

**SARDAR PATEL UNIVERSITY  
VALLABH VIDYANAGAR**



**SYLLABUS EFFECTIVE FROM: 2018-19  
(Under Choice Based Credit Scheme)  
MCA**

(પીજી બીસી તા. 03/04/2019)

**Semester – IV**

**THE LINUX OPERATING SYSTEM  
COURSE NO: PS04CMCA21**

(3 Lectures & 1 Seminar/Tutorial per Week

Total Marks: 100)

**COURSE CONTENT:**

**1. Introduction to the UNIX/Linux Environment and CLI**

- Introduction to UNIX and GNU/Linux: history, features, derivatives
- Overview of different software models and software licenses
- An overview of the Linux environment
- Introduction to the Bourne Again SHell (bash)
- The vim editor
- Shell environment, commands, syntax, options, getting help
- File system navigation and manipulation
- Process management

**2. Basic Shell Scripting**

- Command line processing
- I/O redirection and filters
- The built-in constructs of the shell
- Basics of filters and regular expressions
- Basic commands and utilities
- Examples

**3. Advanced Shell Scripting and System Calls**

- Using advanced features of the shell
- The sed filter
- The awk filter
- Common Linux commands
- Programming using system calls under Linux
- Examples

#### **4. Linux System Administration**

- System structure
- Partitioning, formatting, mounting and unmounting file systems
- Devices and file system management
- User management
- System configuration files
- System startup and shutdown, runlevels
- Updating the system and installing and updating packages
- An introduction to the Linux file system

#### **MAIN REFERENCE BOOKS:**

1. Das S. : Your UNIX – The Ultimate Guide, Tata McGraw-Hill, 2001
2. Nemeth E., Hein T., Snyder G.: Linux Administration Handbook, 2nd edition, Pearson Education / PH PTR, 2007
3. Online Manuals

#### **BOOKS FOR ADDITIONAL READING:**

1. Kernighan B. W. and Pike R. : The Unix Programming Environment, Prentice-Hall of India, 1994
2. Sobel M.: A Practical Guide to Linux Commands, Editors, and Shell Programming, Pearson Education, 2006
3. Prata S. : Advanced Unix – A Programmer’s Guide, BPB Publications, 1986
4. Bach, Maurice J: The Design of the UNIX Operating System, Prentice Hall of India, 1986

**COMPILER DESIGN**  
**COURSE NO: PS04CMCA22**

(3 Lectures & 1 Seminar/Tutorial per Week

Total Marks: 100)

**COURSE CONTENT:**

**1. Introduction**

- Introduction to compilers
- Compilers, translators, interpreters, byte-code compilers
- Importance of compiler design techniques
- Cousins of compilers
- Model of compilation, phases of compilation
- Passes, front end and back end
- Compiler construction tools
- Symbol table management
- Error handling

**2. Lexical Analysis**

- Role of lexical analyzer
- Input buffering
- Specification of tokens using regular expressions
- Transition diagrams
- Deterministic and non deterministic finite automata
- Lexical analyzer generators, lex

**3. Syntax Analysis**

- Role of the parser
- Context Free Grammars
- Derivation, parse trees
- Eliminating ambiguity and left recursion, left factoring
- Recursive descent parsing
- Predictive parsing
- Construction of predictive parsing tables
- Rightmost and leftmost derivations
- Handles and handle pruning
- Shift-reduce parsing
- Operator precedence parsing
- LR parsing
- Construction of SLR parsing tables

**4. Intermediate Code Generation, Code optimization and Code generation**

- Intermediate code generation
- Code optimization
- Code generation

**MAIN REFERENCE BOOKS:**

1. Aho A. V., Sethi R., Ullman J. D. : Compilers - Principles, Techniques and Tools, Addison-Wesley Publishing Company, 1988
2. Dhamdhare D. M. : Compiler Construction, MacMillan India Limited, 1997

**BOOKS FOR ADDITIONAL READING:**

1. Holub A. I. : Compiler Design in C, Prentice Hall of India Private Limited, 1993
2. Appel A. W. : Modern Compiler Implementation in C, Foundation Books, 2000

# SOFTWARE ENGINEERING

COURSE NO: PS04CMCA23

(3 Lectures & 1 Seminar/Tutorial per Week

Total Marks: 100)

## COURSE CONTENT:

### 1. Introduction

- Software – meaning and applications
- Software Engineering – meaning, goal, challenges and approach
- Current trends in Software Engineering- Software Reuse, Web Engineering, Re-engineering
- Software Processes and models, desirable characteristics of software process
- Software Development Process Models – waterfall, prototyping, iterative, time boxing and spiral. Agile view of process

### 2. Software Requirement Analysis and Project Management

- Software Requirements – need, process
- Problem Analysis, Requirement Specifications, Functional Specifications with Use Cases
- Verification and Validation (V&V), Metrics
- Process planning, responsibilities of a software project manager
- Effort estimation, Project Scheduling and Staffing, Work Breakdown Structure (WBS), Software Configuration Management plans, Quality Plan,
- Risk Management, Project Monitoring Plan

### 3. Software Design

- Design – meaning, types, process and quality
- Design approaches - Function-oriented design (introduction), Object-oriented design
- Design Concepts for Function-oriented design – problem partitioning, abstraction, modularity (coupling and cohesion)
- Design Concepts for Object-oriented design - information hiding, functional independence, refinement, refactoring and design classes
- Object Modeling using UML – overview of UML
- UML diagrams – class, sequence, collaboration, use-case, activity, state chart, etc.

### 4. Coding and Testing

- Coding – meaning, process, programming standards and guidelines, refactoring, verification, metrics
- Testing – meaning, importance and process
- Testing fundamentals – error, fault, bug, failure, test oracles, test cases and test criteria
- Introduction to Black-box (functional) testing and White-box (structural) testing
- Comparison of Black-box and White-box testing
- Alpha testing and Beta testing
- Testing tools

**MAIN REFERENCE BOOKS :**

1. Roger S. Pressman : Software Engineering, A Practice Approach, 6<sup>th</sup> Edition, McGraw Hill International Edition, 2005 (ISBN 007-124083-7).
2. Jalote Pankaj : Integrated Approach to Software Engineering, 3<sup>rd</sup> Edition, Narosa Publishing House, 2005 (ISBN 978-81-7319-702-4).
3. Rajib Mall : Fundamentals of Software Engineering, 2<sup>nd</sup> Edition, Prentice-Hall of India, 2006 (ISBN-81-203-2445-5).

**BOOKS FOR ADDITIONAL READING :**

1. Ian Sommerville : Software Engineering, 6<sup>th</sup> edition, Pearson Education, 2001, (ISBN 81 7808-497-X).
2. Waman S Jawadekar, Software Engineering Principles and Practice, 1<sup>st</sup> Edition, Tata McGraw Hill, 2004.

# WEB APPLICATION DEVELOPMENT TECHNOLOGY

COURSE NO: PS04CMCA24

(3 Lectures & 1 Seminar/Tutorial per Week

Total Marks: 100)

## COURSE CONTENT:

### 1 Markup Languages and Server-side Scripting using ASP.NET-I

- Introduction to HTML, DHTML and CSS
- Introduction to ASP.NET
- ASP.NET Web Application Project – introduction, creation
- ASP.NET Web form - introduction, creating web forms
- ASP.NET Page – layout, lifecycle
- ASP.NET Controls - adding server controls to a Web Form, adding event procedures to Web Server Controls, Implementing code-behind pages
- Creating Master Pages, themes and skins, class libraries

### 2 Server-side Scripting using ASP.NET-II

- Accessing Data with ADO.NET
- Validating user input – validation controls, page validation
- Site Navigation, Personalization
- Securing Web Application , ASP.NET configuration and Security, Membership and Role Management
- Web Services – overview, creation and calling
- State Management, Packaging and Deploying ASP.NET Applications
- Creating ASP.NET AJAX application

### 3 Server-side Scripting using PHP-I

- Introduction to PHP – meaning, versions, basic syntax
- Introduction to MySQL
- Using MySQL and PHP
- Common PHP script elements – data types, Variables, Constants, operators, Flow Control and looping, strings, arrays, associative arrays, functions
- Working with Forms – Processing forms, Form validation
- Input validation, string manipulation, regular expression functions

### 4 Server-side Scripting using PHP-II and Client-side Scripting

- MySQL - database design, basic SQL commands of MySQL, accessing databases with PHP
- Reporting/Viewing data in WebPages from MySQL
- Addressing the stateless nature of HTTP – hidden form fields, cookies, sessions
- Security – Authentication (user logins), Authorization (Permissions)
- OOP programming with PHP, Error handling
- File and Directory Handling – Files and file access
- PEAR, Blogs, Forums
- JavaScript basics – introduction, variables, operators, flow control statements

- JavaScript Document Object Model
- Validations using JavaScript

#### **MAIN REFERENCE BOOKS:**

1. Ivan Bayross, “Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, Perl CGI”
2. PHP5 and MySQL Bible – Wiley Publishing Inc., First Edition, 2004, ISBN 81-265-0521-4, Time Converse and Joyce Park with Clark Morgan,
3. Ivan Bayross, Sharanam Shah, “PHP5.1”, Second Edition, 2006, Shroff Publishers & Distributors Pvt. Ltd., 2006, ISBN -10 : 81-8404-075-x
4. Danny Goodman, Machael Morrison , “JavaScript Bible”, 3<sup>rd</sup> edition
5. Matthew MacDonald, “Beginning ASP.NET 3.5 in C# 2008”, 2<sup>nd</sup> Edition, Apress,
6. Mathew MacDonald & Maria Szpuszta, “Pro ASP.NET 3.5 in C# 2008”, Second Edition, Apress, 2007

#### **BOOKS FOR ADDITIONAL READING:**

1. Beginning PHP5, Apache, MYSQL web Development – Elizabeth Naramore, Wiley Publishing Inc.,
2. G. Andrew Duthie, “ASP.NET programming with Microsoft Visual C#.NET Step by Step”, version 2003, Prentice-Hall of India
3. Internet reference for the relevant topics

### **PRACTICALS**

#### **COURSE NO : PS04CMCA25**

Practicals based on PS04CMCA21 and PS04CMCA24



# ADVANCED JAVA PROGRAMMING

COURSE NO: PS04EMCA21

(3 Lectures & 1 Seminar/Tutorial per Week

Total Marks: 100)

## COURSE CONTENT:

### 1. Java Servlet and Java Server Page(JSP)

- Introduction to Java Servlet
- Life cycle of Servlet
- Introduction to JSP, Architecture of JSP
- Developing simple JSP page
- JSP directives
- JSP scripting elements
- JSP action elements
- JSP implicit objects
- Introduction to internationalization in JSP
- Overview of security in Java Servlet / JSP environment

### 2. The Struts Framework

- Introduction to the struts framework and the MVC architecture
- Struts actions, interceptors
- Struts tag libraries
- Struts validators
- Struts configuration

### 3. Hibernate

- Understanding object relational persistence
- Hibernate mapping
- Managing entity identity
- Mapping class inheritance
- Integrating Hibernate with Struts

### 4. Enterprise Java Beans (EJB) and Java EE Design Patterns

- Enterprise Java Beans (EJB)
  - Introduction to Java EE architecture
  - EJB Overview
  - Entity Beans, Session Beans, Message Driven Beans
- Java EE Design Patterns
  - Introduction to design patterns
  - Generic patterns
  - Presentation tier patterns
  - Business tier patterns
  - Persistence patterns

**MAIN REFERENCE BOOKS:**

1. Bayross Ivan, Shah Sharanam, Bayross Cynthia and Shah Vaishali: Java Server Programming, 2<sup>nd</sup> Edition, Shroff Publishers and Distributors Pvt. Ltd., 2008
2. Brown, Chad and Stanlick : Struts 2 in Action, Dreamtech Press, 2011
3. Bauer Chritian and King Gavin : Java Persistence with Hibernate, Dreamtech Press, 2010
4. Panda, Rahman and Lane : EJB 3 in Action, Dreamtech Press, 2010
5. Bond, Law, Longshaw, Haywood and Roxburgh : Teach yourself J2EE, 2<sup>nd</sup> Edition, Pearson Education, 2007

**BOOKS FOR ADDITIONAL READING:**

1. Shah Sharanam and Shah Vaishali : Struts 2 for beginners, 2<sup>nd</sup> Edition, Shroff Publishers and Distributors Pvt. Ltd., 2009
2. Koegh Jim : The Complete Reference J2EE, Tata McGraw-Hill, 2006

# APPLICATION DEVELOPMENT FOR THE ANDROID PLATFORM

COURSE NO: PS04EMCA22

(3 Lectures & 1 Seminar/Tutorial per week

Total Marks: 100)

## COURSE CONTENT:

### 1. Introduction to the Android Platform and Application Development - I

- Introduction to the Android platform
- Android system architecture
- Android application development environment, working with the IDE
- The Android application life cycle
- Key Android concepts - AVDs, activities, views, adapters, intents, broadcast receivers, services, content providers, layouts and their inflation, different types of resources, notifications, widgets
- The Android activity
- Creating the first application, anatomy of the project
- Using menus and context menus
- Handling events

### 2. Application Development - II

- Using different layouts
- Using different UI components
- Intents
- Lists
- Adapters
- Notifications

### 3. Data Access

- Introduction to the SQLite database
- Creating and managing the SQLite database
- Using the database in applications
- Using different types of content providers
- Accessing contacts
- File system access

### 4. Multimedia and System Services

- Using images, audio, video
- Accessing the camera using intent
- Introduction to Animation in Android
- Broadcast Receivers
- Services
- Using text messages(SMS)
- Accessing the network
- Accessing files and data from a server
- Introduction to Geolocation and location aware applications

**MAIN REFERENCE BOOKS:**

1. Meier Reto : Professional Android 2 Application Development, Wiley Publishing, Inc., 2010
2. Conder Shane, Darcey Lauren : Android Wireless Application Development, 2<sup>nd</sup> Edition, Addition Wesley, 2011
3. Documentation of relevant software packages

**BOOKS FOR ADDITIONAL READING :**

1. Lee Wei-Meng : Beginning Android Application Development, Wiley Publishing, Inc., 2011
2. Darwin I. A. : Android Cookbook, O'Reiley Media, Inc., 2012
3. Mew K. M. : Android 3.0 Application Development Cookbook, Packt Publishing, 2011