

SEMESTER – III
Major/DS course (Core) BCA 3011
Object Oriented Programming Using JAVA

Credit : 5

Course Learning Outcomes: After successful completion of the Course

- **Able to solve real world problems using OOP techniques.**
- **Able to understand the use of abstract classes.**
- **Able to solve problems using java collection framework and I/o classes.**
- **Able to develop multithreaded applications with synchronization.**
- **Able to develop applets for web applications**

Introduction: JAVA as internet language. A first simple program. Entering the program, Compiling the program, control statements, using blocks of code, lexical issues-white space, identifiers, literals, comments, separators, The Java keyword-The java class libraries, data types, variables and arrays, the simple types, integers-byte, short, int, long, floating point types-float, double, characters, Booleans. A closer look at literals-integer literals, floating point literals, Boolean literals, character literals, string literals, variables – declaring a variable, dynamic initialization, the scope and lifetime of variables, type conversion and casting – java's automatic conversions, casting incompatible types, automatic type promotion in expressions, the type promotion rules, arrays-one dimensional arrays, multidimensional arrays, alternative array declaration syntax. Operators-assignment operators, increment and decrement, the bitwise operators, relational operators, Boolean logical operators, the assignment operator, the ? operator, operator precedence, using parentheses, control statements-Java's selection statements, if, switch, interaction statements-while, do-while, for, some for loop variations, nested loops, jump statements-using break, using continue, return. [20L]

Introduction Classes: class fundamentals, the general form of a class, a simple class, declaring objects, a closer look at new, assigning object reference variables, introducing methods, adding a method, the box class, returning a value, adding a method to the box class, constructors, parameterized constructors, the this keyword, instance variable hiding, garbage collection, the finalize method, a stack class, a closer look at methods and classes, overloading methods, overloading constructors. Using object as parameters, argument passing, returning objects, introducing access control, understanding static, introducing final, arrays revised., exploring the string class, using command line arguments, inheritance, inheritance basics, a more practical example, a superclass variable can reference a subclass object, using super, using super to call superclass constructors, a second use for super, creating a multilevel hierarchy, when constructor are called, method overriding, dynamic method dispatch, overridden methods, applying methods overriding, using abstract classes, using final with inheritance, using final to prevent overriding, using final to prevent inheritance, the object class. [20L]

Package and interfaces: Defining a package, understanding class path, a short package example, access protection, an access example, importing packages- interface-defining an

interface, implementing interfaces, applying interfaces, variables in interfaces, interface can be extended.[7L]

Exception Handling: Exception fundamentals, exception types, uncaught exceptions, using try and catch, displaying a description of an exception, multiple catch clauses, nested try statements, throw, throws, finally, java's built-in exceptions-creating you own exception subclasses, using exceptions, multithreaded programming. [8L]

Threads: The java's thread model, thread priorities, synchronization, message, the thread class and the runnable interface, the main thread, creating a thread, implementing runnable, extending thread, closing an approach, creating multiple thread, thread priorities, synchronization, using synchronized methods, the synchronized statement, interthread communication, using multithreading. [10L]

Applets: Concept, and use of applet, I/O basics, streams, applet fundamentals, writing simple applet program. [5L]

Stream classes: The predefined streams, reading console input, writing console output, reading and writing files, the transient and volatile modifiers, using instance of native methods, problem with native methods. [5L]

String handling: The string constructor, string length, special string operations-string literals, string concatenation, string concatenation with other data types, string conversion, character extraction, string comparison, searching strings, modifying a string-data conversion using string buffer constructors. [10L]

Wrappers: Number, double and float, integer and long, character, Boolean, process, runtime, memory management, executing other programs, system-using current time limits to time, program execution, using array copy, environment properties, object, using clone and the cloneable interface, class, class loader, math-transcendental functions, exponential functions, rounding functions, miscellaneous math methods, classes, input stream, output stream file input stream, file output stream. [10L]

Java Database Connectivity (JDBC): Implementation of simple system using JDBC. [5L]

Books: 1. Programming with JAVA – E.Balagurusamy, TMH

Major/DS course (Core) BCA 3012

Operating System

Credit : 5

Course Learning Outcomes: After successful completion of the Course the student will:

- know basic components of an operating system.
- comprehend how an operating system virtualises CPU and memory
- discuss various scheduling and swapping policies

- get to know how an operating system protects the computer system

Operating system as an extended machine and a resource manager, operating system concepts process, files, shell, Operating system structure: monolithic system, layered systems, virtual machines, client server model. Idea of multiprogramming, multiprocessing, batch processing and time sharing. Real time systems [30L]

Concurrent processes: Critical section problem, Semaphores & Synchronization. [10%]

CPU scheduling: Scheduling concepts and algorithms [15L]

Memory management: Static & dynamic partitioning, Dynamic relocation, Paging & demand paging memory management, Virtual memory, Replacement algorithm, Segmented memory management, Thrashing. [15L]

Device management: Scheduling concept and algorithm, spooling. [10L]

Deadlock detection, prevention and avoidance. [10L]

File management: File concept, access methods, allocation methods, Directory concept. [10L]

Books:

1. Modern Operating Systems- A.S. Tanenbaum (PHI)
2. UNIX – S.Das, TMH

Skill Enhancement Course (SEC) BCA 3051

Unix and Shell Programming

Credit : 3

On completion of this module the student should be able to:

- Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.
- Effectively use the UNIX/Linux system to accomplish typical personal, office, technical, and software development tasks.

Introduction, Brief history. Unix Components/Architecture. Features of Unix. The UNIX Environment and UNIX Structure. The login prompt. General features of Unix commands/ command structure. Command arguments and options. Understanding of some basic commands such as echo, printf, ls, who, date, passwd, cal, Combining commands. Meaning of Internal and external commands. The type command: knowing the type of a command and locating it. The man command knowing more about Unix commands and using Unix online manual pages. The man with keyword option and whatis. The more command and using it with other commands. Knowing the user terminal, displaying its characteristics and setting characteristics. The root login. Becoming the super user: su command. The /etc/passwd and /etc/shadow files. Commands to add, modify and delete users. Unix files. Naming files. Basic file types/categories. Organization of files. Hidden files. Standard directories. Parent child relationship. The home directory and the HOME variable. Reaching required files- the PATH variable, manipulating the PATH, Relative and absolute pathnames. Directory commands – pwd, cd, mkdir, rmdir commands. The dot (.) and double dots (..) notations to represent present and parent directories and their usage in relative path names. File related commands – cat, mv, rm, cp, wc and od commands. File attributes and permissions and knowing them. The ls command with options. Changing file permissions: the relative and absolute permissions changing methods. Recursively changing file permissions. Directory permissions. [35L]

The vi editor. Basics. The .exrc file. Different ways of invoking and quitting vi. Different modes of vi. Input mode commands. Command mode commands. The ex mode commands. Illustrative examples Navigation commands. Repeat command. Pattern searching. The search and replace command. The set, map and abbr commands. Simple examples using these commands. The shells interpretive cycle. Wild cards and file name generation. Removing the special meanings of wild cards. Three standard files and redirection. Connecting commands: Pipe. Splitting the output: tee. Command substitution. Basic and Extended regular expressions. The grep, egrep. Typical examples involving different regular expressions. Shell programming. Ordinary and environment variables. The .profile. Read and readonly commands. Command line arguments. exit and exit status of a command. Logical operators for conditional execution. The test command and its shortcut. The if, while, for and case control statements. The set and

shift commands and handling positional parameters. The here (<<) document and trap command. Simple shell program examples. File inodes and the inode structure. [35L]

Software Lab based on Unix and shell Programming

[30L]

1. Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to modify “cal” command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of “who” command along with the total number of users.
10. Write a shell script to display the multiplication table any number,
11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
12. Write a shell script to find the sum of digits of a given number.
13. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
14. Write a shell script to find the LCD(least common divisor) of two numbers.
15. Write a shell script to perform the tasks of basic calculator.
16. Write a shell script to find the power of a given number.
17. Write a shell script to find the factorial of a given number.
18. Write a shell script to check whether the number is Armstrong or not.
19. Write a shell script to check whether the file have all the permissions or not.
20. Program to show the pyramid of special character “*”.

Books:

1. 1.Sumitabha Das., Unix Concepts and Applications., 4th Edition., Tata McGraw Hill
2. Behrouz A. Forouzan, Richard F. Gilberg : UNIX and Shell Programming- Cengage Learning – India Edition. 2009.
3. M.G. Venkatesh Murthy: UNIX & Shell Programming, Pearson Education.
4. 4.Richard Blum , Christine Bresnahan : Linux Command Line and Shell Scripting Bible, 2ndEdition , Wiley,2014

Unit 5: Marginal Costing and Cost Volume-Profit Analysis**20 Lectures**

Definition of marginal cost and marginal costing, features of marginal costing, comparison between direct costing, marginal costing and absorption costing, advantages and limitations of marginal costing, cost-volume-profit analysis-profit volume chart, break-even analysis, graphical presentation of break-even chart, limitations of break-even analysis, methods of break-even analysis, margin of safety, angle of incidence.

Suggested Readings

1. Jawahar Lal, Cost Accounting, McGraw Hill Education.
2. S.P. Jain and K.L. Narang, Cost Accounting, Kalyani Publishers.
3. S.N. Maheshwari and S.N. Mittal, Cost Accounting: Theory and Problems, ShriMahavir Book Depo
4. S.P. Iyengar, Cost Accounting. Sultan Chand & Sons.
5. Saxsena and Vasisth, Cost and Management Accounting. Sultan Chand and Sons
6. Hanif, Cost Accounting II, McGraw Hill Education.
7. Debasis Banerjee, Cost Accounting & Management Accounting.
8. C.H. Sengupta and B.G. Chowdhury, Cost and Management Accounting. Dey Book Concern
9. G.K. Jana. Cost and Management Accounting. Books and Allied (P) Ltd.
10. Samir Kumar Chakraborty, Cost and Management Accounting. New Central Book Agency.

Comm3031: FUNDAMENTALS OF FINANCE**Marks: 50 Course Evaluation: Semester Examination (40 Marks) and Internal Assessment (10 Marks)****Credit: 3****Lectures: 48**

Objectives: This basic objective of this course is to provide students with a comprehensive understanding of essential financial concepts, techniques, and decision-making processes crucial for effective financial management within organizations. Through this course, students will learn to analyse financial situations, make informed decisions, and contribute to the overall financial success of firms.

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

1. Understand the fundamental issues associated with financial decision making.
2. Develop skills for the application of various techniques relevant to financial management decisions.

CONTENTS**Unit-1: Introduction to Finance****10 Lectures**

Finance – definition, nature and scope; Sources of Finance - short-term and long-term sources; Financial management-concept, objectives and decision areas; Time value of money-concept and importance; Future value and Present value calculations; Cost of capital-meaning and relevance.

Unit-2: Capital Budgeting Decision**10 Lectures**

Capital budgeting – definition, features and importance; Different kinds of capital budgeting decisions; Various approaches to capital budgeting decisions under certainty condition.

Unit-3 Capital Structure Decision**10 Lectures**

Concept of capital Structure; Capital Structure vs. Financial Structure; Importance of Capital Structure; Optimal Capital Structure: Determinants of Capital Structure.

Unit-4 Working Capital Management**10 Lectures**

Meaning and classification of working capital; Working Capital Management-concept and importance, Determinants of working capital requirement, Sources of working capital finance.

Unit-5 Dividend Decision**8 Lectures**

Meaning and classification of dividend; Meaning, objectives and determinants of dividend policy.

Suggested Readings

1. Chandra, P., Financial Management: Theory and Practice, TMH.
2. Pandey, I.M., Financial Management, Vikas Publishing House Pvt. Ltd., New Delhi.
3. Sur, D. and Sarkhel, J., An Introduction to Financial Management, Book Syndicate.
4. Van Horne, Fundamentals of Financial Management, Pearson.
5. Khan, M.Y. and Jain, P.K., Financial Management: Text, Problems and Cases, Tata McGraw-Hill Publishing Co., Ltd. New Delhi