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COURSE STRUCTURE AND DETAILED SYLLABUS

For

MASTER OF COMPUTER APPLICATIONS



**JAWAHARLAL NEHRU TECHNOLOGY UNIVERSITY KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India**

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**JAWAHARLAL NEHRU TECHNOLOGY
UNIVERSITY KAKINADA
MASTER OF COMPUTER APPLICATION**

II SEMESTER

S.No	Subject	T	P
1	OOPS THROUGH JAVA	4	-
2	OPERATING SYSTEMS	4	-
3	ORGANIZATIONAL STRUCTURES AND HUMAN RESOURCE MANAGEMENT	4	-
4	OPTIMIZATION TECHNIQUES	4	-
5	BUSINESS DATA PROCESSING	4	-
6	OOPS THROUGH JAVA LAB	-	3
7	BUSINESS DATA PROCESSING LAB	-	3

II	L	P	Credits
	4	-	-

OOPS THROUGH JAVA

UNIT-I

Basics of Object Oriented Programming(OOP): Need for OO paradigm , A way of viewing world- Agents, responsibility, messages,methods,classes and instances, class hierarchies(Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity , abstraction mechanisms

Java Basics: Data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects- concepts of classes, objects, constructors methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT-II

Inheritance: Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, sombination, benifits of inheritance costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism, abstract classes.

Packages and Interfaces: Defining, Creating and Accessing a package, Understanding CLASSPATH,Importing packages, differences between classes and interfaces, defining an interface, Implementing interface, applying interfaces variables in interface and extending interfaces.

UNIT-III

Exception handling and Multithreading: Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT-IV

Event Handling: Events, Event sources, Event classes, Event Listeners,

Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, list panes- scrollpane, dialogs, menubar, graphics, layout manager- layout manager types- boarder, grid, flow, card and grid bag.

UNIT-V

Applets: Concepts of Applets, differences between applets and applications, lifecycle of an applet, types of applets, creating applets, passing parameters to applets.

Swings: Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons-The JButton class, Check boxes, Radio Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees and Tables.

TEXTBOOKS:

1. Java-The complete reference, 7/e, Herbert schildt, TMH.

REFERENCES:

1. JAVA:How to program, 8/e, Dietal, Dietal,PHI.
2. Introduction of programming with JAVA,S.Dean,TMH.
3. Introduction to Java programming, 6/e, Y.Daniel Liang, Pearson.
4. Core Java 2, Vol 1(Vol 2) Fundamentals(Advanced), 7/e, Cay.S.Horstmann,Gary Cornell, Pearson.
5. Big Java2,3/e, Cay.S. Horstmann,Wiley.
6. Object Oriented Programming through Java, P.Radha Krishna, University Press.
7. JAVA&Object Orientation an Introduction, 2/e, John Hunt, Springer.
8. Introduction to JAVA Programming, 7/e, Y.Daniel Liang, Pearson.
9. AVA Programming and Object –Oriented Application Development, Johnson, Cengage Learning.
10. First Encounter with JAVA, S.P.Bhuta, SPD
11. JAVA for Professionals, B.M.Harwani, SPD.
12. Program with JAVA, Mahesh Bhave, Palekan, Pearson.
13. Programming with JAVA, 3/e, E.Balaguruswamy, TMH.

II	L	P	Credits
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OPERATING SYSTEMS

UNIT-I:

Introduction: Computer –system organization, Computer- system Architecture, Operating- system Structure, Operating-system Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Special- purpose systems, Computing Environments , Operating-system Structure: , Operating-system Services, User , Operating-system Interface, System calls, System programs, Operating-system Design and Implementation, , Operating-system structure, Virtual Machine

UNIT-II:**Process Management:**

Processes: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC Systems, Communication in Client-Server systems

Threads: Overview, Multithreading Models, Thread Libraries, Java Threads, Threading Issues, OSExamples

CPUScheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Thread Scheduling, Operating system Examples

Process Synchronization: Background, The Critical- section problem, Petersons solution, Synchronization Hardware, Semaphores, Classic problems of Synchronization, Monitors, Atomic Transactions.

UNIT-III:

Memory management: Main memory: Swapping, Contiguous memory Allocation, Paging, Structure of the Page table, Segementation

Virtual memory: Background, Demand paging, copy-on-Write, Page Replacement, Allocation of frames, Thrashing, Memory-Mapped Files.

UNIT-IV:

File-system Interface: Concept, Access Methods, Directory structure, File-system Mounting, File sharing, Protection

File-system Implementation: File-system Structure, Implementation,

Directory Implementation, Allocation Methods, Free- Space Management, Efficiency and Performance, Recovery, Log-Structured File systems, NFS Mass –storage Structure: Overview, Disk Structure, Disk Attachment, Disk Scheduling, Disk and swap-space Management, RAID Structure, Stable-Storage Implementation, Tertiary-Storage Structure
 I/O systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O requests to Hardware Operations, STREAMS, Performance.

UNIT-V:

Deadlocks: System model, Deadlock Characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock avoidance Deadlock Detection and Recovery form Deadlock.

Protection: Goals of Protection, Principles of protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability –Based systems, Languge-Based Protection

Security: The Security Problem, Program Threads, System and Network Threats, Cryptography as a security tool, User Authentication, Implementing security Defenses, Firewalling to protect systems and Networks.

TEXTBOOKS:

1. Operating system concepts, 7/e, Abraham Siliberschatz, Galvin, John Wiley & sons , Inc.

REFERENCES:

1. Operating systems,6/E,William stallings, PHI/Pearson.
2. Operating systems 3/e,Dietal ,Dietal,Pearson.
3. Operating systems, 2/e, Dhamdhare, TMH.
4. An introduction to Operating systems, Concepts and practice, Pramod Chandra P.Bhat, PHI
5. Operating systems, Elmasri, Carrick, Levine, TMH.
6. Operating systems ,3/e ,Nutt, Chaki, Neogy, Pearson.
7. Operating systems, Brian L. Stuart, Cengage.
8. Operating systems, Haldar, Aravind, Pearson.
9. Operating systems, PAL Choudhury, PHI.
10. Operating systems :design and Implementation, 3/e, Tanenbaum, Woodhull.

II	L	P	Credits
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ORGANIZATIONAL STRUCTURE AND HUMAN RESOURCE MANAGEMENT

UNIT – 1**Introduction to Management :**

Concepts, nature and definitions of management – management and administration, principles of management - functions of management- planning, organizing, directing and controlling – importance of management.

UNIT – II**Classical Theories of Organization:**

Functional approach – division of labor, levels of authority, span of Control, authority & responsibility, efficiency of management.

Concept of organization structure- Formal and Informal organization, difficulties due to informal organization- group behaviour- Committee- motivation and theories of motivation.

UNIT – III**Human Resource Management:**

Objectives, functions of HRM, duties and responsibilities of HR manager- position of HR department in the organization- Changing, concept of personnel management in India. Job Description, recruitment, job specification and selection, interviewing techniques, transfers, promotion and its policies

Trainings and Development: Objectives of training – identifying trainings needs – training methods- on the job training – off the job training – job evolution- training function India- State-of – Art- survey

UNIT IV**Communication:**

Importance of communication, communication process- methods of communication two way communication, barriers of Communication, organizational barriers – essentials of effective Communication system

Strategic Management:

Introduction –study of strategic management – environmental scanning-internal environment and external environment-SWOT analysis- challenges' in LPG

REFERENCES:

1. Organization Structure and personal Management, 2/e, Subbarao. P, HPH.
2. personal and Human Resource Management, Recenzo, Robins, PHI.
3. Business Communications and soft skills, kuberudu B, and Krishna K.s, Excel publications.
4. Management process and Organizational Behaviour, karam pal, I.k.int.
5. Management process and Organizational Behaviour, karam pal, I.K int.
6. Human Resource Management Jyothoi, Oxford.
7. Organizations and Management, Agarwal, TMH.
8. Fundamentals of HRM, David A. Decenzo, Stephen R. Robins, Wiley India.
9. Organizational Structure and Human Resurce management, Varaprasad, SciTech.
10. Human Resource Management, Chabra. T.N, Dhanpat Rai.
11. Personal Management and Human Resources, Venkat Ratnam, TMH,

II	L	P	Credits
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OPTIMIZATION TECHNIQUES

UNIT-I

Development: Definition, Characteristics and Phrases, scientific method. Types of models, general methods for solving, operations research modes. Allocation: introduction linear programming formulation, graphical solution, simplex methods, artificial variable technique, duality principle.

UNIT-II

Transportation problem: Formulation, optimal solution, unbalanced transportation, assignment problem: formulation, optimal solution, variations problem, degeneracy i.e. non square $M \times N$ matrix, restrictions sequencing: Introduction, optimal solution for processing each of n jobs through three machines, travelling salesman problem(i.e.) shortest acyclic route models.

UNIT-III

Replacement: Introduction, replacement of items that deteriorate when money value is not counted and counted, and replacement of items that fail completely (i.e.) group replacements. Waiting lines: Introduction, single channel, poisson arrivals, exponential service time infinite population and unrestricted queue.

UNIT-VI

Inventory: Introduction, single item, deterministic models, production is instantaneous or at a constant rate, shortages are allowed or not allowed and with draws from stock is continuous, purchase inventory model with one price break, shortages are not allowed, instantaneous production demand production or purchase cost is relevant, stochastic models, simple problems.

UNIT-V

Theory of Games: Introduction, minmax(maximum), criterion and optimal strategy solution of games with saddle points, rectangular without saddle

points. Dynamic programming: Introduction, Bellman's Principle of optimality, solutions for simple problems.

Project Management: PERT and CPM, difference between PERT and CPM, PERT/CPM network components and precedence relations, Time Estimates for activities.

TEXTBOOKS:

1. Operations Research, S.D.Sharma, Ramnath,& Kedarnath co, Meerut.
2. Operations Research, An introduction, 8/e, Taha, Pearson.

REFERENCES:

1. Operations Research, P.K.Gupta, D.S. Hira, S.Chand.
1. Operations Research, R.D.Asrhedkar, R.V.Kulkarni.
2. Operations Research, Problems & solutions, 3/e, JKSharma, Macmillan.
3. Operations Research, 8/e, Hillier, Liberman, TMH.
4. Operations Research, 2/e, Panneerselvam.

II	L	P	Credits
	4	-	-

BUSINESS DATA PROCESSING

UNIT-I

Introduction to data processing, types of data processing, Overview of COBOL: History of COBOL, Coding formats of a COBOL program, Structure of a COBOL program, Character set, Cobol words, data names and identifiers, literals, figurative constants, hierarchy of COBOL statements, continuation of lines, language description notation, implementation differences.

Introduction to divisions(Identification, environment, data and procedure divisions),Format and functions of the different sections and paragraphs in each division.

UNIT-II

Data Division:Level structure(including special level Nos.66,77 and 88, picture clause, editing characters, concept of qualification of names, record structure, working storage section: VALUE clause, REDEFINES clause, RENAMES clause, USAGE clause, SIGN clause, JUSTIFIED clause, SYNCHRONIZED clause.

UNIT-III

Procedure division : Organization of a COBOL program: Section, Paragraph, sentence, Statement, syntax and function of the different COBOL verbs.

Elementary verbs: add, subtract, multiply, divide and compute.

Input-Output verbs: Accept, display.

Data movement: move verb

Conditional and sequence control verbs:

Types of conditions, condition name, condition, relation condition, class condition, sign condition, Relational operators, Logical operators, if and nested if statements, complex conditions, evaluation roles, abbreviated, compound conditions, EVALUATE statements, ALTER statement.

Miscellaneous verbs: GOTO,STOP,RUN, EXIT, CONTINUE.

Perform-verb:In-line and Out-Line,PERFORM,Types of Out-line , PERFORM, PERFORM-UNITL, PERFORM -VARIYING, PERFORM -THRU, PERFORM-

TIMES, Usage of TEST BEFORE and TEST AFTER clauses, nested PERFORM.

UNIT-IV

Table handling: basic concepts, OCCURS clause, Assigning values to table elements, single, multiple dimensional table, INDEX/SUBSCRIPT, SET verb: indexed by clause, usage in index clause, SEARCH concepts, SEARCH verb, serial/ binary searching in COBOL, Handling sorted/ unsorted tables. String handling in COBOL: STRING statement, EXAMINE statement, INSPECT statement, UNSTRNG statement.

UNIT-V

File Handling: Basic file concepts, Characteristics, File Description, File Organization/access, file section and file control paragraphs, Sequential indexed and relevant file handling in COBOL, USE statement

Input- output Statements: open, close, read, write, rewrite, delete, start.

Compiler directing verb: Copy.

Sorting and Merging: Basic concepts, SORT verb, MERGE verb.

Inter –program communication: Basic concepts, subroutines, Linkage section, call verb, call by address and call by content.

Screen section, Report Writing.

TEXT BOOKS:

1. COBOL Programming, D.Ghosh Dasthidar, M.K.Roy, TMH.
2. Structured COBOL, Phillipakis, Kazmier, MGH.

REFERENCES:

1. Structured COBOL programming , 8/e, Stern, A.Stern, wiley.
2. COBOL for beginners, Worth, Thomas, PHI.

II	L	P	Credits
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OOPS THROUGH JAVA LAB

1. Use JDK 1.5 or above on any platform e.g. Windows or Unix.
2. Student is expected to complete any 16 programs.
 1. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1,1 every subsequent value is the sum of the 2 values preceding it. Write A Java Program (WJJP) that uses both recursive and nonrecursive functions to print the n^{th} value of the Fibonacci sequence.
 2. WJJP to demonstrate wrapper classes and to fix the precision.
 3. WJJP that prompts the user for an integer and then prints out all the prime numbers upto that Integer.
 4. WJJP that checks whether a given string is a palindrome or not. Ex. MALAYALAM is a palindrome.
 5. WJJP for sorting a given list of names in ascending order.
 6. WJJP to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.
 7. WJJP that illustrates how runtime polymorphism is achieved.
 8. WJJP to create and demonstrate packages.
 9. WJJP, using String Tokenizer class, which reads a line of integers and then displays each integer and the sum of all integers.
 10. WJJP that reads on file name form the user then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the using FileInputStream class.
 11. WJJP that displays the number of characters, lines and words in a text/text file.
 12. Write an Applet that displays the content of a file.
 13. WJJP that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the $+ - * ? /$ operations. Add a text field to display the result.
 14. WJJP for handling mouse events.

15. WJJP demonstrating the life cycle of a thread.
16. WJJP that correctly implements Producer-Consumer problem using the concept of Inter Thread Communication.
17. WJJP that lets users create Pie charts. Design your own user interface(with Swings & AWT).
18. WJJP that allows user to draw lines, rectangles and ovals.
19. WJJP that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result and then sends the result back to the client. The client displays the result on the console. For ex: The data send from the client is the radius of a circle and the result produced by the server is the area of the circle.
20. WJJP to generate a set of random numbers between two numbers x_1 and x_2 , and $x_1 > 0$.
21. WJJP to create an abstract class named shape, that contains an empty method named numberOfSides(). Provide three classes named Trapezoid, Triangle and Hexagon, such that each one of the classes contains only the method numberOfSides(), that contains the number of sides in the given geometrical figure.
22. WJJP to implement a Queue, using user defined Exception Handling (also make use of throw, throws).
23. WJJP that creates 3 threads by extending Thread class. First thread displays "Good Morning" every 1 sec, the second thread displays "Hello" every 2 seconds and the third displays "Welcome" every 3 seconds. (Repeat the same by implementing Runnable).
24. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviours, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.

II	L	P	Credits
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BUSINESS DATA PROCESSING LAB

All the programs should be implemented in COBOL language. The standards that can be used are COBOL-68, COBOL-74, COBOL-85, MS-COBOL, COBOL 2002. The operating systems that can be used are :IBM's z/OS, Microsoft's Windows, and the POSIX families (Unixx/Linux etc.)etc. At least two programs from each set of 9.

1. **Beginners Programs**- Simple programs using ACCEPT, DISPLAY and some arithmetic verbs.
 1. Program illustrating usage of editing characters.
 2. Programs for simplification the following equations using
 - a) Arithmetic Verbs b) COMPUTE verb
 the equations are i) $C=(5/9)(F-32)$ ii) $A=\delta r^2$
2. **Selection and Iteration**- selection (IF,EVALUATE) and Iteration (PERFORM) example programs.
3. **Tables**-Example programs using tables.
 1. Program that determines the multiplication on two matrices.
 2. Programs for performing linear search and Binary search operations.
4. **String handling**-Example programs that show how to use Reference Modifications, STRING, UNSTRING INSPECT and UNSTRING.
 1. A data item Name contains 4 characters. Write a program to change all instances of "MR" or "Mr" by "Sri" and "MRS" or "Mrs" by "Smt".
5. **Sequential Files**: Programs that demonstrate how to process sequential files.
 1. Develop a program to maintain and process a sequential file to generate electrical bills. The bill should have the following details. APSEB, House Number, Operator, Owner's name, Zone, Category, previous meter reading, unit charge, total.
 2. Program to merge files and print the merged files. Take input form user.

3. Write a program which accepts student's details from a file and displays them along with grades. Input file should have details regarding Roll-no and marks in three subjects. Output file format should be

Name	RollNo	Maths	Physics	Computers	Total	Grade
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6. **Sorting and Merging**-Examples that use INPUT PROCEDURE'S and the SORT and the MERGE verbs.

- Write sample programs for sorting and merging of sequential files using SORT and MERGE verbs.

7. **Direct Access Files**-Examples programs that show how to process Indexed and Relative files.

1. Write a program that performs the conversion of sequential data to indexed data.
2. Write a program which converts the given sequential file into relative file.
3. Develop a program to maintain and generate bills in a supermarket. The master file is maintained as indexed organization with fields item -code, item-name, unit-price. Generate bills for customers with the random requests about items as common in any super market in the following Format..

S.No.	code	Description	Unit Price	Qty	Total
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Total Amount:

8. **CALLING sub-programs**-Example programs that Demonstrate contained, and external, sub-programs-sample programs illustrating Linkage section.

9. **The COBOL Report Writer**-Example programs using the COBOL Report Writer.

1. Simple report using only one control break.
2. Report containing all the control breaks but not using declaratives.
3. Report containing all control breaks and using declaratives to calculate the sales person salary and commission.