a flash drive/ CD ROM bootable.
    2. Installing an OS
    3. Installing applications device
    4. Configuring Display Settings I.e multiple displays
    5. Printer setup and configuration
    6. Creating, modifying and deleting user account
    7. Dual booting with windows
    8. Adding and removing software
    9. Manually Mounting Partitions
    10. Setting up a Virtual OS using Virtual Box
    11. Study of Basic commands of Linux.
    12. Shell Programming in Unix/Linux, arithmetic operations, loops
    13. Menu Driven Shell scripting
    14. Filters and Pipes in LINUX

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Course Title: Web Design
Course Code: CSD-SK2
Marks: 75
Credits: 3
Duration: 45 Hours

Course objectives:

- How to design websites that are responsive.
- Create interactive web applications using javascript.

Course Learning Outcomes:
On successful completion of this course students will be able to:

CLO1: Demonstrate the use of various HTML and CSS elements
CLO2: Design responsive websites
CLO3: Implement frameworks used in web designing.
CLO4: Build interactive applications using Javascript
CLO5: Apply markup language for presenting of information in webpages

Syllabus

Unit 1 **[15 Hrs]**

HTML and CSS

HTML Introduction. The development process, basic HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, simple HTML forms, web site structure, Meta tags,Input types, form elements, form attributes, CSS Introduction – Syntax, Id & Class, Backgrounds, Text, Fonts, Box Model – Border,Outline, Margin, Padding. Advanced - Grouping/Nesting, Dimension, Display, Positioning, Floating, Align, Pseudo-class, Pseudo-element, Navigation Bar, Image Gallery, Image Opacity, Media Types, Transitions and

Animations.

Web Design Basics : Introduction to industry and Job roles, SDLC models and DevOps Lifecycle, principles of WebDesign, Phases in web Development.

Unit 2 **[15 Hrs]**

Javascript

Introduction - What is JavaScript, Understanding Events, JavaScript Example, External JavaScript. Basic Elements – Comment, Variable, Global Variable, DataTypes, Operators, If Statement, Switch, Loop: for and while, Function. JavaScriptObjects – objects, Array. Browser Object Model - Browser Objects, Window Object, Document Object – getElementById, getElementsByName, getElementsByTagName, innerHTML property, inner Text property. Validation- form validation, email validation.

Planning and Design : Planning Web Development, Web Designing Process,Web Application Development

Web Development Process : Developing reusable content, Designing Accessibleweb content, Evaluating Websites

Unit 3 **[15 Hrs]**

Bootstrap and jQuery Framework

JQuery Introduction - Syntax, Selectors, Events. Effects- Hide/Show, Fade, Slide, Animate, stop(), Callback, Chaining. HTML/CSS- Add, Remove, CSS Classes, css(), Dimensions, slider. aversing – ancestors, descendants, siblings, filtering, bootstrap components - alert, button, card, carousel. Forms, list groups, modal, navbar, pagination, progress

Web Information Security : Privacy Regulations, Data Security

UAT and deployment

REFERENCE

Mandatory Reading:

3. Elisabeth R, Eric F, (2012). *Head First HTML and CSS* (2nd ed). Canada,O'Reilly Media, Inc.
4. Handbook for Web Developer Qualification Pack.

Supplementary Reading:

3. Ivan B (2017), HTML5 and CSS3 Made Simple (1st ed). India, BPB publication
4. DT Editorial Services (2016), ―HTML5 Black Book: Covers CSS3, Javascript,XML, XHTML, Ajax, PHP and Jquery (2nd ed). India, Dreamtech Press.

Web References:

7. https://www.w3schools.com/html/
8. https://www.w3schools.com/css/
9. https://www.w3schools.com/jquery/
10. https://www.w3schools.com/bootstrap/
11. https://www.javatpoint.com/html5-tutorial
12. https://www.javatpoint.com/bootstrap-tutorial

Course Title: Web Design
Marks: 75
Credit: 3
Duration: 45 hrs

List of Practicals

10. Creating a webpage using the html tags (1P)
11. Creating a webpage styled using CSS (1P)
12. Embed Video and audio in an HTML page (1P)
13. Create a simple navigation bar (1P)
14. Replicate the footer of a website (1P)
15. Replicate a website (2P)
16. Using javascript validate (3P)
    A. Check whether a given email address is valid or not.
    B. Check whether a value is a number or not.
    C. Check whether a given credit card number is valid or not.
    D. Check whether a given credit card number is valid or not.
17. Using jQuery Show and hide html elements (3P)
18. Create a responsive website using bootstrap (2P)

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Course Title: Multimedia
Course Code: CSD-SK6
Credits: 03
Marks: 75
Duration: 45 hours

Pre requisite : NIL

Course Objectives:

- Develop specific skills and competencies by making them proficient in Designing Graphical Images, Audio and Video Capture and Editing using Software tools

Course Learning Outcomes:

CLO1: Develop specific skills in designing Graphical Images, Audio and Video Capture and Editing using Software tools
CLO2: Explain the industrial standard of video, audio and image formats.
CLO3: Explain were and when to use image manipulation software tools.
CLO4: Describe the process of editing audio/video/image content.

Syllabus

Unit 1 **[15hrs]**

Introduction to Multimedia :

Commonly used terms associated with multimedia like CDROM, Storyboard, Script and Authoring tools.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 Software. Multimedia Hardware.

Multimedia Authoring Tools:

Types of Authoring tools - card or page based tools, icon-based, event-driven tools, time-based and presentation tools and object-oriented tools.

Unit 2 **[15hrs]**

Multimedia Building Blocks:

Designing with Text, menus and buttons for navigation , Animating text , Hypermedia and Hypertext Basic Sound Concepts , Music , Speech , MIDI and Digital Audio Making still images, Bitmaps, Clipart, Capturing and Editing Images , Scanning Images , Vector, Drawing , 3D Drawing and Rendering.

Animation

Principles of Animation- persistence of vision, animation file formats Computer animation , kinematics and morphing , Making animations that work- a rolling ball, a bouncing ball and creating an animated scene.

Unit 3 **[15hrs]**

Video

Video Broadcast Standards- NTSC, PAL, SECAM, HDTV , Integrating Computers and, Television like Video Overlay Systems, Digitized Video Playback, , Differences between Computer and Television Video , Recording Formats like S-VHA Video, Component (YUV), Component Digital, Composite , Digital, Video Hardware Resolutions , Video Tips like Shooting platforms, Lighting, Chroma Key or Blue Screen , Video Compression methods like MPEG and DVI.

Assembling and Delivering a project

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

REFRENCES

Mandatory Reading:

2. Vaughan, T. (2011). *Multimedia: Making it work*. McGraw-Hill.

Supplementary Reading:

2. Vic, C. (2016). *Multimedia Foundations: Core Concepts for Digital Design.* Routledge

Web Refrences:

4. https://www.youtube.com/watch?v=aCisC3sHneM
5. https://www.gimp.org/tutorials/
6. https://www.infotrendnow.com/2018/08/openshot-tutorial.html

Practical: Multimedia
Credit: 03
Duration: 45 hrs
Marks: 75

List of of PRACTICALS

9. **Image Handling: [1P]**

Cropping an image, adjusting image size, increasing the size of the work canvas, saving an image.

10. **Layers: [2P]**
    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.
11. **Channels and Masks: [2P]**
    Channel palette, showing and hiding channels, splitting channels in to separate image, merging channels, creating a quick mask, editing masks using quick mask mode
12. **Painting and Editing: [2P]**
    Brushes palette, brush shape, creating and deleting brushes, creating custom brushes, setting brush options, saving, loading and appending brushes, Options palette.
13. **Image Editing Effects and Tools: [2P]**
    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.
14. **Sound : [2P]**
    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.
15. **Video: [2P]**
    Record video from video capture devices, webcams, screen capture or even streaming video and Video Editing.
16. **Mini Project/Problem Statement/Case Study (integrating the above experiments) [2P]**

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Course Title: Content Writing
Course Code: SD-G6
Marks: **100**
Credits: 4
Duration: **60 hours**

Pre requisite : NIL

Course Objectives:

- This course introduces students to the principles and techniques of effective content writing for various digital platforms. Students will learn how to create engaging, informative, and persuasive content for websites, blogs, social media, and other online channels.

Course Learning Outcomes (CLO):

CLO-1: Understand the principles of effective content writing for digital platforms.
CLO-2: Identify and analyze target audiences to tailor content accordingly.
CLO-3: Create compelling and engaging content using appropriate tone, style, and voice.
CLO-4: Optimize content for search engines and maximize online visibility.

Syllabus:

Unit 1: Introduction to Content Writing **[20 HRS]**

Overview of content writing principles and practices Understanding the digital landscape and Discuss the importance of backlinks in the digital landscape and how they contribute to a website's authority and credibility Exploring different types of content: articles, blog posts, social media updates, etc.

Writing Techniques and Style. Explain how understanding backlinks can help writers tailor contentto attract quality inbound links from reputable sources. Explore strategies for creating content that naturally attracts backlinks from other websites within the same niche or industry. Developing a unique voice and tone for different platforms Crafting headlines, introductions, and call-to-actions Incorporating storytelling techniques to engage readers

Unit 2: Search Engine Optimization (SEO) **[10 HRS]**

Include a section on backlink acquisition strategies as part of the SEO principles and best practices. This could involve guest blogging, outreach campaigns, and creating link-worthy content.

Discuss the role of backlinks in SEO and how they influence search engine algorithms in determining a website's authority and relevance.Provide guidance on ethical and effective methods for building a diverse backlink profile while avoiding black hat SEO practices that could lead to penalties from search engines.

Unit 3 : Writing for Social Media **[20 HRS]**

Tailoring content for various social media platforms (e.g., Facebook, Twitter, Instagram) Understanding the role of visuals and multimedia in social media content Managing tone and voicein social media interactions. Touch upon the indirect impact of social media shares on backlinkgeneration. When content goes viral or gains significant traction on social media platforms, it oftenattracts backlinks from other websites interested in citing or referencing the content.

Unit 4: Content Strategy and Analytics **[10 HRS]**

Developing content calendars and editorial schedules Analyzing content performance using analytics tools (e.g., Google Analytics) Iterating and optimizing content based on performance metrics.

Highlight the importance of monitoring social media analytics to identify content that resonates with the audience and has the potential to attract backlinks from external sources. Encourage students to craft social media content that not only engages users but also encouragessharing and ultimately leads to the creation of backlinks.

REFERENCE

Mandatory Reading:

5. "Everybody Writes: Your Go-To Guide to Creating Ridiculously Good Content" by

AnnHandley

6. "Content Rules: How to Create Killer Blogs, Podcasts, Videos, Ebooks, Webinars (and More)That Engage Customers and Ignite Your Business" by Ann Handley and C.C. Chapman
7. "Everybody Writes: Writing for the Web" by Barry Silverstein
8. "The Ultimate Guide to Content Writing: The Art of Writing Engaging Web Content, Blogs,Emails, and More" by Mehdi Khazendar

Supplementary Reading:

3. "Content Strategy for the Web" by Kristina Halvorson and Melissa Rach
4. "The Copywriter's Handbook: A Step-By-Step Guide To Writing Copy That Sells" by Robert W. Bly

Web References:

4. https://www.skillshare.com/en/browse/content-writing
5. https://www.udemy.com/course/content-writing-with-live-practical-project/
6. https://www.youtube.com/watch?v=J2h0Xb0WNwQ

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Course Title: Language Paper-1
Course Code: SD-G1
Marks: 100
Credits: 4
Duration: 60 hours

Prerequisit :

Students need to have a basic proficiency in Grammar to complete this course.
Pre-requisite to the course: Knowledge of Basic Grammar –Articles, Adjectives, adverbs, Conjunctions, Sentence Structures– SVO etc
The above can be revised briefly. Grammar component will be taught incidentally and in conjunction with Unit II.

Course Objectives:

- To help students develop proficiency in oral communication in English.
- To help students understand the importance of developing good listening skills.
- To help students become proficient in listening, writing and speaking skills

Course Learning Outcomes:

Upon completion of the course the student should be able:

CLO1: Build confidence while conversing and writing in formal English.
CLO2: Make use of the benefits of good communication skills.
CLO3: Agree on the profit of having a proficient grasp on written skills like letter writing, minutes of a meeting and agendas.
CLO4:Create a purposeful use of English with correct grammar and pronunciation.

Syllabus:

Unit 1 **[15hrs]**

Fun with Grammar

Parts of Speech, Reported Speech, Punctuation, Phrases and Clauses, Active and Passive, Basic Errors in English Language, Spotting Errors and correcting them, Revising and Editing

Note: The teacher concerned can make use of the following, to teach Grammar.

Reading a picture, Quiz, Wordplay, Dialogues,

Unit 2 **[15hrs]**

Spoken English

Individual Presentation Skills (5 hours)

Students are to be taught public speaking using Presentation skills through application based teaching; public speaking is to be taught and application of these skill in formal and informal settings.

a) Concepts:

v. Importance of Body Language and Eye Contacti n Spoken Communication
vi. Ways to Overcome Fear of Speaking
vii. Pace, Tone and Intonation
viii. L istening as an Essential Part of Communication. How to be a an Effective Listener

b) Applied:

Students will be given topics to present before the class. They can use a host of methods to do so

iv. Presentation with material-Formal
v. Oral presentation
vi. Formal/ Informal Speeches–Welcome, Introduction to a dignitary, Raising a toast, Farewell Speech, celebratory speeches

Pair Based Activities (5 hours)

c) Telephone Etiquette
d) Speaking and Listening Classroom Practice Exercises in Pairs and Groups.

Group Based Activities (5 hours)

c) Minutes of the meeting can be used as a group based activity.
d) Group Discussions of Formal and Informal nature.

Unit 3 **[15hrs]**

Written English

1. Letters

a) Formal Letters

vii. Job Application Letters
viii. E nquiry Letters
ix. Orders and Complaints letters
x. RTI
xi. Representations
xii. Writing a resume

b) Social Letters

v. Invitation & Reply
vi. Condolence & Reply
vii. Congratulations & Reply
viii. T hank you & Reply

Unit 4 **[15 Hrs]**

Digital StoryTelling(DST)

Descriptive Writing– (Open to the Teacher to explore this writing in various areas Fiction and Non-Fiction and creative expression of personal writing)

REFERENCES:

Web References:

12. **https://www.gooverseas.com/blog/10-best-games-esl-teachers**
13. **https://www.englishgrammar.org/**
14. **https://www.grammarly.com/blog/how-to-write-a-letter/**
15. **https://byjus.com/english/letter-writing/**
16. **https://readygrad.com.au/blog-career/dos-and-donts-of-telephone-etiquette**
17. **https://www.mitel.com/articles/telephone-etiquette-tips**
18. **https://edtechteacher.org/8-steps-to-great-digital-storytelling-from-samantha-on-edudemic/**
19. **https://www.masterclass.com/articles/complete-guide-to-writing-a-good-story**
20. **https://www.grammarly.com/blog/how-to-write-a-story/**
21. **https://youtu.be/xcXRXwneFY0**
22. **https://youtu.be/YiS5kdrJhno**

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Course Title: Entrepreneurship
Course Code: SD-G11
Credits: 4
Marks: 100
Duration: 60 Hrs

Prerequisit : NIL

Course Objectives:

On Completion of this course students will be able to understand:

- How to do Analysis of Business Environment & Policies: Market, Resources& Competition. Use of SWOT Differentiate betweenEntrepreneurship & startups

Course Learning outcomes:

Upon completion of the course students will be able to:

CLO1: Identify and evaluate business opportunities
CLO2 : Evaluate risks
CLO3 : Pursue innovations
CLO4 : Production and marketing of goods to understand the economics ofentrepreneurship
CLO5 : Prepare/Create a business plan.

Syllabus

Unit 1 **[15hrs]**

Introduction to entrepreneurship

Entrepreneurship: meaning, definition, Types, qualities, skills and functions; Risk and uncertainty; Analysis of Business Environment & Policies: Market, Resources& Competition. Use of SWOT and Porter's Five Forces Analysis; Difference between Entrepreneurship & startups

Unit 2 **[15hrs]**

Risk & Innovations

Importance and management of risk; market/commercial risk, technological risk, financial risk, social risk, political risk, personal risk; Innovations: Concept & theory, Types and forms of innovations; innovation & imitation; Branding, Patents and Copyrights, Support for startups: Purpose of Incubators & Accelerators.

UNIT 3 **[15hrs]**

Sources of funds and Costing, Pricing and Marketing

Financial Resources - Sources of funds; Uses of funds; Fixed and Working Capital; Material Resources: Supply and distribution chains; Government and local resources; Human Resources. Costing Strategies – Absorption and marginal costing; Costing for inventories; Pricing and pricing strategies (skimming price, penetration price, mark-up, marginal-cost price); Break- even analysis and break- even chart; Marketing techniques and strategies.

Unit 4: **[15hrs]**

Preparing the Business Plan

Components and Uses of the Business Plan; Creating a Business Plan; Sources of funds; Marketing Plan Expenditures and Revenues; Profitability; Growth Rate of the business andthe Rate of Return.

Manage your work to meet requirements: Understanding Scope of work andworking within limits of authority, work and work environment, maintaining confidentiality.

Working effectively with colleagues : Effective communication, Working Effectively, Maintain a healthy, safe and secure work environment Provide data and information in standard formants, Develop knowledge, skill and competence.

REFERENCES:

Mandatory Reading:

4. Charantimath, Poornima M. (2014), Entrepreneurship Development and Small Business Enterprises, Pearson, Chennai.
5. Colombo Plan Staff College for Technical Education, Manila (1999), Entrepreneurship Development, Tata McGraw Hill, New Delhi.
6. Handbook for Web Developer Qualification Pack.

Supplementary Reading:

4. Chandra, Prasana (1995), Projects: Planning, Analysis, Selection, Implementation & Review, Tata McGraw Hill, New Delhi.
5. Kuriloff, Arthur H; Hemphill, John M. (1988), Starting and Managing the Small Business, McGraw-Hill, New York.
6. Mukherjee AbhikKumar;RoyShaunak, (2019)Entrepreneurship Development and Business Ethics,Oxford University Press,New Delhi

Web References:

6. https://up.startupindia.gov.in/content/sih/en/home-page.html
7. http://www.ciba.org.in/
8. https://www.goa.gov.in/wp-content/uploads/2017/09/Goa-IT-Start-up-Policy-201 7.pdf
9. https://www.forbes.com/pictures/mgj45fgmd/100-best-websites-for-entrepreneurs-
   https://www.india.gov.in/people-groups/community/entrepreneur
10. https://www.entrepreneur.com/magazine

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B. Voc. in Software Development

Skill Development Qualification Pack - Application Developer - Web & Mobile (SSC/Q8403)

Syllabus (Semester – III)

Course Title : Object Oriented Programming
Course Code : CSD-SK7
Credits : 3
Marks : 75
Duration: 45 hrs

Prerequisite : Basic Understanding of Programming

Course Objectives:

- To learn the basic concepts and techniques of object oriented programming paradigm
- To introduce object oriented programming (OOP) using Java.

Course Learning Outcomes:
On successful completion of this course students will be able to:

CLO1 : Explain the benefits of object oriented design and understand when it is an appropriate methodology to use.
CLO2 : Differentiate between the top-down and bottom-up approach. Develop problem-solving and programming skills using the OOP concept.
CLO3 : Apply the concepts of object-oriented programming using Java. Design object oriented solutions for small systems involving multiple objects.
CLO4: Develop GUI for an application.

Syllabus:

Unit 1 **[15hrs]**

Principles of OOP

Programming Paradigms, Basic concepts, OOP: major principles - encapsulation, abstraction, inheritance, polymorphism. Benefits of OOP, Applications of OOP

Introduction to Java

Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, java.Math class, Arrays in java.

UNIT 2 **[15hrs]**

Objects and Classes

Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.

Inheritance and Polymorphism.

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.

UNIT 3 **[15hrs]**

Event driven and GUI programming

Windows and Layout Manipulation, Dialogs (Message, confirmation, input), Event Handling: Event sources, Listeners, Mouse and Keyboard Event Handling.

Exception Handling

Exception handling – what and why? Try and catch block. Multiple catch blocks. Nested try, finally block, throw keyword, throws keyword. Custom Exception.

Multithreading

Running and starting thread using Thread class. Thread priorities. Running multiple threads. The Runnable interface.Synchronization and inter thread communication.

REFERENCE

Mandatory Reading:

2. Matha, M. P. (2011). *Core Java: a comprehensive study*. PHI Learning.

Supplementary Reading:

2. Balaguruswamy, E. (2014). *Programming with Java-A Primer*. McGraw-Hill Professionals.

Web References:

4. www.tutorialspoint.com/java/index.htm
5. https://www.w3schools.com/java/java_intro.asp
6. https://www.geeksforgeeks.org/java/

Practical: Object Oriented Programming
Credit: 3
Duration: 45 hrs
Marks: 75

Programs using Java language that covers the following concepts:

10. Classes and instances (2P)
11. Working with the java.Math class (1P)
12. Inheritance (1P)
13. Polymorphism, abstract classes and interfaces (2P)
14. Utilising the java.util package (1P)
15. Collections framework (2P)
16. Event handling and GUI (2P)
17. Exception handling (2P)
18. Mini Project (2P)

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Course Title: Server Side programming
Course Code: CSD-SK9
Credits: 03
Marks: 75
Duration: 45hrs

Course Prerequisite: Object Oriented Programming

Course Objectives:

- Provide an in depth understanding of a server side language, and use it to develop applications
- Design and implement basic server-side scripts.

- Create responsive and interactive web applications using frameworks

Course Learning Outcomes:
On successful completion of this course students will be able to:

CLO1: Explain the core features and functionalities of PHP
CLO2: Design interactive web application using core PHP
CLO3: Develop basic server side script to interact with users and the database
CLO4: Build a web application using laravel framework
CLO5: Utilize MVC model

Syllabus

Unit 1 **[15hrs]**

Static vs. Dynamic web pages, Need for Server Side technologies, Multi Tier Web Architecture, file architecture of a web server, Variable Types, Constants, Decision Making- If...Else, ElseIf, Loop Types - For, while, do while, foreach, Array, string, functions, Object Oriented Concepts - Class, Object, member variable, member function, Inheritance, Polymorphism, overloading, Data Abstraction, Encapsulation. Constructor, Destructor.

Unit 2 **[15hrs]**

Use of PHP Tags, Tag Styles, Calling Functions, include, Processing GET and POST request, uploading files to server, cookies, sessions, Difference between MySQLi and PDO, database connection using PDO, CRUD - Create, Read, Update, Delete, records in database, pagination, login, difference between XML and AJAX, defining AJAX array, parse AJAX using JQuery, AJAX request, AJAX response.

Unit 3 **[15hrs]**

Introduction to Laravel, Routing in Laravel, MVC in Laravel, Caching in Laravel, Event subscribers in Laravel, Package Development, Templates, Creating an Application, Testing in Laravel, Database Configuration, Helpers in Laravel, Laravel Pagination, Laravel Security, Authentication Facade, Validation in Laravel, Eloquent ORM, Artisan Command Line Interface, Deploy Application using Laravel.

REFERENCE

Mandatory Reading:

3. Leon A, Zee S(2004), *Core PHP Programming* (3rd ed.).Prentice Hall Professional
4. Stauffer, M. (2019). *Laravel: Up & Running: A Framework for Building Modern PHP Apps.* O'Reilly Media.

Supplementary Reading:

3. Williams, H. E., & Lane, D. (2004). *Web Database Applications with PHP and MySQL: Building Effective Database-Driven Web Sites*. O'Reilly Media, Inc.
4. Brinzarea, B., & Hendrix, A. (2009). *Ajax and PHP: Building modern Web applications*. Packt Publishing Ltd.

Web References:

5. https://www.w3schools.com/php/
6. https://www.tutorialspoint.com/php/index.htm
7. https://laravel.com/docs/6.x
8. https://www.tutorialspoint.com/laravel/index.htm

Practical :Server Side programming
Marks: 75
Duration: 45hrs
Credits: 03

13. PHP Classes and instances,PHP Controls Structures [1P]
14. PHP Array Programming, Inheritance [1P]
15. CRUD using PHP database API's. [3P]
    a. Fetch data from a form, validate and insert in the database.
    b. Delete data in the database.
    c. Update data in the database
    d. Display data from the database.
16. Uploading files and session management. [1P]
17. Implementing MVC [2P]
18. Migrations in Laravel [1P]
19. Using Forms and Gathering Input in Laravel [1P]
20. Creating a registration & user login form in Larvael [1P]
21. Using Controllers and Routes for URLs and APIs in Laravel [1P]
22. Eloquent ORM in Laravel [1P]
23. Creating and Using Composer Packages [1P]
24. Security and Session [1P]

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Course Title: Computer Networks
Course Code: CSD-SK8
Marks: 75
Credits: 3
Duration: 45 hrs

Prerequisite Courses: Nil

Course Objectives:
- Gain Knowledge of the Reference models
- Understand basic concepts of data transmission medium, Compare various routing, transport protocols and Identify suitable protocol for a given network.

Course Learning Outcomes:
On successful completion of this course students will be able to:

CLO1:Select the most appropriate networking architecture and technologies for the given organization structure.
CLO2: Compare and contrast the layers in OSI model and TCP/IP.
CLO3: Explain the functionalities provided by each layer in the OSI model.
CLO4: Define the concept used for error handling in Datalink layer Develop client server programs for different applications.
CLO6: Design basic computer network

Syllabus

Unit 1 **[15hrs]**

Introduction and Data Link Layer

Basics of Computer Networks, Classification: transmission technology, scale; Applications; Data Communications: data, signal, bandwidth, bit interval and bit rate, Modes of Communication. Layered network architecture, Networks models: OSI model, TCP / IP protocol suite; Guided and Unguided Transmission media, Multiplexing: FDM, TDM. Switching: Circuit switching, message switching, Packet Switching. Data link control: Framing: Character Count, Character Stuffing, Bit Stuffing , Error Detection and correction, Flow and error control, HDLC; Multiple access: Random access – Controlled access , ALOHA, CSMA, CSMA/CD and CSMA/CA; Ethernet : IEEE standards, standard Ethernet, Fast Ethernet, Gigabit Ethernet; Connecting devices: repeater/hub, bridge, router and gateway, Backbone networks - Virtual LANS.

Unit 2 **[15 hrs]**

Network Layer

Functions of Network layer; Network Service types: Virtual Circuits, Datagrams; Logical addressing: IPv4, private and public IP addressing, special IP addresses, subnetting, IPV6 addressing Internet Protocol: Internetworking:IPv4, Fragmentation and reassembly , Address mapping : ARP, RARP, BOOTP, DHCP, ICMP . Routing: classification of routing, Shortest path routing, Distance Vector routing, Link State routing 4. Transport layer and Application layer

Unit 3 **[15 hrs]**

Transport and Application Layer

Process-to-Process delivery: User Datagram Protocol (UDP), Transmission Control Protocol(TCP), Quality of services (QoS); Application Layer: Domain Name System (DNS), E-mail, FTP, HTTP.5. Wireless Networks

REFERENCE

Mandatory Reading:

1. Andrew T, David J (2013). *Computer Networks* (5th ed.). India, Prentice-Hall,

Supplementary Reading:

1. Behrouz A (2011), *Data communication and Networking* (4th ed.). Amarica McGraw Hill Education.
2. James F, Keith R (2009). *Computer Networking - A Top-Down Approach Featuring the Internet* (5th ed.). Amarica, Pearson Education

Web References:

1. https://www.javatpoint.com/computer-network-tutorial
2. https://www.geeksforgeeks.org/computer-network-tutorials/
3. https://www.studytonight.com/computer-networks/
4. https://www.softwaretestinghelp.com/computer-networking-basics/

Practical: Computer Networks
Credits: 3
Duration: 45 hrs
Marks: 25

List of Practicals

1. Installing virtual machines, Ethernet cabling [1P]
2. Study of network commands ping, ipconfig, netstat, traceroute [1P]

3. Setting up of LAN Network [1P]
4. IP address manipulation -Extract network id and Host id given netmask [1P]
5. Mini Project / Packet capture tool/ packet generator tool [1P]
6. UDP Socket programming (c/c++/Java/ Perl/Python) [1P]
7. TCP Socket programming [1P]
8. Configuring routing tables [1P]
9. Configuring DHCP server/client [1P]
10. Configuring Telnet/SSH and ftp server. [1P]
11. Firewall Configuring [2P]
12. Write(C / C++/ Java / Perl / Python) program to implement Bit and Byte stuffing. [3p]

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Course Title: Reasoning Techniques
Course Code: SD-G20
Credits: **4**
Marks: 100
Duration: 60 Hours

Prerequisite Courses : NIL

Course Objective

- To build logical and reasoning aptitude that is essential requirement in understanding various concepts and to solve problems effectively.

Course Learning Outcomes:
On successful completion of the course the students will

CLO1 :Create, solve and interpret basic data and logical models.

CLO2 :Make sound arguments based on reasoning and/or careful analysis of data.

CLO3 :Exhibit critical thinking by developing and expressing sound arguments from given premises to related conclusions

CLO4 : Effectively communicate the substance and meaning of logical problems and their solutions.

Syllabus:

Unit 1 **[15 hrs]**

Logic, Statements, Arguments, and Assumptions, Statements and Course of Action, Logical Venn Diagrams, Statements and Conclusions, Syllogism

Unit 2 **[15 hrs]**

Seating Arrangement, Ranking & Time Sequence Test, Blood Relations, Direction Sense Test, Conditions & Grouping, Simple & Coded Inequality, Decision Making, Clocks and Calendar, Situation Reaction Test

Unit 3 **[15 hrs]**

Decision-making, Judgment, Problem-solving, Analogies, Analysis, Differences, Discrimination Arithmetic series, Similarities, Verbal & figure classification, Space visualization, Observation Simple Problems on Data interpretation and Data sufficiency

Unit 4 **[15 hrs]**

Mathematical Logic: Introduction, Statements, Logical Connectives and Compound Statements: Negation, Conjunction, Disjunction, Implication, Converse and Inverse, logical

Equivalence, Tautologies: Contradiction, Contingency, Algebra of Propositions, Argument, Predicate and Quantifiers.

REFRENCES

Mandatory Reading:

1. Arun Sharma, How to Prepare for Logical Reasoning for the CAT, 8th edition**,** McGraw Hill Education (India) Private Ltd.
2. A.K. Gupta, Logical and Analytical Reasoning, Ramesh Publishing House; 34th edition
3. Peeyush Bhardwaj, Analytical & Logical Reasoning for CAT & Other Management Entrance Tests, Arihant Publications; 4th edition
4. Rosen H. Kenneth, Discrete Mathematics and its Applications, Tata McGraw Hill, 7th edition

Supplementary Reading:

1. Ananta Ashisha, Data Interpretation & Data Sufficiency, Arihant Publications; Third edition
2. MK Pandey, Magical Book Series - Analytical Reasoning, BSC Publishing Co. Pvt. Ltd., 2017
3. Daniel kahneman, thinking fast and slow, Farrar, Straus and Giroux; Reprint edition
4. Dr. R.S. Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, 2018, S. Chand Publication

Web Refrences:

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Course Title: Personality Development
Course Code: SD-G13
Credits: 4
Marks: 100
Duration: 60 Hours

Course Objectives:

- To understand the scope of personality and its development.
- To develop core skills for development of self.
- To cultivate interpersonal skills for successful life.

Course Learning Outcomes:
On successful completion of the course the students will

CLO1 : Be able to make SWOT analysis, find causes of failure

CLO2 : Importance of self- motivation and Factors leading to demotivation

CLO3 : Do's and Don'ts to develop positive self-esteem, Low self-esteem, Managing diversity, Effective communication

CLO4 : Team work, Good manners and etiquette. Resume building, The art of participating in Group Discussion

Syllabus:

Unit 1 **[12 Hrs]**

Introduction to Personality Development

The concept of personality - Dimensions of personality – Five Factor Model- Theories of Freud and Erickson-Significance of personality development. The concept of success and failure: Success- Hurdles in achieving success - Overcoming hurdles - Factors responsible for success – What is failure - Causes of failure. SWOT analysis.

UNIT 2 **[12 Hrs]**

Attitude and Motivation

Attitude - Concept - Significance - Factors affecting attitudes - Positive attitude – Advantages – Negative attitude- Disadvantages - Ways to develop positive attitude - Differences between personalities having positive and negative attitude. Concept of motivation - Significance – Internal and external motives - Importance of self- motivation- Factors leading to demotivation

Unit 3 **[12Hrs]**

Self-esteem

Term self-esteem - Symptoms - Advantages - Do's and Don'ts to develop positive self-esteem – Low self-esteem - Symptoms - Personality having low self - esteem - Positive and negative self - esteem. Interpersonal Relationships – Defining the difference between aggressive, submissive and assertive behaviours – Lateral thinking.

UNIT 4 **[8 Hrs]**

Interpersonal Skills

-Hard Skills and Soft Skills. Effective Communication - Need or importance of effective communication -6 C's of effective communication: Managing Diversity.

UNIT 5 **[8 Hrs]**

Other Aspects of Personality Development

Body language - Problem-solving - Conflict and Stress Management – Decision making skills - Leadership and qualities of a successful leader – Character building -Team-work – Time management - Work ethics –Good manners and etiquette.

UNIT 6 **[8Hrs]**

Employability Quotient

Resume building- The art of participating in Group Discussion – Facing the Personal (HR & Technical) Interview -Frequently Asked Questions - Psychometric Analysis - Mock Interview Sessions.

REFRENCES

Mandatory Reading:

1. Hurlock, E.B. Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.
2. Stephen P. Robbins and Timothy A. Judge(2014), Organizational Behavior 16th Edition: Prentice Hall

Supplementary Reading:

1. Andrews, Sudhir. How to Succeed at Interviews. 21st (rep.) New Delhi.Tata McGraw-Hill
2. Heller, Robert.Effective leadership. Essential Manager series. Dk Publishing,
3. Hindle, Tim. Reducing Stress. Essential Manager series. Dk Publishing
4. Lucas, Stephen. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill.
5. Mile, D.J Power of positive thinking. Delhi. Rohan Book Company.
6. Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House.
7. Smith, B . Body Language. Delhi: Rohan Book Company

Web Refrences:

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Course Title: Mathematical Foundation of Computer Science

Course Code: SD-G21
Credits: 2
Marks:50
Duration : 30

Prerequisite Courses : NIL

Course Objectives:

- To build mathematical foundations that are essential requirement in understanding various concepts related to computer science.

Course Learning Outcomes:

CLO1:Gain knowledge in Propositions through the use of Logics.
CLO2:Demonstrate an understanding of relations and functions and determine their properties.
CLO3:Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
CLO4:Write an argument using logical notation and determine if the argument is valid or not.

Syllabus:

Unit 1: **[15 Hrs]**

Binary Numerical Systems, Matrix Operations and Basic Sets

1. Binary Number Systems:

Introduction to Boolean Number System, Decimal to binary conversion and vice versa, binary number representation (signed, 1's Complement and 2's Complement), binary addition and subtraction, binary to octal, hexadecimal conversion and vice versa, floating point representation.

2. Linear Algebra:

Introduction to Matrices and Linear Algebra, Adjacent, Inverse of a Matrix, Rank, Linear Equations, Characteristics roots and vertices.

3. Basics of Sets, Relations and Functions:

Introductions to sets, relations and functions, Venn diagram, set operations, relations and properties, closures, equivalence relations, partial ordering, function types, inverse of functions, composition of functions, recursive functions, growth functions.

Unit 2: **[15 Hrs]**

Boolean Systems and Operations

1. Boolean Algebra:

Introduction to Boolean Algebra, boolean functions, truth table, DeMorgan's theorem, logic gates, realization of boolean functions using logic gates, simplification using Karnaugh map.

2. Logic:

What is logic, propositional logic, first order logic, mathematical induction, deduction, proof by contradiction, program correctness.

REFRENCES

Mandatory Reading:

1. Rosen H. Kenneth, Discrete Mathematics and its Applications, Tata McGraw Hill, Seventh Edition, 2011.

Supplementary Reading:

1. Sarkar Kumar Swapan, A Textbook of Discrete Mathematics, S Chand & Company, 2005.

Web Refrences:

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B. Voc. in Software Development

Skill Development Qualification Pack - Application Developer - Web & Mobile (SSC/Q8403)

Syllabus (Semester – IV)

Course Title: Web Development Framework
Course Code:CSD-SK10
Marks: 75
Credits: 03
Duration: 45 hrs

Prerequisite Course:

- Web Design
- Object Oriented Paradigm
- Database Management System

Course Objective:-

- Use Web Frameworks and Libraries to develop interactive web applications.

Course Learning Outcomes:
On completion of the course student will be able to

CLO1: Use ReactJS to build rich and interactive front end applications.
CLO2: Use NodeJS to develop back end application to accept POST, GET, PUT, DELETE requests.
CLO3: Develop REST API's using NodeJS.
CLO4: Write non-blocking and blocking JavaScript code.
CLO5: Explain Framework and Libraries with respect Web Development.

Syllabus

Unit 1 **[15hrs]**

ReactJS
History of front end libraries, Motivation for using React, Thinking in React, One way binding, JSX + CSS modules, Virtual DOM, ES6
ReactJS:components
Component lifecycle, Component API, Render functions, State, Props, Mixins

Unit 2 **[15hrs]**

ReactJS:Interaction between components
Passing data from parent to child, Passing data from child to parent, Passing data between 2 components at the same level, Forms, Refs, React-Router, API integration
NodeJS: Introduction

Brief overview on the benefits of using Node.js and how Node.js is used in modern web development, Node and NPM, Introduction to setting up a Node.js project, Importing modules using npm, Using core modules to make HTTP requests and manipulate the file system.

Unit 3 **[15hrs]**

NodeJS: Express framework

Set up a web server, Implementing API routing, Implementing middle-ware, Implementing URL parameters.

NodeJS: MySQL module

Settings up a database and connecting it to a NodeJS server, Storing and retrieving data from the database.

REFERENCES

Mandatory Reading:

1. Brett McLaughlin (2011). *What Is Node ?* (1st ed) O'Reilly Media
2. Alex Banks (2017). *Learning React. (1st ed)* Shroff/O'Reilly

Reference Books:

1. Mario Casciaro (2016). Node.js Design Patterns (2nd ed) Packt Publishing Limited

Web Refrences:

1. https://www.tutorialspoint.com/nodejs/index.htm
2. https://reactjs.org/docs/getting-started.html
3. https://www.youtube.com/watch?v=Ke90Tje7VS0

Practical: Web Development Framework
Marks: 75
Duration: 45hrs
Credits: 03

1. Creating a simple web server. (1P)
2. Connect to MySQL database. (1P)
3. CRUD using MySQL database API's. (4P)
    a. Fetch data from a form, validate and insert in the database.
    b. Delete data in the database.
    c. Update data in the database
    d. Display data from the database.
4. Uploading files. (1P)
5. Login functionality using sessions. (1P)
6. Using cookies to store website data. (1P)
7. Mini project. (3P)

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Course Title : Software Engineering
Course Code : CSD-SK11
Marks : 75
Credits : 3
Duration: 45hrs

Prerequisite Courses: NIL

Course Objectives:

- To Understand the various software development methodologies and estimation of software projects
- To analyze and design software projects
- To study the various phases of a S/W Development Project.

Course Learning Outcomes:

On successful completion of this course students will be able to:

CLO1 :Understand the various Software Development Methodologies
CLO2: Apply Estimation techniques to live projects
CLO3: Analyze Software Projects.
CLO4: Design Software Projects.

Syllabus:

Unit 1 **[15hrs]**

SOFTWARE PROCESS:

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:

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

Unit 2 **[15hrs]**

OOAD and UML:

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:

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.

Unit 3 **[15hrs]**

HUMAN COMPUTER INTERACTION:

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

CODING:

Coding styles, standards, peer reviews, checklist.

TESTING:

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

DOCUMENTATION and MAINTENANCE:

Need for Software Documentation. Types of documentation, Need for Maintenance; Types of Maintenance

RE ENGINEERING:
Business Process Re engineering, Software Re engineering, Reverse Engineering, Restructuring, Forward Engineering, The Economics of Re engineering

References:

Mandatory

1. Pressman R.S., (2017). *Software Engineering: A Practitioner's Approach*, 6th edition:McGrawHill
2. Larman C.,(2015). *Applying UML and patterns*, 3rd Edition: Addison Wesley

Supplementary

1. Jalote P., (2010) *An Integrated Approach to Software Engineering*, 3rd Edition :Narosa Publishing House
2. Sommerville I.,(2015) *Software Engineering*, 10th Edition:Adison Wesley
3. Fowler M., (2003) *UML Distilled*, 3rd Edition:Addison Wesley

Web References:

1. https://www.tutorialspoint.com/software_engineering
2. https://www.w3schools.in/sdlc-tutorial
3. https://www.geeksforgeeks.org/software-engineering
4. https://www.javatpoint.com/software-engineering-tutorial

Practical : Software Engineering
Credit : 3
Duration: 45hrs
Marks : 75

List of suggested PRACTICALS :

For a given project/case study

1) Requirements Gathering Techniques (2P)
2) Gantt Chart (2P)
3) USE Case diagram and Use Case descriptions for the Use Cases (3P)
4) Class Diagram (2P)
5) Sequence Diagram (2P)
6) Activity Diagram (2P)
7) State Chart Diagram (2P)

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Course Title: Mobile Application Development
Course Code: CSD-SK12
Credits: 3
Marks: 75
Duration : 45 Hours

Prerequisite Courses : Object Oriented Programming using Java

Course Objective:

- To develop applications for mobile devices, including smart phones and tablets, introduced to the current mobile platforms, mobile application development environments and mobile device input methods.

Course Learning Outcomes :
On successful completion of this course students will be able to:

CLO1: Define mobile platforms and their architectures.
CLO2: Compare development for different mobile platforms.
CLO3: Demonstrate the use of Android Components.
CLO4: Develop Mobile applications for Android Platform.
CLO5: Make use of SQLite database.
CLO6: Test Mobile applications for Android Platform.

Syllabus:

Unit 1 **[15hrs]**

Introduction to mobile devices
Mobile devices vs. desktop devices, Why we Need Mobile App, Different Kinds of Mobile Apps, ARM and intel architectures, Power Management, Screen resolution, Touch interfaces, Application deployment : App Store, Google Play, Windows Store, Native vs. web applications.

Android Overview
Introduction to Android.Overview of android stack, Introduction to OS layers, Android features. Linux Kernel, Libraries, Android Runtime, Application Framework, Dalvik VM

Mobile OS Architectures
Comparing and Contrasting architectures of Android, iOS and Windows, Underlying OS (Darwin vs. Linux vs. Windows), Kernel structure and native level programming, Runtime (Objective-C vs. Dalvik vs. WinRT), Approaches to power management, Security.

Android Components
Activities, Services, Broadcast Receivers ,Content Providers.

Unit 2 **[15hrs]**

Building UI with Activities
Activities, Views, layouts and Common UI components, Creating UI through code and XML, Activity life cycle, Intents, Communicating data among Activities.

Advanced UI
Selection components (GridView, ListView, Spinner), Adapters, Custom Adapters, Menus, Toast, Custom Toast,Dialogs, Status bar Notifications.

Intent Filters and Broadcast Receivers
Role of filters, Intent-matching rules, Filters in yor manifest, Filters in dynamic Broadcast Receivers, Creating Broadcast receiver, Receiving System Broadcast, Understanding Broadcast action, category and data, Sending Broadcast.

Unit 3 **[15hrs]**

Data Storage
Shared Preferences, Android File System, Internal storage, External storage. SQLite Introducing SQLite, SQLiteOpenHelper and creating a database, Opening and closing a database, Working with cursors, inserts, updates, and deletes

Services
Overview of services in Android, Implementing a Service, Service lifecycle, Inter Process Communication (AIDL Services). Web Services and WebView - Consuming web services, Receiving HTTP Response (XML, JSON), Parsing JSON and XML, Using WebView,

Firebase

Introduction to Firebase and cloud messaging, real time database, authentication.

References

Mandatory Readings:

1. Lee, W. M. (2012). *Beginning android 4 application Development*. John Wiley & Sons.

Supplementary Reading:

2. 1.Burnette, E. (2009). *Hello, Android introducing Google's mobile development platform 2nd*.

Web References:

1. http://developer.android.com
2. https://www.tutorialspoint.com/android/index.htm
3. https://abhiandroid.com/

Practical: Mobile Application Development
Credit: 3
Duration: 45hrs
Marks: 75

List of practicals

1. Getting Started with Android (1P)
2. Creating a basic Android Application (2P)
3. Making use of GUI components (2P)
4. Making use of advanced UI components. (1P)
5. Implementing Data storage application (2P)
6. Implementing Services/Multithreading/Multiprocessing (2P)
7. Firebase (2P)
8. Mini project (3P)

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Course Title: E-Commerce
Course Code: SD-G17
Marks: 100
Credits: 4
Duration : 60 hours

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 ecommerce like buying, selling and payment, understand the various technologies used in ecommerce websites and security mechanisms involved in e-commerce websites.

Course Learning Outcomes:

At the end of the course students will be able to :

CLO1: Understand various E-Commerce Strategies.
CLO2: Understand the Working of an E-Commerce Website.
CLO3: Evaluate the various Payment Mechanisms.

Syllabus

Unit 1 **[15 hrs]**

Introduction to Electronic E-Commerce [4Hrs]

The Scope of Electronic Commerce, Definition of Electronic Commerce, Electronic Commerce and the Trade Cycle, Electronic Markets, Electronic Data Interchange, Internet Commerce, Electronic Commerce in Perspective.

The Value Chain [5Hrs]

Supply Chains, Porter's Value Chain Model, Inter Organizational Value Chains.

Competitive Advantage [6Hrs]

Competitive Advantage, Porter's Model, First Mover Advantage, Sustainable Competitive, Competitive Advantage using e-commerce

Unit 2 **[15 hrs]**

Business Strategy [8Hrs]

Introduction to Business Strategy: Michael Porter's 5 force analysis, Strategic Implications of IT, Technology, Business Environment, Business Capability, Existing Business Strategy, Strategy Formulation and Implementation Planning, e-Commerce Implementation - technical and business e-Commerce Evaluation, Auction methods.

Electronic Data Interchange [7Hrs]

EDI Definition, EDI Technology, EDI Standards, EDI Communications

Unit 3 **[16 hrs]**

Electronic Payment System [10Hrs]

Overview of the electronic payment technology; limitations of traditional payment instruments. Electronic or Digital Cash-Properties of Electronic Cash, Digital Cash in action. Electronic Checks-benefits of electronic checks, electronic checks in action, Online Credit Card-Based Systems- types of credit card payments, Secure Electronic Transactions (SET). Other Emerging Financial Instruments: POS (Point of Sale), E-Cash, Net Banking, Credit/Debit Cards and Electronic Benefits and Security Issues. Case Studies of the various modes of electronic payment of various types of websites.

E-Business [6Hrs]

EDI Application in business, E- Commerce Law, Forms of Agreement, Govt policies and Agenda. Case Study of Internet bookshops, Grocery supplies, software supplies and support, electronic newspapers, Internet banking, Virtual auctions, online, share dealing. 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.

Unit 4 **[10 hrs]**

Firewall and Internet Security [8Hrs]

Firewalls and Network Security: Types of firewalls, Firewall Security Policies, Emerging Firewall Management Issues. Transaction Security: Types of Online Transactions, Requirements for Transaction Security. Encryption and Transaction Security: Secret-Key encryption, Public-Key Encryption , Implementation and Management Issues. Digital Certificate. Security Threats to E Commerce, Virtual Organization, Business Transactions on Web.

Consumer E-Commerce [3Hrs]

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

M-Commerce [3Hrs]

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

References

Mandatory Readings:

1. E-COMMERCE Strategy, Technologies and Applications by David Whiteley; TataMcGrawHill.

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

Supplementary Reading:

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

Web References:

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Course Title: Creative Thinking
Course Code: SD-G22
Credits: 2
Marks:50
Duration: 30

Prerequisite Courses : NIL

Course Objective

- This is a course on study of creative/lateral thinking and problem solving techniques those are essential to solve real world problems. Causal, deductive, and inductive arguments are described as well as the use of persuasion.

Course Learning Outcomes:
Upon completion of this course, students should be able to

CLO1: Identify the benefits of employing creative/lateral-thinking processes.

CLO2: Apply creative/lateral-thinking and problem-solving theories to real-world problems.

CLO3: Develop strategies to overcome the barriers that inhibit creative thinking.

CLO4: Identify strategies for creating an organizational culture that embraces and sustains creative-thinking practices

CLO5: Identify strategies to solve complex problems in a collaborative way.

CLO6: Apply creative/lateral-thinking principles to develop persuasive arguments that employ legal, moral, and aesthetic reasoning.

Syllabus

Unit 1 **[15 hrs]**

The way the mind works, Difference between lateral and vertical thinking, Attitudes towards lateral thinking, Basic nature of lateral thinking, The use of lateral thinking techniques, The generation of alternatives, Challenging assumptions, Innovation, Suspended judgement Design, Dominant ideas and crucial factors

Unit 2 **[15 hrs]**

Fractionation, The reversal method, Brainstorming Analogies, Choice of entry point and attention area, Random stimulation Concepts/divisions/polarization, The new word problem, Blocked by openness, Description/problem solving/design

REFRENCES

Mandatory Reading:

1. Edward De Bono, Lateral Thinking: Creativity Step by Step, Harper Perennial; Reissue edition (24 February 2015)
2. Ken Watanabe, Problem Solving 101: A simple book for smart people, Vermilion

Supplementary Reading:

1. R G Chaudhari, Training Techniques of Creative Problem Solving: Trainers Manual, Notion Press, Inc.; 1st edition
2. Mahon N, Basics Advertising 03: Ideation, AVA Publishing (October 26, 2011)
3. Brian Tracy, Creativity & Problem Solving: The Brian Tracy Success Library, Manjul Publishing House
4. Michael Sloan, The Art Of Problem Solving 101: Improve Your Critical Thinking And Decision Making Skills And Learn How To Solve Problems Creatively, Make Profits Easy LLC
5. Ruggiero, V. R., The art of thinking: A guide to critical and creative thought (11th ed.), Longman (2015).
6. Proctor, T., Creative Problem Solving for Managers: Developing Skills for Decision Making and Innovation, Routledge, 4th edition

Web References:

****

Course Title: Advanced Quantitative Techniques
Course Code: SD-G23
Credits: 4
Marks: 100
Duration: 60

Prerequisite Courses: NIL

Course Objective

- To build mathematical foundation that is essential requirement in understanding various concepts.
- To understand appropriate statistical techniques for grouping, displaying, analyzing and interpreting statistical data

Course Learning Outcomes:
On successful completion of the course, the students will be able to

CLO1: Understand the basic principles of sets and operations in sets.

CLO2: Apply counting principles to determine probabilities.

CLO3: Demonstrate an understanding of matrices and determinants

CLO4: Apply basic statistical concepts & techniques for quantification of data.

CLO5: Independently calculate basic statistical parameters (measures of central tendency and dispersion, correlation and regression coefficients, indexes)

CLO6: Interpret the meaning of the calculated statistical indicators based on the acquired knowledge

Syllabus

Unit 1 **[15 Hrs]**

Set, Relation, and Functions

SETS: Sets, Subsets, Equal Sets, Universal Sets, Finite and Infinite Sets, Operation of Sets, Union, Intersection and Complement of sets, Cartesian product, Cardinality of Sets, Simple Applications.

RELATION: Properties of Relation, Equivalence Relation

FUNCTIONS: Domain and Range, Onto , Into and One-to One- Functions, Composite and Inverse functions, Hashing functions and Recursive Functions, growth of functions

Unit 2 **[15 Hrs]**

Counting Principles

Permutations; Combinations; Counting; Probability Summation; Basics of recurrence relations

Matrices and Determinants

Definition, Minors, Cofactors, Properties of Determinants MATRICES: Definition, Types of matrices, Multiplication of matrices, Adjoint, Inverse, Cramer's Rule, Rank of matrix, Dependence of vectors, Eigen vectors of a matrix

Unit 3 **[15 Hrs]**

Statistical Sampling and Central Tendency

Collection, classification, tabulation and presentation of data; the concept and methods of sampling, sample types Measures of central tendency **-** mean, median, mode, quartiles, deciles and percentiles and their applications in data analyses

Unit 4 **[15 Hrs]**

Measures of Dispersion and Relation

Measures of Dispersion- Range - Quartile Deviation – Mean Deviation - Standard Deviation. Coefficient of Variation Meaning and use of correlation – Types of correlation-Karl Pearson's correlation coefficient – Spearman's Rank correlation. Calculation of Correlation; Regression analysis, comparison between correlation and Regression – Regression Equations, Interpretation of Regression Co-efficients

Note: *It is recommended to use excel/spreadsheets for Unit4 and Unit5*

REFRENCES

Mandatory Reading:

1. Rosen H. Kenneth, Discrete Mathematics and its Applications, Tata McGraw Hill, 7th edition
2. Gupta. S. C. Fundamental of Statistics, Himalaya Publishing House, Mumbai, 6th edition
3. Kolman, Busby, Ross, Discrete Mathematical structures, Pearson

Supplementary Reading:

1. Sarkar Kumar Swapan, A Textbook of Discrete Mathematics, S Chand & Company, 2005.
2. J.K. Sharma, Discrete Mathematics, Macmillan India Ltd., Second Edition – 2005
3. Spiegel. M. R. and Stephens. J. L., Shaum's Outlines Statistics, Tata McGraw-Hill, India, 2011
4. Sanchetti D.C and Kapoor V.K .Statistics - Theory, Methods and Application, Sultan Chand & Sons , New Delhi, 7th edition, 2010.

Web References:

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B. Voc. in Software Development

Skill Development Qualification Pack - Application Architect - Web & Mobile (SSC/Q8402)

Syllabus (Semester – V)

Course Title: Software Testing
Course Code: CSD-SK14
Credits: 3
Marks: 75
Duration: 45hrs

Prerequisite Courses: 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.

Course Learning Outcomes:

On successful completion of this course students will be able to:

CLO1: Define Software Testing process for an applications.
CLO2: Apply Software Testing process in relation to Software Development and Project Management.
CLO3: Create Test Strategies and plans, design test cases, prioritize and execute them.
CLO4: Identify various Software Testing problems and solve them.
CLO5: Identify the needs of software test automation, and define and develop a test tool to support test automation.
CLO6:Use software testing methods and modern software testing tools for their testing projects

Syllabus

Unit 1 **[15hrs]**

Software Testing principles

Software testing principles, Levels of software testing, Test activities, SDLC and Testing, Verification & Validation, Quality Assurance, Quality Control.

White Box Testing Techniques

Statement coverage, Branch Coverage, Condition coverage, Decision/Condition coverage, Multiple condition coverage, Inspections, Walkthroughs Code Review.

Black Box Testing

Boundary value analysis, Equivalence partitioning, Cause Effect Graphing.

Unit 2 **[20hrs]**

Functional Testing

Performance Testing, Stress testing, Configuration Testing, Security Testing, Recovery Testing, Integration Testing, Regression Testing, and Acceptance Testing.

Unit 3 **[10hrs]**

Testing process

Comparison of different techniques, Test Plan, Test case Design Procedure Specification, Test Case Execution and Analysis, Test Documentation, Reporting test results

Testing web Application

Testing concepts for web apps, Content Testing, User Interface Testing, Component Level Testing, Navigation Testing, Configuration Testing, Security Testing, and Performance Testing.

REFERENCES

Mandatory Reading:

1. Desikan, S., & Ramesh, G. (2006). *Software testing: principles and practice*. Pearson Education India.

Supplementary Reading:

1. Kit E. *Software Testing in the Real World*, United States: Addison-Wesley Publishing Co.
2. Lewis, W. E. (2017). *Software testing and continuous quality improvement*. Auerbach publications.

Web References :

1. www.guru99.com/software-testing.html
2. https://www.tutorialspoint.com/software_testing/index.htm
3. https://www.javatpoint.com/software-testing-tutorial

Practical: Software Testing
Credit: 3
Duration: 45hrs
Marks: 75

List of suggested PRACTICALS using any testing tool such as Selenium or equivalent:

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

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Course Title: Data Structure
Course Code: CSD-SK13
Marks: 75
Credits: 03
Duration: 45hrs

Prerequisite: Introduction to Programming

Course Objectives:

- To understand different methods of organizing data and efficiently implement different data structures.

Course Learning Outcomes:

On successful completion of this course students will be able to:

CLO1: Select appropriate data structures as applied to specified problem definition.

CLO2: Implement operations like searching, insertion, and deletion, traversing mechanism etc. On various data structures

CLO3: make use of appropriate sorting/searching technique for given problem

CLO4: Design advance data structure using NonLinear data structure.

Syllabus

Unit 1 **[15hrs]**

Concept, Data type, Data object, ADT, Need of Data Structure, Types of Data Structure, Stack Introduction, Representation-static & dynamic, Operations, Application - infix to postfix & prefix, postfix evaluation, Simulating recursion using stack, Introduction, Representation -static & dynamic, Operations, Circular queue, priority queue (with implementation), Concept of doubly ended queue.

Unit 2 **[15hrs]**

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, 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.

Unit 3 **[15hrs]**

Concept & terminologies, Graph Representation – Adjacency matrix, adjacency list, Traversals –BFS & DFS, Application of BFS, DFS – Shortest path, Bubble sort, Merge sort, Selection sort, Sequential Searching, Binary Searching

REFERENCE

Mandatory Reading:

1. Horowitz E, Sahni S (2008), *Fundamentals of Data Structures in C* (2nd ed.). University Press.

Supplementary Reading:

2. Langsam Y, Augenstein M, Tenenbaum A (2009). Data Structures using C and C++ (2nd ed.). Pearson Education
3. Gilbeg R, Forouzan B, *Data Structures: A Pseudocode Approach with C++* (2nd ed.). Cengage Learning

Web References:

1. https://www.javatpoint.com/data-structure-tutorial
2. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
3. https://www.geeksforgeeks.org/data-structures/
4. https://www.studytonight.com/data-structures/

Practical: Data Structures

Credit: 03
Duration: 45hrs
Marks: 75

Programs using C language / Java Language that covers the following concepts:

1. Stack: Static/Dynamic stack implementation.
2. Stack: infix to postfix. [2P]
3. Stack: Evaluation of Postfix expression.
4. Queues: Static and Dynamic Queue Implementation
5. Queues: Circular queue
6. List: Singly Linked List, [2P]
7. List: Doubly Linked List [2P]
8. List: Circular Linked List [2P]
9. Linked List: Polynomial addition
10. Trees: Binary Search Tree: create, add, delete, display nodes. [2P]

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Course Title: Digital Marketing
Course Code: SD-G14
Credits: 4
Marks: 100
Duration: 60 Hours

Prerequisite Courses: NIL

Course Objective

- To study various online Marketing Strategies and build Search engine Optimised websites

Course Learning Outcomes:
On successful completion of the course, the students will be able to

CLO1 : Students will be able to optimise their Search Engine
CLO2 : Create Adsin Google Adwords, Account Performance Reporting
CLO3: Will get Started with Social media. Building Relationships via Facebook, Twitter, LinkedIn, YouTube
CLO4 : E-Mail Marketing Network, Data Management; Social Media Analytics

Syllabus

Unit 1: **[15hrs]**

SEARCH ENGINE OPTIMISATION (SEO):
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.

Unit 2: **[15hrs]**

SEARCH ENGINE MARKETING (SEM):
Introduction to Internet and Search Engine Marketing; Google Ad words; Ad words Account Structure; Navigating in Google Ad words; Working with Keywords; Creating Ads in Google Adwords; Creating and Managing your First Ad Campaign; Ad words Reporting and AccountPerformance Reports.

Unit 3: **[15hrs]**

SOCIAL MEDIA MARKETING (SMM):

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

Unit 4: **[15hrs]**

EMAIL MARKETING:

Importance of Email marketing; Email Marketing Software's; Email MarketingCampaign; Newsletters; Measuring the results.

WEB Analytics:

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

REFERENCE

Mandatory Reading:

1. Calvin Jones and Damian Ryan, "The Best Digital Marketing Campaigns in the World:
2. Nick Smith, "Successful SEO and Search Marketing in a Week",Teach Yourself Publisher, 2013.
3. Lee Odden ," Optimize: How to Attract and Engage More Customers by Integrating SEO, Social Media, and Content Marketing", Wiley Publishing, 1st edition, 2012.

Supplementary Reading:

1. Avinash Kaushik, "Web Analytics 2.0: The Art of Online Accountability & Science of Customer Centricity (Sybex)",Wiley Publishing, 2nd edition 2013.

Web References:

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Course Title: Organizational Behavior
Course Code: SD-G15
Credits: 4
Marks: 100
Duration : 60 Hours

Course Objectives:

- To enable the students to understand the impact that individual, group & structures have on behavior within the organizations and apply such knowledge towards improving Organizational effectiveness.

Course Learning Outcome:

On successful completion of the course, the students will be able to

CLO1: Organizational Behavior Fundamental Concepts.
CLO2: Learn how to deal with work stress in an organization.
CLO3: Learning how to lead a team

Syllabus:

Unit 1: **[10Hrs]**

Fundamentals of Organizational Behavior

Nature, Scope, Definition and Goals of Organizational Behavior Fundamental Concepts of Organizational Behavior Models of Organizational Behavior Emerging aspects of Organizational Behavior: TQM, Managing Cultural Diversity, Managing the Perception Process.

Unit 2: **[10Hrs]**

Attitude Values and Motivation

Effects of employee attitudes Personal and Organizational Values Job Satisfaction Nature and Importance of Motivation Achievement Motive Theories of Work Motivation: Maslow's Need Hierarchy Theory, McGregcrs's Theory 'X' and Theory 'Y

Unit 3: **[10Hrs]**

Personality

Definition of Personality, Determinants of Personality Theories of Personality – Trait and Type Theories, The Big Five Traites, Mytes-Briggs Indicator, Locus of Control, Type A and Type B Assessment of Personality.

Unit 4: **[10Hrs]**

Work Stress

Meaning and definition of Stress, Symptoms of Stress Sources of Stress: Individual Level, Group Level, Organizational Level Stressors, Extra Organizational Stressors Effect of Stress – Burnouts Stress Management – Individual Strategies, Organizational Strategies Employee Counseling.

Unit 5: **[10Hrs]**

Group Behavior and Leadership

Nature of Group, Types of Groups Nature and Characteristics of team Team Building, Effective Teamwork Nature of Leadership, Leadership Styles Traits of Effective Leaders.

Unit 6: **[10Hrs]**

Conflict in Organizations

Nature of Conflict, Process of Conflict Levels of Conflict – Intrapersonal, Interpersonal Sources of Conflict Effects of Conflict Conflict Resolution.

REFERENCE

Mandatory Reading:

1. Organizational Behavior Text, Cases and Games- By K. Aswathappa, Himalaya Publishing House, Mumbai, Sixth Edition (2005)
2. Organizational Behavior Human Behavior at Work By J. W. Newstrom, Tata McGraw Hill Publishing Company Limited, New Delhi, 12th Edition (2007)
3. Organizational Behavior Fandamentals, Realities and Challenges By Detra Nelson, James Campbell Quick Thomson Publications

Supplementary Reading:

1. Organizational Behavior through Indian Philosophy By N. M. Mishra, Himalaya Publication House

Web References:

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Course Title: Maths for Competative Exams
Course Code: SD-G16
Credits: 4

Marks: 100
Duration : 60 Hours

Course Objectives:

- To make the student aware of different types of questions asked in such examination, logical thinking, data interpretation.

Course Learning Outcome:
On successful completion of the course, the students will be able to

CLO1: Students will be better equipped for such examination and also it will improve their thinking ability.

Syllabus:

Unit 1: **[15Hrs]**

Numerals

Integers, Rationales, Real Numbers, place Values, face values, prime Numbers, Composit Numbers, Co-Prime Numbers, Binary Numbers.

Divisibity test for 2,3,4,5,6,7,8,9 etc. Division Algorithm, Progressions, ratio, proportions (direct, indirect), Percentages, LCM, HCF.

Average, Square root, cube root, Square, cube, surds and indices, logarithms. Linear – Quadratic equations, Simultaneous Equations, some special cases of higher degree polynomial equations.

Unit 2: **[15Hrs]**

Time and work, Time and distance, speed and velocity, trains and boats & streams problems, pipes and containers.

Problems on Ages, Averages, Simple & compound interest, profit & loss, Partnership, stock & shares, True discount, Banker's discount.

Unit 3: **[15Hrs]**

Calendar, clock, race, games and logical problems, Logical gates.

Area, Volumes, Surface area, three-dimensional perspectives, Height & Distance.

Unit 4: **[15Hrs]**

Permutation & combinations, probability, odd man out & Series.

Data Interpretation, Tables, bar Graphs, pie charts, Line Gaphs, Curves.

REFERENCE

Mandatory Reading:

Supplementary Reading:

Web References:

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Course Title: Network Security
Course Code: CSD-SK15
Credits: 3
Marks: 75
Duration : 45 Hours

Prerequisite Courses: Knowledge of Java Programming or any other Programming language

Course Objectives:

- To understand the theory and concepts of Network Security

Course Learning Outcomes:
At the end of the course students will be able to :

CLO1: Gain Knowledge of the threats, vulnerabilities and system risks
CLO2: Understand cryptography, ciphers and encryption algorithms
CLO3 : Compare and contrast symmetric and asymmetric encryption systems
CLO4: Know about viruses, Trojan horses, worms, program flaws and the defences against them

Syllabus :

Unit 1 **[15 hrs]**

Concepts of Security & Classical Encryption Techniques
Introduction, The need for security, Security Approaches, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security, Classical Encryption Techniques : Substitution techniques, Transposition techniques, Steganography.

Design Principle of Block Cipher
Block Cipher Operation: Electronic Code Book, Cipher Block Chaining, Cipher Feedback, Output Feedback, Counter, Feistel Cipher, The Data Encryption Standard.

Cryptography Mathematical Tools
Introduction to Number Theory, Modular Arithmetic, Prime Numbers, Euler‘s Totient Function.

UNIT 2 **[15 hrs]**

Public Key Cryptography
Principles of Public Key Cryptosystems, The RSA Algorithm, Other Public key cryptosystems, Diffie Hellman Key Exchange.

Cryptographic Hash Functions
Applications of Cryptographic Hash Functions, Two Simple Hash Functions, Hash Functions Based on Cipher Block Chaining, MD5 Message Digest Algorithm, Secure Hash Algorithm SHA 512.

Message Authentication Codes and Digital Signatures
Message Authentication Requirements – Message Authentication Functions –Requirements for Security of MACs,MACs Based on Hash Functions, HMAC, MACs Based on Block Ciphers, Data Authentication Algorithm. Digital Signatures, Digital Signature Standard.

UNIT 3 **[15 hrs]**

Key Management & Distribution And User Authentication
Introduction, Digital Certificate, Private key Management, The PKIX Model, Public key cryptographic standards ,XML, PKI and security

Program Security
Flaws, Malicious code: viruses, Trojan horses, worms, Program flaws: buffer overflows, time-of check to time-of-use flaws, incomplete mediation.

Firewall and Virtual Private Network
Introduction to network security techniques: IP Security, firewalls, virtual private networks.

REFERENCE

Mandatory Reading :

1. William Stallings, ―Cryptography and Network Security – Principles and Practices‖, Prentice Hall of India, Fifth Edition

Supplimantry Reading

1. KahateAtul, ―Cryptography and Network Security‖ Tata McGraw-Hill.

Web References:

1. https://www.tutorialspoint.com/cryptography/index.htm
2. https://www.tutorialspoint.com/internet_technologies/firewall_security.htm
3. https://www.tutorialspoint.com/webservices/web_services_security.htm

Lab : Network Security
Credits : 3
Marks : 75

List of Practicals

1. Implementation of Caesar Cipher (1P)
2. Implementation of One-Time Pad (1P)
3. Implementation of Playfair Cipher (1P)
4. Implementation of Vignere Cipher (1P)
5. Implementation of Hill Cipher (1P)
6. Implementation of Data Encryption Standard Algorithm (2P)
7. Implementation of Image Steganography (1P)
8. Implementation of RSA Algorithm (1P)
9. Implementation of Digital Signatures using RSA Algorithm (1P)
10. Mini Project/ Case Study (3P)

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Course Title: Cloud Computing
Course Code: CSD-SK16
Credits: 3
Marks: 75
Duration: 45Hours

Prerequisite Courses: NIL

Course Objectives:

- To make students understand the key elements of cloud computing.
- To understand the difference between deploying applications on the cloud and the local infrastructure.
- To understand various cloud service models.

Course Learning Outcomes:
On completion of the course students will be able to:

- **CLO1**: Explain the core concepts of the cloud computing paradigm.
- **CLO2**: Characterize the different cloud services ie. Infrastructure, Platform and Software as a Service (IaaS, PaaS, SaaS).
- **CLO3**: Deploy application in a production environment.
- **CLO4**: Host a cloud platform like Apache OwnStack and Owncloud

Syllabus:

Unit 1 **[15 hrs]**

Overview of Computing Paradigm

Recent trends in Computing: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing

Introduction to cloud computing:

Cloud Computing definition, History of Cloud Computing, How Cloud Computing Works, Benefits and challenges of cloud computing, Issues for Cloud Computing.

Unit 2 **[15 hrs]**

Comparison with traditional computing architecture (client/server), Cloud Computing Service Models, Deployment Models- Public cloud, Private cloud, Hybrid cloud and Community cloud, Key drivers to adopting cloud, Impact of cloud on users, Governance in the cloud.

Infrastructure as a Service (IaaS)

Introduction to IaaS: IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Docker Container, CloudStack, Open Stack, Virtual Machine (VM). Resource Virtualization: Server, Storage, Network. Examples: Amazon EC2, Load balancing

Unit 3 **[15 hrs]**

Platform as a Service (PaaS)

Introduction to PaaS: What is PaaS, Service Oriented Architecture (SOA).Cloud Platform and Management: Computation, Storage, Examples: Google App Engine, Microsoft Azure, SalesForce.com.

Software as a Service (PaaS)

Introduction to SaaS, Web services,Web 2.0, Web OS, Introduction to MapReduce, Case Study on SaaS.

References:

Mandatory Reading:

1. Hill, R., Hirsch, L., Lake, P., & Moshiri, S. (2012). *Guide to cloud computing: principles and practice*. Springer Science & Business Media.

Supplementary Reading:

1. Furht, B., & Escalante, A. (2010). *Handbook of cloud computing* (Vol. 3). New York: Springer.

Web References:

1. https://www.tutorialspoint.com/cloud_computing/index.htm
2. https://www.guru99.com/cloud-computing-for-beginners.html
3. https://www.techopedia.com/definition/2/cloud-computing

Practical: Cloud Computing
Credit: 3
Duration: 45hrs
Marks: 75

List of Prcticals

1. Setup owncloud [2]
2. Cloud Server Management using VestaCP/Froxlor/ISPConfig3 [4]
   a) DNS Setup
   b) Email Configuration
   c) Domain management
3. Apache CloudStack [4]
   a) Installation
   b) VPN
   c) Working with Instances, Network, Storage
4. Container Management Using Docker [5]
   a) Installing docker
   b) Creating containers
   c) Package and run a custom app using docker

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Course Title: Human Computer Interactions
Course Code: SD-G19
Credits: 4
Marks: 100
Duration: 60 Hours

Course Objectives

- The key objective of this course is to provide the students exposure to industry standard UI/UX design practices and help them understand the thinking process behind UX Design and enable them to design better applications that help customers

Course Learning Outcomes
On Completing the course, the students will be able to:

CLO1: Understand the UX Design workflow and understand the thinking process behind UX Design
CLO2: Understand Industry standard practices regarding Design Thinking and UX Design
CLO3: Design User Experiences which will solve customer problems

Syllabus

Unit 1 **[15 hrs]**

Design Thinking
Color Theory - Color Theory in Design, Seeing World through Color, Color mixing and Systems, Color Harmonies and Meanings.
Typography – Typography in Design, Type Anatomy, Type Styles, Different Font Styles, Kerning, Leading, Spacing, Type Hierarchy, Font Pairing
Layout Theory – Layout and Design, Effective Layout, Grids and Blocking, A detailed study of Grids in Layout, Grid Theory, Design Theme

Logo Design, Avatar Design – Ideation, Inspirations, Sketching, Color Blocking, Rendering Design Trends

Unit 2 **[15 hrs]**

UX Design – User Flows and Case Studies

Mood Boards, Understanding User flows, Creating User flows for applications, Solving customer problems with the help of case studies

Unit 3 **[15 hrs]**

UX Design – Wireframes, Hi-Fi, Lofi, Prototyping

Creating Wireframes, Creating High Fidelity and Low Fidelity Designs, Understanding Prototyping and Animations

Unit 4 **[15 hrs]**

Creating Case Studies, Comparing Case Studies, Creating Case Studies for portfolio

Portfolio Design and UX Presentations

References

Mandatory Reading

1. The Design of EveryDay Things by Don Norman
2. Thinking with Type by Ellen Lupton
3. Interaction of Color 50th Anniversary edition – Josef Albers
4. The Paradox of Choice – Why More is Less – Barry Schwartz

Supplementary Reading

1. The War of Art – Steven Pressfield

Web References

1. https://uxdesign.cc/
2. https://medium.com/
3. https://lawsofux.com/
4. https://builtformars.com/ux-glossary

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Course Title: Independent Studies
Course Code: SD-G18
Credits: 4
Marks: 100
Duration: 60 Hours

Course Objectives

- This course provides students with the opportunity to engage in self-directed study and research under the guidance of a faculty mentor. Students will define their research topics, conduct literature reviews, collect and analyze data (if applicable), and produce a scholarly paper or project.

Course Learning Outcomes

On Completing the course, the students will be able to:

CLO1: Demonstrate the ability to formulate a clear and focused research question or project proposal.

CLO2: Conduct independent research using appropriate methodologies, resources, and techniques.

CLO3: Analyze and interpret data (if applicable) to draw meaningful conclusions relevant to the research question or project objectives.

CLO4: Communicate research findings effectively through a scholarly paper, presentation, or other appropriate medium.

CLO5: Demonstrate critical thinking and problem-solving skills in the context of their discipline and Demonstrate effective communication skills both orally and in writing.

CLO6: Apply theoretical knowledge to practical situations and real-world problems. Conduct independent research and contribute to the body of knowledge in their field.

Syllabus

Unit 1: **[15 hrs]**

Topic Selection and Proposal Development

Introduction to the course and expectations Guidance on selecting a research topic Formulating research questions or project proposals identifying and reviewing relevant literature.

Unit 2: **[15 hrs]**

Research Design and Data Collection

Research methodologies and techniques Ethical considerations in research Data collection and analysis (if applicable) Consultation with faculty mentor and peers

Unit 3: **[15 hrs]**

Data Analysis and Interpretation

Data analysis techniques and software tools (if applicable) Interpreting research findings Drawing conclusions and implications Drafting the research paper or project report

Unit 4: **[15 hrs]**

Presentation and Final Submission

Presentation of research findings (oral presentation or poster session) Peer review and feedback Revision and finalization of the research paper or project Submission of the final paper or project report

Note: The syllabus and assessment criteria can be adjusted based on the specific requirements and objectives of the course and program. Additionally, the course may require regular meetings with the faculty mentor and periodic progress reports to ensure that students are meeting the established milestones.

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Course Title: Security in Web and Mobile Applications
Course Code: SD-G24
Marks: 100
Credits: 4
Duration: 60 hours

Course Learning Outcomes (CLO):

CLO-1: Define the significance of security in web and mobile applications.

CLO-2: Identify common security threats and vulnerabilities in web and mobile environments.

CLO-3: Explain fundamental concepts of cryptography and encryption.
CLO-4: Apply secure communication protocols in web and mobile applications.
CLO-5: Implement secure authentication mechanisms in web and mobile applications.
CLO-6: Understand principles of authorization and access control.
CLO-7: Apply best practices to mitigate common security vulnerabilities in web and mobile applications.
CLO-8: Implement vulnerability management strategies and security testing methodologies.

SYLLABUS:

Unit 1: Fundamentals of Web and Mobile Application Security [15 Hours]

Web and mobile application security principles involve understanding the fundamental concepts and practices aimed at protecting applications from unauthorized access, data breaches, and other security threats. It includes concepts such as authentication, authorization, data encryption, secure communication protocols, input validation, output encoding, and secure session management. Security principles also encompass the concept of defense in depth, which involves implementing multiple layers of security controls to mitigate risks effectively.

Common security threats and attack vectors refer to various techniques and methods employed by attackers to compromise the security of web and mobile applications. Examples of common threatsand attack vectors include SQL injection, cross-site scripting (XSS), cross-site request forgery (CSRF), insecure direct object references (IDOR), security misconfigurations, and sensitive data exposure. Understanding these threats and attack vectors is crucial for developers and security professionals to identify vulnerabilities and implement appropriate countermeasures.

OWASP (Open Web Application Security Project) publishes a list of the top 10 most critical web application security risks, which serves as a guideline for identifying and addressing common

vulnerabilities. The OWASP Top 10 list includes vulnerabilities such as injection attacks (e.g., SQL injection, NoSQL injection), broken authentication, sensitive data exposure, XML external entities (XXE), broken access control, security misconfigurations, cross-site scripting (XSS), insecure deserialization, using components with known vulnerabilities, and insufficient loggingand monitoring. Understanding the OWASP Top 10 vulnerabilities helps developers prioritize security efforts and focus on mitigating the most critical risks in their applications.

Secure coding involves writing code that is resilient to security threats and vulnerabilities from the outset. It includes adopting coding practices that adhere to security best practices, such as input validation, output encoding, parameterized queries to prevent SQL injection, proper error handling, and secure session management. Defensive programming techniques aim to anticipate and mitigatepotential security issues by implementing robust error handling, input validation, and accesscontrols. Secure coding also involves following coding standards and guidelines, conducting code reviews, and using automated security testing tools to

identify vulnerabilities early in the development lifecycle.

Unit 2: Cryptography and Secure Communication [15 Hours]

Basics of Encryption and Decryption:

Encryption is the process of converting plaintext (readable data) into ciphertext (unreadable data)

using an encryption algorithm and a key. Decryption is the reverse process of converting ciphertextback into plaintext using a decryption algorithm and the correct key. The purpose of encryption is to protect data confidentiality by ensuring that only authorized parties can access the plaintext. Encryption algorithms can be categorized into symmetric and asymmetric encryption.

Types of Cryptographic Algorithms: Symmetric and Asymmetric:

Symmetric Encryption: In symmetric encryption, the same key is used for both encryption and decryption. Examples of symmetric encryption algorithms include AES (Advanced Encryption Standard), DES (Data Encryption Standard), and 3DES (Triple DES).

Asymmetric Encryption: Asymmetric encryption uses a pair of keys: a public key for encryption and a private key for decryption. The public key is widely distributed, while the private key is kept secret. Examples of asymmetric encryption algorithms include RSA (Rivest-Shamir-Adleman) andECC (Elliptic Curve Cryptography).

Secure Communication Protocols: HTTPS, SSL/TLS:

HTTPS (Hypertext Transfer Protocol Secure) is the secure version of HTTP, the protocol used for transmitting data over the internet. HTTPS encrypts data transmitted between a web browser and a web server using SSL/TLS encryption protocols.

SSL (Secure Sockets Layer) and TLS (Transport Layer Security) are cryptographic protocols that provide secure communication over a computer network. They ensure that data transmitted between two parties is encrypted and cannot be intercepted or tampered with by attackers.

SSL and TLS protocols establish a secure connection between a client and a server by authenticating the server's identity, negotiating encryption algorithms, and exchanging cryptographic keys.

Key Management and Secure Key Exchange Mechanisms:

Key management involves securely generating, storing, distributing, and disposing of cryptographic keys used for encryption and decryption.

Secure key exchange mechanisms ensure that cryptographic keys are exchanged securely between parties without being intercepted or tampered with by attackers.

Key exchange protocols such as Diffie-Hellman key exchange and its variants (DH, DHE, ECDH, ECDHE) enable parties to securely negotiate a shared secret key over an insecure

communication channel.

Key management practices include using strong key generation algorithms, protecting keys from unauthorized access, periodically rotating keys, and securely disposing of keys that are no longer needed.

Unit 3:Authentication and Authorization Mechanisms [15 HRS]

Authentication Methods: Passwords, Multi-factor Authentication (MFA), Biometrics:
Passwords: Password-based authentication involves users providing a unique combination ofcharacters to prove their identity. Password policies should enforce complexity requirements,regular updates, and protection against common attacks like brute force.

Multi-factor Authentication (MFA): MFA enhances security by requiring users to provide two or more authentication factors to access an account. These factors typically include something the user knows (password), something they have (security token), or something they are (biometric characteristic).

Biometrics: Biometric authentication uses physical or behavioral traits of an individual, such as fingerprints, facial recognition, or iris scans, to verify identity. Biometric authentication is increasingly being used in mobile devices and other systems for secure and convenient access control.

Secure Password Storage and Hashing Techniques:

Storing passwords securely involves using cryptographic hashing algorithms to convert plaintext passwords into irreversible hashes before storage.

Hashing techniques ensure that even if the password database is compromised, attackers cannot easily reverse-engineer passwords.

Common hashing algorithms include SHA-256, SHA-512, bcrypt, and Argon2. These algorithms incorporate salting (adding random data to each password before hashing) and stretching (repeated hashing) to further enhance security.

OAuth, OpenID Connect, and Single Sign-On (SSO):

OAuth (Open Authorization): OAuth is an authorization framework that enables third-party services to access user data without exposing user credentials. It allows users to grant limited access to their resources (e.g., profile data) to other applications or services without sharing their passwords.

OpenID Connect: OpenID Connect is an authentication protocol built on top of OAuth 2.0. It provides user authentication and single sign-on (SSO) functionality, allowing users to log in to multiple applications using the same set of credentials.

Single Sign-On (SSO): SSO is a mechanism that allows users to authenticate once and gain

access to multiple applications or services without needing to log in separately to each one. SSO systems typically use authentication tokens or cookies to manage user sessions across multiple domains or applications.

Role-based Access Control (RBAC) and Permissions Management:

RBAC is an access control model that assigns permissions to users based on their roles within an organization. Users are granted access rights according to their roles, rather than individual identities.

RBAC simplifies permissions management and reduces the risk of unauthorized access by providing a structured approach to defining access controls.

Permissions management involves defining access policies, assigning roles to users, and enforcing least privilege principles to limit access to only the resources necessary for performing specific tasks.

Unit 4: Security Best Practices and Vulnerability Management [15 Hours]

Input Validation and Output Encoding:

Input Validation: Input validation is the process of inspecting and validating user input to ensure that it conforms to expected formats and ranges. This helps prevent malicious input from being processed and potentially causing security vulnerabilities such as injection attacks.

Output Encoding: Output encoding involves encoding user-generated content before displaying it in web pages to prevent Cross-Site Scripting (XSS) attacks. Encoding converts potentially dangerous characters into their equivalent HTML entities, ensuring that the content is rendered as intended without posing a security risk.

Protection Against Common Vulnerabilities: SQL Injection, Cross-Site Scripting (XSS), Cross-Site Request Forgery (CSRF):

SQL Injection (SQLi): SQL injection is a type of attack where malicious SQL queries are inserted into input fields, exploiting vulnerabilities in the application's database layer. Protection measures include using parameterized queries, prepared statements, and input validation to sanitizeuser input.

Cross-Site Scripting (XSS): XSS attacks involve injecting malicious scripts into web pages viewed by other users. Protection methods include output encoding, validating and sanitizing input, and implementing proper content security policies to prevent execution of unauthorized scripts.

Cross-Site Request Forgery (CSRF): CSRF attacks trick users into performing actions on a web application without their consent. Mitigation techniques include using anti-CSRF tokens, validating referer headers, and implementing strict input validation and authentication mechanisms.

Implementation of Security Headers and Content Security Policy (CSP):

Security Headers: Security headers are HTTP response headers that provide additional security controls to web browsers. Examples include the X-Content-Type-Options, X-Frame-Options, and X-XSS-Protection headers. These headers help prevent certain types of attacks, such as MIME sniffing, clickjacking, and XSS attacks.

Content Security Policy (CSP): CSP is a security standard that allows website owners to specify which content sources are allowed to be loaded by their web pages. CSP helps mitigate XSS attacks by defining a whitelist of trusted sources for scripts, stylesheets, and other resources, thereby reducing the risk of unauthorized code execution.

Security Testing Techniques: Penetration Testing, Code Review, Vulnerability Scanning: Penetration Testing: Penetration testing, also known as ethical hacking, involves simulatingreal-world attacks to identify security weaknesses in web and mobile applications. Penetrationtesters use various tools and techniques to exploit vulnerabilities and assess the effectiveness ofexisting security controls.

Code Review: Code review is a manual or automated process of examining application code to identify security vulnerabilities, coding errors, and adherence to security best practices. Code review helps detect issues early in the development lifecycle and ensures that security considerations are integrated into the development process.

Vulnerability Scanning: Vulnerability scanning involves using automated tools to scan web and mobile applications for known security vulnerabilities and misconfigurations. Vulnerability scanners identify potential weaknesses in the application's code, configuration, and infrastructure, allowing developers to remediate them before they can be exploited by attackers.

REFERENCE

Mandatory Reading:

1. "Web Application Security: A Beginner's Guide" by Bryan Sullivan and Vincent Liu
2. "The Mobile Application Hacker's Handbook" by Dominic Chell, Tyrone Erasmus, ShaunColley, Ollie Whitehouse
3. "OWASP Mobile Security Testing Guide" by OWASP (Open Web Application SecurityProject)
4. "The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws" by Dafydd Stuttard and Marcus Pinto

Web References:

1. YouTube Channel: The Cyber Mentor
2. YouTube Channel: HackerSploit
3. https://owasp.org/ OWASP (Open Web Application Security Project)
4. https://www.sans.org/in_en/ SANS Institute