BCA COURSE PLAN

IV SEMESTER

GIRIDEEPAM INSTITUTE OF ADVANCED LEARNING
Affiliated to Mahatma Gandhi University, Kottayam

Programme : **BCA**

Course : **MM4CMT03 – OPERATIONS RESEARCH**

Semester : **4**

Name of the Faculty : Ms. Anuja Varghese

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Significance of the Course

Operations research helps in solving problems in different environments that needs decisions. The topics like linear programming, Transportation, Assignment etc. and analytic techniques, computer packages etc. will be used to solve problems facing business managers in decision environments. This course will equip the student with the expertise to mathematically model real life optimization problems as Linear Programming (Optimization) Problems and subsequently educate the student to solve these models with the help of the available methods.

Expected Course Outcomes (ECO):

On completion of the Course, it is expected that the student will be able to:

ECO 1: Summarising the concepts about O.R. like nature, uses, math concepts, approaches and models.

ECO 2: Describing mathematical formulation of a LPP, solution of a LPP, graphical method for solving a LPP, Simplex method, Optimality conditions, and Big M method.

ECO 3: Explaining Transportation problem and its solutions, and Assignment problems.

ECO 4: Summarising Game Theory, pure and mixed strategy with saddle point, and principle of dominance

Allocation of Sessions:

Module	1	2	3	4	Total
Sessions Allotted	10	25	20	17	72

Session Plan

Module	Topics	CO Linkage
Module 1	**Basics of O.R. –** The nature and uses of O.R. – math concepts and approaches of O.R.- models in O.R.	**CO 1**

Learning Outcomes	Assessment
1. Explaining nature and uses of O.R. 2. Describing the concepts of O.R. 3. Explaining the approaches of O.R. 4. Summarising the models in O.R	**1)** Assignments in related topics. **2)** Interactive sessions and discussion. **3)** Test.

Module	Topics	CO Linkage
Module 2	**Linear Programming Problems –** Mathematical formulation of a L.P.P., General linear programming problems, solution of a L.P.P, graphical method for solving a L.P.P., Simplex Method: Stack and surplus variables – reduction of any feasible solution to a basic feasible solution, unbounded solution, optimality conditions-artificial variable techniques – Big M method.	**CO2**

Learning Outcomes	Assessment
1. Summarising the mathematical formulation of a L.P.P. 2. Inferring General linear programming problems and its solutions. 3. Structuring graphical method for solving a L.P.P. 4. Explaining Simplex method. 5. Describing Big M method.	1. Problem solving. 2. Discussion. 3. Assignment. 4. Test.

Module	Topics	CO Linkage
Module 3	**Transportation & Assignment problems –** Transportation model – solution by simplex method- north west corner rule, lowest cost entry method, Vogel method, MODI method, degeneracy, assignment problems.	**CO3 & CO4**

Learning Outcomes	Assessment
1. Describing Transportation model. 2. Interpreting the solution of transportation problem by simplex method. 3. Comparing the solutions by north west corner rule, lowest cost entry method, Vogel method, MODI method. 4. Explaining the concept of degeneracy. 5. Describing assignment problems.	1. Problem solving. 2. Discussion. 3. Test. 4. Assignment.

Module	Topics	CO Linkage
Module 4	**Game theory –** Two persons zero sum games, pure and mixed strategy with saddle point, solution of pure strategy games, solution of mixed strategy problems by arithmetic method, principle of dominance.	**CO5**

Learning Outcomes	Assessment

1. Explaining game theory. 2. Describing two persons zero sum games. 3. Comparing pure and mixed strategy with saddle point. 4. Interpreting the solution of pure and mixed strategy games by arithmetic method. 5. Explaining principle of dominance.	1. Discussion. 2. Problem solving. 3. Assignment. 4. Test.

Reference Books

1. V.K. Kapoor – Operations Research.
2. Kanti Swarup, P.K. Gupta and Man mohan – Operations Research, Sultan Chand & Sons.
3. K.V. Mital and C.Mohan - Optimization methods in operations Research and system analysis.
4. J.K. Sharma – Operations Research theory and applications, Macmillan.
5. B.N.Mishra, B.K. Mishra – optimization Linear programmimg Ane Books.

GIRIDEEPAM INSTITUTE OF ADVANCED LEARNING
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Programme : **BCA**

Course : **CA4CRT10 - Design and Analysis of Algorithms**

Semester : **4**

Name of the Faculty : Mr. Vinumon Jacob

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Significance of the Course

Design and Analysis of Algorithmis acore course on algorithm analysis and design to develop hardware and software in computer. In the case of problem identification of a system, each problem has to solve based on newly developed algorithms. For each specific problem the most efficient algorithm for its solution is usually presented and analysed. The missing ingredient is a lack of emphasis on design techniques. A knowledge of design certainly help one to create good algorithms, yet without the tools of analysis there is a way to determine the quality of the result. This observation that design should be taught on a par with analysis lead to a more promising line of approach: namely to organize around some fundamental strategies of algorithm design. The number of basic design strategies is reasonably small. Moreover all of the algorithms one would typically with to study can easily be fit into these categories; for example merge sort and quick sort are perfect examples of the divide and conquer strategy while Kruskal's minimum spanning tree algorithm is a straight forward example of the greedy strategy. An understanding of these strategies is an essential first step towards acquiring the skills of algorithm design.Different algorithmic techniques are included in this course can convert as programs using different computer programming languages and also can implement as hardware and software in computer system.

Expected Course Outcomes (ECO):

On completion of the Course, it is expected that the student will be able to:

ECO 1: Summarising the basic concepts of algorithm design techniques, analysis and its performance.

ECO 2: Identifying searching and sorting techniques to retrieve data and information from storage repositories.

ECO 3: Describing general characteristics of algorithmic problem solving methods.

ECO 4: Applying dynamic programming with multistage graphs powerful algorithm implementations.

ECO 5: Explaining traversal and search techniques using depth and breadth searching, and backtracking general method.

Allocation of Sessions:

Module	1	2	3	4	5	Total
Sessions Allotted	12	14	18	16	12	72

Session Plan

Module	Topics	CO Linkage
Module 1	Introduction, Definition of Algorithm, Algorithm design techniques, Algorithm Analysis, performance analysis - space complexity, time complexity, Best, Worst, And average case complexity.	**CO 1**

Learning Outcomes	Assessment
1. Explaining definition of algorithm and its criteria. 2. Describing algorithm design techniques with divide and conquer approach. 3. Explaining algorithm analysis including devise algorithm and validate algorithm. 4. Comparing performance analysis with space and time complexities. 5. Summarising algorithm analysis and design to solve problems.	**1)**Assignments **2)** Interactive sessions **3)** Test and Case Studies

Module	Topics	CO Linkage
Module 2	Divide and Conquer General method, Binary search, finding the maximum and minimum, merge sort, quick sort, performance measurement of quick sort, Selection, Strassen's matrix multiplication	**CO2**

Learning Outcomes	Assessment
1. Identifying general methods of algorithm. 2. Describing binary search and minimum maximum identification. 3. Explaining quick sort and is performance measurement. 4. Identifying selection sort and its comparison to quick sort. 5. Implementing Strassen's matrix multiplication to reduce multiplication complexity.	1. Assignment 2. Quiz. 3. Discussion.

Module	Topics	CO Linkage
Module 3	Greedy Algorithm General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Knapsack problem, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm).	**CO3**

Learning Outcomes	Assessment
1. Describing general method and characteristics of greedy algorithm. 2. Interpreting a problem using Knapsack method 3. Explaining algorithms using different capacity of knapsack for feasible solution. 4. Comparing Kruskal's and Prim's algithms. 5. Describing minimum spanning trees and its algorithms.	1. Interactive session 2. Quiz. 3. Program development

Module	Topics	CO Linkage
Module 4	Dynamic programming The general method, multistage graphs, all-pairs shortest path, Single source Shortest path, 0/1 Knapsack problem, Traveling Sales Person problem.	**CO4**

Learning Outcomes	Assessment
1. Designing the design dynamic programming algorithms and Principle of Optimality. 2. Identifying multistage graphs and its stages. 3. Explaining 0/1 Knapsack problem and its algorithms. 4. Describing Travelling Salesperson problem and techniques.	5. Discussion 6. Interactive session 7. Assignment

Module	Topics	CO Linkage
Module 5	Basic traversal and search techniques - BFS and traversal, DFS and traversal,	**CO5**

	Bi-connected components and DFS, Backtracking General method, 8-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.	

Learning Outcomes	**Assessment**
1. Describing breadth first search, depth first search traversal and bi-connected components. 2. Explaining general method of backtracking 3. Understanding 8 queens problem. 4. Executing sum of subset problem using fixed or variable-sized tuples. 5. Implementing graph colouring and Hamiltonian cycles for nonadjacent and used positions	1. Discussion 2. Quiz 3. Test.

Reference Books

1. Ellis Horowitz, SartajSahni, SanguthevarRajasekharan, Computer algorithms/C++,SecondEdition, Universities Press.
2. AnanyLevitin- Introduction to design and analysis of algorithms, Third Edition, Addison WesleyLow price edition.
3. Richard Neapolitan &KumarssNaimipour, Foundation of Algorithms using C++ Pseudocode,Third edition, Jones And Bartlett Publishers.

Programme : **BCA**

Course : **CA4CRT11 - System Analysis & Software Engineering**

Semester : **4**

Name of the Faculty : Jintu John

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Significance of the Course

Software Engineering (SE) comprises the core principles consistent in software construction and maintenance: fundamental software processes and life-cycles, mathematical foundations of software engineering, requirements analysis, software engineering methodologies and standard notations, principles of software architecture and re-use, software quality frameworks and validation, software development, and maintenance environments and tools. Current industry-strength programming languages, technologies and systems feature highly in the practical components, electives and projects of the course, but they are also taught with a view to understanding and applying principles underlying their more ephemeral character.

Expected Course Outcomes (ECO):

On completion of the Course, it is expected that the student will be able to:

ECO 1: Understanding the basic concepts of business and information systems.
ECO 2: Explaining software process models such as the waterfall and evolutionary models.
ECO 3: Inferring software requirements and the SRS documents and understand the role of project management
ECO 4: Explaining different design strategies and models.

ECO 5: Understanding of software testing approaches such as unit testing and integration testing.

Allocation of Sessions:

Module	1	2	3	4	5	Total
Sessions Allotted	12	14	18	14	14	72

Session Plan

Module	Topics	CO Linkage
Module 1	Information systems concepts, Business information systems; Describing the business organization – organization chart , organization function list ; information system levels - operational, lower, middle, top management; SDLC Life cycle activities- life cycle flow chart, task, management review, baseline Specifications, role of system analyst.	**CO 1**

Learning Outcomes	Assessment
1) Summarizing different information systems. **2)** Creating organization chart. **3)** Comparing different life cycle activities. **4)** Structuring baseline specifications and role of system analyst.	**1)** Assignment **2)** Test **3)** seminar

Module	Topics	CO Linkage
Module 2	Introduction to Software Engineering - Definition, Program Vs Software, and Software process, Software Characteristics, Brief introduction about product and process, Software process and product matrices. Software life cycle models , Definition, Waterfall model, Increment process	**CO2**

	models- Iterative , RAD, Evolutionary process models-Prototyping, Spiral. Selection of a life cycle model	
Learning Outcomes		**Assessment**
1) Describing program and software **2)** Summarizing different terminologies in software development. **3)** Explaining different software life cycle models.		1. Discussion. 2.Test 3.Assignment
Module	**Topics**	**CO Linkage**
Module 3	Software Requirement Analysis and Specification Requirements Engineering type of requirements, Feasibility Studies, Requirement Elicitation – Use Case, DFD, Data Dictionaries , Various steps for requirement analysis, Requirement documentation, Requirement validation, an example to illustrate the various stages in Requirement analysis. Project planning-Size estimation, cost estimation, the constructive cost model (COCOMO).	**CO3**
Learning Outcomes		**Assessment**
1) Explaining requirements and its types. **2)** Constructing use case and DFD. **3)** Analyzing size and cost estimation techniques.		1. Assignment 2. Class test 3. Seminar
Module	**Topics**	**CO Linkage**
Module 4	Software Design - Definition, Various types, Objectives and importance of Design phase, Modularity, Strategy of design, Function oriented design, IEEE recommended practice for software design descriptions. Steps to Analyze and Design Objected Oriented System. Software Reliability Definition, McCall software	**CO4**

	quality model, Capability Maturity Model.	
Learning Outcomes		**Assessment**
1. Understanding different design strategies. 2. Implementing IEEE recommended practice for software design. 3. Attributing different quality models.		1. Test 2. Assignment.
Module	**Topics**	**CO Linkage**
Module 5	Software Testing : What is testing?, Test, Test case and Test Suit, Verification and Validation, Alpha, beta and acceptance testing, functional testing, techniques to design test cases, boundary value analysis, Equivalence class testing, decision table based testing, cause effect graphing technique, Structural testing, path testing, Graph matrices, Data flow testing; Levels of testing Unit testing, integration testing, system testing, validation testing	**CO5**

Learning Outcomes	**Assessment**
1. Explaining different testing techniques 2. Summarizing levels of testing	1. Test. 2. Assignment

Reference Books

1. Marvin Gore & John Stubbe -Elements Of System Analysis, Fourth Edition, Galgotia Book Source.

2. K K Aggarwal, Yogesh Singh - Software Engineering,Third Edition, New Age International Publications.

3. Roger S Pressman - Software Engineering: A Practitioner's Approach, Sixth Edition, McGraw-Hill Higher Education.

4. Ian Sommerville - Software Engineering , Seventh Edition, Pearson Education.

5. Pankaj Jalote - An Integrated approach to Software Engineering, Second Edition, Narosa Publishing Company.

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Programme : **BCA**

Course : **CA4CRT12 - LINUX ADMINISTRATION**

Semester : **4**

Name of the Faculty : SARITHA N PILLAI

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Course Objectives:

This course provides the features of shells and basic concepts in bash shell. The shell scripts are illustrated with example programs. System administration tools are also discussed.

Expected Course Outcomes:

On completion of the Course, it is expected that the student will be able to:

ECO 1: Understand the overview of Linux.

ECO 2: Discuss the essential Linux commands.

ECO 3: Concepts of shell programming.

ECO 4: Understand various system administration tools.

ECO 5: Understand simple filter commands and various servers.

Allocation of Sessions

Module	1	2	3	4	5	Total
Sessions Allotted	12	15	15	18	12	72

Session Plan

Module	Topics	CO Linkage
Module 1	What is Linux, Linux's root in Unix, Common Linux Features, advantage of Linux, Overview of Unix and Linux architectures, Linux files system, hardware requirements for Linux, Linux standard directories. Commands for files and directories cd, ls, cp, rm, mkdir, rmdir, pwd, file, more, less, Creating and viewing files using cat, file comparisons.	ECO-1
Learning Outcomes		**Assessment**
1. Describe the different features of Linux. 2. Explain the basic file and directory commands. 3. List the various file comparison commands.		1. Test 2. Example 3. Explanation 4. Presentation
Module	**Topics**	**CO Linkage**
Module 2	Processes in Linux, process fundamentals, connecting processes with pipes, redirecting input/output, Background processing, managing multiple processes, process scheduling – (at, batch), nohup command, kill, ps, who, find, sort, touch, file, file processing commands - wc, cut, paste etc Mathematical commands - expr, factor etc. Creating and editing files with vi editor	ECO-2
Learning Outcomes		**Assessment**
1. Outline the process fundamentals. 2. Explain different file processing commands. 3. Understand the mathematical commands. 4. Exemplify the vi editor.		1. Test 2. Example 3. Explanation 4. Presentation
Module	**Topics**	**CO Linkage**
Module 3	**Shell programming** - Basics of shell programming, various types of shell available in Linux, comparisons between various shells, shell programming in bash. Conditional and looping statements, case statement, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automating system tasks	ECO-3

Learning Outcomes		**Assessment**
1. Compare various types of shells available. 2. Summarize the shell programming concepts. 3. Create shell programs for automating system tasks		1.Test 2. Example 3. Explanation 4. Presentation
Module	**Topics**	**CO Linkage**
Module 4	Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of users accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command.	ECO-4
Learning Outcomes		**Assessment**
1. Explain common administrative tasks. 2. Compare the administrative files configuration and log files 3. Understand commands for managing users and groups.		1.Test 2. Example 3. Explanation 4. Presentation
Module	Topics	**CO Linkage**
Module 5	**Simple filter commands:** pr, head, tail, cut, sort, uniq, tr Filter using regular expression grep, egrep, sed **Understanding various Servers :**DHCP, DNS, Squid, Apache, Telnet, FTP, Samba.	ECO-5
Learning Outcomes		**Assessment**
1. Summarize various simple filter commands. 2. Explain various servers.		1.Explanation 2. Example 3.Presentation 4.Test

References Books

1. Cristopher Negus - Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar - UNIX Shell Programming, First edition, BPB.
3. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
4. Graham Glass & King Ables - UNIX for programmers and users, Third Edition, Pearson Education.
5. Neil Mathew & Richard Stones - Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.

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Programme : **BCA**

Course : **CA4CRT13 -Web Programming Using PHP**

Semester : **4**

Name of the Faculty : SWAPNA JOSE

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Course Objectives:

This course provides the knowledge necessary to design and develop dynamic, database-driven web pages using PHP that powers many websites. It originally started out as a way to make dynamic websites by generating html.

Expected Course Outcomes:

On completion of the Course, it is expected that the student will be able to:

ECO 1: Design static webpages using HTML

ECO 2: Use CSS to style and layout webpages.

ECO 3: Construct web pages more dynamic and user-friendly using JavaScript

ECO 4:Experiment how server-side programming works on the web using PHP.

ECO 5: Execute *PHP* and MySQL Database operations skills.

Allocation of Sessions

Module	1	2	3	4	5	Total
Sessions Allotted	8	10	10	12	14	54

Session Plan

Module	Topics	CO Linkage
Module 1	Introduction to web, WWW architecture, Fundamentals of HTML, text formatting tags, marquee, inserting images, links, lists, creating tables, frames, working with form elements.	ECO-1
Learning Outcomes		**Assessment**
1.Describe the architecture of WWW. 2. Explain the fundamentals of HTML. 3. List the different tags and form elements		1. Test 2. Example 3. Explanation 4. Presentation
Module	**Topics**	**CO Linkage**
Module 2	CSS introduction, <link> and <style> elements, CSS properties, Controlling Fonts, Text formatting, Text- pseudo classes, Selectors, Links, Backgrounds, lists, Introduction to Java Script, Java Script variables, operators, decision control statements, looping, functions, arrays, events, popup boxes-alert, prompt, conform box, built-in objects, writing JavaScript, form validation	ECO-2 ECO-3
Learning Outcomes		**Assessment**
1. Outline the CSS elements and properties. 2. Explain different selectors. 3. Summarize the basic concepts and dynamic language features of JavaScript. 4. Execute form validation rules.		1. Test 2. Example 3. Explanation 4. Presentation
Module	**Topics**	**CO Linkage**
Module 3	Introduction to PHP, server side scripting, role of web server software, php comments, variables, echo and print, PHP operators, data types, branching statements, loops, arrays.	ECO-4
Learning Outcomes		**Assessment**

1. Compare server side and client side scripting language 2. Summarize PHP operators, data types, branching statements, loops, arrays.		1.Test 2. Example 3. Explanation 4. Presentation
Module	**Topics**	**CO Linkage**
Module 4	PHP functions, PHP form, Passing information between pages, $_GET, $_POST, $_REQUEST. String functions, include and require, session and cookie management, error handling in PHP, Object Oriented Programming using PHP .	ECO-4
Learning Outcomes		**Assessment**
1.Summarize PHP functions, forms and Passing information between pages. 2.Compare $_GET, $_POST, $_REQUEST arrays 3.Classify sessions and cookie management 4.Explain error handling techniques in PHP 5. Exemplify Object Oriented Programming using PHP.		1.Test 2. Example 3. Explanation 4. Presentation
Module	**Topics**	**CO Linkage**
Module 5	Introduction to MySQL, datatypes, SQL commands-CREATE, UPDATE, INSERT, DELETE, SELECT, PHP functions for MySQL connectivity and operation- mysql_connect, mysql_select_db,mysql_query, mysql_fetch_row, mysql_ fetch_ array, mysql_result, mysql_ list_ fields, mysql _ num_ fields, insertion,updation and deletion of data using PHP, displaying data from MySQL in webpage.	ECO-5
Learning Outcomes		**Assessment**
1. Summarize the basic MYSQL commands 2. Explain PHP functions for MYSQL connectivity 3. Construct PHP scripts capable of inserting and modifying data in a MySQL database. 4. Design web pages with the ability to retrieve and present data from a MySQL database.		1.Explanation 2. Example 3.Presentation 4.Test

References Books

1. Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi - “Beginning PHP”, Wiley Publishing, Inc

2. Ivan Bayross - “HTML, DHTML, JavaScript, Pearl & CGI ”, Fourth Revised Edition, BPB Publication.

3. Programming PHP”,Rasmus Lerdorf and Kevin Tatore, Shroff Publishers & Distributors Pvt. Ltd

4. “Beginning PHP”, Dave W Mercer, Allan Kent, Steven D Nowicki, David Mercer, Dan Squier, Wankyu Choi, Wiley Publishing, Inc.