M.O.P. VAISHNAV COLLEGE FOR WOMEN

(AUTONOMOUS)

Choice Based Credit System

Course of Study for the batch of Candidates admitted in

2016 – 2017

2015 – 2016

2014 – 2015

ACADEMIC YEAR 2016 – 2017

B. C.A

Activities / Content with direct bearing on Employability/ Entrepreneurship/ Skill Development

M.O.P.VAISHNAVCOLLEGE FOR WOMEN (AUTONOMOUS), CHENNAI-34

(Effective for the batch of Candidates admitted in 2016- 2017)

B.C.A

Choice Based Credit System
Course of Study for the batch of Candidates admitted in 2016 – 2017

M.O.P.VAISHNAVCOLLEGE FOR WOMEN (AUTONOMOUS), CHENNAI-34

(Effective for the batch of Candidates admitted in 2016- 2017)

B.C.A

CORE I - PROGRAM DESIGN WITH C
(COMMON TO B.C.A & B.Sc. COMPUTER SCIENCE)

COURSE CODE: 15UCSC302 & 15UCSC302P	**YEAR/SEMESTER : I/ I**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36 Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- To Understand the basic programming principles
- To Understand problem solving using flowcharts, algorithms
- To Recognize the basic concepts of C Program
- To Understand the principles of code design , documentation and coding standards

UNIT I

Introduction to programming

Introduction, Kinds of Flowcharts, Symbols used in flowcharts, Constants and variables, Advantages of flowchart (8 Hrs)

UNIT II

Pseudo Code and Flowchart

Pseudo Code, Flowchart – Selection, Multiple Selection, Iteration using for, while and do while, Problems on array, one dimensional. (6 Hrs)

UNIT III

Subscripted Variables

Introduction, Basic concepts of subscripted variables, one dimensional array, Tracing Logic. **Files -** Introduction to file structure, Concept of a Data File, Types of Data files, File Organizations, File Processing. (6 Hrs)

UNIT IV

Introduction to C

Constants, Variables and Data Types – Introduction, Character set, Tokens, Keywords and Identifiers, Constants, Variables, Data Types. Operators and Expressions - Types of operators, Operator precedence, Evaluation of expressions. Input and Output functions – scanf, printf.

(8 Hrs)

UNIT V

Control Structures in C

Control structures – if, if-else, nested if-else, else-if ladder, switch, Conditional operator, While, do-while, for, break, continue statements, Goto statement, Simple programs.

(8 Hrs)

TEXT BOOKS

- Raj K Jain (2002), Insight into Flowcharting. Sultan Chand Publishers, New Delhi.
- Anil Bikas Chaudhuri, The art of programming through flowcharts and algorithms. Firewall Media, New Delhi
- E .Balaguruswamy(2010) , Programming in ANSI C, fifth edition,TMH, New Delhi.

REFERENCE BOOK

- Yashwant P Kanitkar(2008), Let Us C, Infinity Science Press - Eighth Edition, New Delhi

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Problem solving activity: Students write logic for the given problem based on decision making statement, draw flowchart and submit as assignment
- Programming Assignment: Students submit programs based on control structures. This activity helps students to arrive at a solution for a problem through programming.
- Quiz / Class Test on Programming skills/ Debugging skills
- Lab Assessment: Students programming and debugging skills assessed based on lab performance

PROGRAM DESIGN WITH C – PRACTICAL

LIST OF PROGRAMS (24 Hours)

Develop Flowchart and write programs in C for the following:

I. Sequence Structures:

1. Programs to implement Formatted I/O.
2. Programs to implement Arithmetic Operators.
3. Programs to implement Assignment Statements.
4. Programs to implement Auto-increment and auto-increment operators.

II. Branching Control Structures:

5. Programs to implement simple if.
6. Programs to implement nested if.
7. Programs to implement else-if ladder.
8. Programs to implement switch-case.
9. Programs to implement logical operators.
10. Programs to implement go to statements.

III. Looping Control Structures:

11. Programs to implement unconditional looping.
12. Programs to implement for loop.
13. Programs to implement while loop.
14. Programs to implement do-while loop.

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B.C.A

CORE: II - BASICS OF DIGITAL LOGIC AND COMPUTER ARCHITECTURE

COURSE CODE: 15UCSC301 & 15UCSC301P	**YEAR/SEMESTER : I/ I**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- Analyze and design digital logic systems by understanding formal foundations and selected design techniques
- To provide students with the knowledge of basic computer system hardware building blocks, computer organization and architecture and maintenance
- Introduce the fundamental techniques on which high performance computing is based
- To develop the foundations for analyzing the benefits of design options in computer architecture.
- To have the basic knowledge of microprocessor system programming, interfacing and architecture.

UNIT I

Number system and Logic Gates

Number Systems & Codes-Base Conversion, Binary Codes, Code Conversion-1's and 2's complements. Digital Logic- Logic Gates , Truth Tables, Universal Gates. (7Hrs)

UNIT II

Techniques for Simplification of Boolean Functions

Boolean Algebra- Theorems, SOP, POS Methods – Simplification Of Boolean Functions, Using Theorems, K-Map, Prime-implicant method. Implementation Using Universal Gates. - Binary Arithmetic-Binary Addition, Subtraction, Adders, Subtractors, code conversion.

(7Hrs)

UNIT III

Combinational logic, Sequential Logic, Registers & Counters

Decoders – Multiplexers - Introduction to Flip-Flops - Registers, Shift registers, Ripple Counters. (8Hrs)

UNIT IV

Microcomputer System Design

Introduction-Microcomputer Organization-Memory Organization, Input, Interface, Direct Memory Access. (7Hrs)

UNIT V

Introduction to 8085

8085 Architecture – Pin definitions of 8085-bus organization-Signals-Instruction Set-Addressing modes. (7Hrs)

TEXT BOOKS

- M. MorisMano(2001). Digital Logic and computer Design. PHI.
- A.P.Godse , D.A. Godse(2009), Microporecessor and its Applications ,Technical Publications,Pune

REFERENCE BOOKS

- T.C. Bartee(1985). Digital Computer Fundamentals, 6th Edition, Tata McGraw Hill, New Delhi.
- V.Vijayendran(2009), Fundamentals of Microprocessor 8085 – Architecture,programming& interfacing. S.Viswanathan publishers, Chennai
- V.Vijayendran(2009), Digital Fundamentals. S.Viswanathan publishers, Chennai
- R. Gaonkar (2002) - Microprocessor and its Application, Prentice Hall,New Delhi.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Number systems and Conversions:Workbook:Students to do exercises in decimal.binary,octal,hexadecimal conversions.
- Boolean Functions and K-Map:Exercises:Students solve problems using Boolean Theorems and K-map reduction
- Sequential and Combinational Circuits:Digital Project- Students should identify a simple logic and construct models or digital circuits
- Microcomputer Architecture:Assignments on DMA
- 8085:Write programs in Assembly Level Programming

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B.C.A

DIGITAL AND MICROPROCESSORS - PRACTICAL

LIST OF PROGRAMS (24 Hours)

I. STUDY OF LOGIC GATES

1. Logic Gates using discrete components
2. Verification of truth table for AND ,OR, NOT, NAND, NOR and XOR gates
3. Realisation of NOT, AND, OR, EX-OR gates with only NAND gates
4. Realisation of NOT, AND, OR, EX-OR gates with only NOR gates

II. IMPLEMENTATION OF LOGIC CIRCUITS

5. Verification of Associative law for AND, OR gates.
6. Karnaugh's Map reduction and logic circuit implementation

III ADDER AND SUBTRACTOR

7. Verification of Demorgan's Law
8. Implementation of Half-Adder and Half- Subtractor.
9. Implementation of Full-Adder and Full- Subtractor.

IV. SIMPLE PROGRAMS USING MICRO PROCESSOR

10. Arithmetic Operations Using Different Number Systems.
11. Implementation of Control Structures.
12. Implementation of subroutines.

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B.C.A

ALLIED I - STATISTICS

COMMON TO B.Com (Accounting & Finance), B.Com (Marketing Management), B.Com (Corporate Secretaryship), B.Sc(Computer Science), B.C.A, B.B.A

COURSE CODE: 14UMAT307 & 14UMAT307P	**YEAR/SEMESTER : I/ I**	**MAXIMUM MARKS: 100**	**THEORY: 80**
			PRACTICAL: 20
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 5**	**TOTAL TEACHING HOURS: 75**	**THEORY: 55 Hrs**
			PRACTICAL: 20Hrs

COURSE OBJECTIVES:

- To develop skills in analysis & interpretation of data
- Handle challenging problems using appropriate analysis tools

UNIT I

Statistics

Introduction, Meaning, Definition, Scope and Limitations of Statistics, Collection, Classification and Tabulation of Statistical data, Diagrammatic and Graphical Presentation of Statistical data, Measures of Central Tendency – Mean, Median and Mode.

(8 Hrs)

UNIT II

Measures of Dispersion

Introduction, Significance, Range, Quartile deviation, Mean deviation, Standard deviation, Co-efficient of variation.

Correlation

Introduction**,** Significance, Types of correlation, Karl Pearson's co-efficient of correlation and Rank co-efficient of correlation, Regression Analysis.

(8 Hrs)

UNIT III

Tests of Hypothesis

Introduction, Procedure of Testing Hypothesis, Two types of Errors, One tailed and two tailed tests, Standard Error.

Large samples- Tests of significance for Single Mean, Difference of Means.

Small Samples- t test for Single Mean, Difference of Means, Paired t tests.

Non-Parametric test- Chi-Square for goodness of fit (excluding fitting of distributions) and test for association of attributes. (10 Hrs)

UNIT IV

Analysis of Time series

Introduction, Components of time series, Measurement of Trend- Graphic Method, Method of Semi-averages, Method of Moving Averages, Method of Least Squares, Measurement of seasonal variations - Method of Simple Averages (Weekly, Monthly or Quarterly) , Simple Problems. (9 Hrs)

UNIT V

Probability

Introduction, Definitions, Addition and Multiplication Theorem, Conditional probability, Baye's theorem, Simple Problems (Statement only for all the theorems).

Index Numbers

Introduction, Uses of Index Numbers, Methods of Constructing Index Numbers: Unweighted Index Numbers- Simple Aggregative Method, Weighted Index Numbers – Laspeyres, Paasche's, Bowley's and Fischer's Ideal Index numbers, Tests of Adequacy of Index number Formulae – Time and Factor Reversal Tests, Cost of living index- Aggregate Expenditure Method, Family Budget Method. (10 Hrs)

TEXT BOOK

- S.P. Gupta (2008) Statistical methods, Sultan Chand & Sons.

REFERENCE BOOKS

- P.R.Vittal (2009), Mathematical Statistics, Margham Publications.
- Murray R Spiegel, Larry J Stephen (1999) Schaum"s Outline of Theory & Problems of Statistics, Mcgraw Hill.
- Sharma (2007) ,Business Statistics , Pearson Education.
- G C .Beri (2005) Business Statistics, Tata Mcgraw Hill.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- **Test:** Class test in Measures of central Values.
- **Formula test:** in time series analysis and index numbers.
- **Assignment:** To improvise Unit wise problem solving skill.
- **Class test:** students write classtest as a reflection analysis to find the level of understanding in the concepts of correlation and regression analysis.
- **Excel as a tool:** Implemention of statistical methods using excel formulas and graphs enables students to become ethical analyst.

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B.C.A

ALLIED I - STATISTICS PRACTICAL

LIST OF PROGRAMS (20 Hours)

- **DIAGRAMMATIC REPRESENTATION**
  Column, Bar Diagram, Line, Pie and Area

- **METHODS OF CENTRAL TENDENCY**
  Mean, Median, Mode.

- **MEASURES OF DISPERSION**
  Standard deviation, Quartile deviation, Range

- **CORRELATION**
  Correlation co-efficient
  Rank Correlation (without repeated ranks)
  Regression co-efficient and Regression lines

- **TESTS OF SIGNIFICANCE**
  Small samples- t test for single mean, difference of means and paired t test.

Chi-square for independence of attributes

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B.C.A

CORE III -PROGRAMMING IN C
(COMMON TO B.C.A & B.Sc. COMPUTER SCIENCE)

COURSE CODE: 15UCSC310 & 15UCSC310P	**YEAR/SEMESTER : I/ II**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36 Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- Acquire a solid foundation in C, the multi-platform programming language
- Recognize the basic concepts of C Program
- Create and solve modular programs.

UNIT I

Arrays

Review of Fundamentals concepts of 'C' - Arrays: Declaration and processing arrays – Handling of Character arrays – Multidimensional arrays – Practical implementation (6 Hrs)

UNIT II

Functions and Structures

Functions : Definition – Prototype – Categories of functions - Passing arguments - Passing arrays to functions-Recursion. Storage Classes-Automatic , External , Static and Register Variables.Structures : Definition- initialization – Array of structures – Array within structures – Nested structures – Structures and Functions – Self –referential Structures–Unions (8 Hrs)

UNIT III

Pointers and Files

Pointers : Declaration – initialization – Pointer operations – Pointers and arrays – Pointers and Structures. File Management : Creating , Opening , Processing and Closing a file –Command line arguments. (9 Hrs)

UNIT IV

Linked Lists

Dynamic Memory Allocation – Linked lists – Basic list Operations. The Preprocessor – Macro Substitution – Compiler Control Directives – File inclusion. (8 Hrs)

UNIT V

Graphics

Simple Programs using C Graphics – Basic commands in C graphics. (5 Hrs)

TEXT BOOKS

- E .Balaguruswamy(2010) 5th Edition. Programming in ANSI C. TMH
- Yashwant Kanetkar(1998). Graphics under C. BPB Publications.

REFERENCE BOOKS

- H. Schildt(2000) – C: The Complete Reference – Fourth Edition ,TMH Edition.
- Gottfried. B.S (1996) – Programming with C – Second Edition – TMH Pub.Co.Ltd, New
- Delhi 1996
- Y.Kanetkar(1999) – Let Us C. Second Edition BPB Publications, New Delhi
- B.W.Kernighan and D.M. Ritchie(1998). The C Programming Language – Second Edition , PHI.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Shoot the Error: Students debugging skills tested using concepts on arrays
- Project: Develop simple projects using File management and pointers.
- Design a pattern : Improve coding skills.

PROGRAMMING IN C - PRACTICAL

LIST OF PROGRAMS (24 Hours)

Write programs in C for the following:

1. Programs to implement One-dimensional array.
2. Programs to implement Two-dimensional array.
3. Programs to implement Strings.
4. Programs to implement Functions
5. Programs to implement Recursive Functions.
6. Programs to implement Structures.
7. Programs to implement Unions.
8. Programs using Pointers.
9. Programs using Files.
10. Programs using Dynamic memory allocation.
11. Programs using Command-line arguments.

Graphics:

1. Write a C program to implement Boundary Fill & Flood fill algorithm.
2. Write a C program to implement Two-dimensional transformations.
3. Design a blue-print of your House in C.
4. Design a car & apply movements as per arrow keys pressed in C.
5. Design bouncing ball game in C.
6. Design an image in C & apply Zoom-in & Zoom-out effects for the image.

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B.C.A

CORE IV- DATA STRUCTURES

COURSE CODE: 14UCSC311	**YEAR/SEMESTER: I/ II**	**MAXIMUM MARKS:100**
COURSE TYPE: THEORY	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**

COURSE OBJECTIVES:

- Understand the meaning asymptotic time complexity analysis
- Understand the underlying organization of various important data structures
- Interpret and develop simple hashing functions.

UNIT I

Arrays and ordered Lists

Abstract data types – asymptotic notations – complexity analysis – Arrays –- Representation of array-operations on arrays – ordered lists – polynomials. (10 Hrs)

UNIT II

Stacks and Queues

Linked lists: Singly linked list – doubly linked lists - Circular linked list, General lists- stacks – Queues – Circular Queues – Evaluation of expressions

(12 Hrs)

UNIT III

Trees

Trees – Binary Trees – Binary Tree Traversal – Binary Tree Representations – Binary Search Trees - threaded Binary Trees - Application of trees (Sets) (12 Hrs)

UNIT IV

Graphs

Representation of Graphs – Graph implementation – graph Traversals - Minimum Cost Spanning Trees – Shortest Path Problems-Application of graphs.

(12 Hrs)

UNIT V

Sorting and Searching

Sorting – Bubble Sort, Insertion Sort, Quick Sort , Merge Sort, Selection Sort, Heap Sort

Searching – Linear search, Binary search - Hashing Techniques – Hash and Search – Tree Hashing – Chaining – Hashing Functions – Division method – Digit Analysis – Folding – Mid Square Method.

(14 Hrs)

TEXT BOOKS

- Seymour Lipshutz(2011). Schaum's Outlines - Data Structures with C – McGraw Hill.
- E.Horowitz, S.Sahani(2010). Fundamentals of Data Structures -Galgotia.

REFERENCE BOOKS

- Gregory L. Heileman – Data Structures, Algorithms and Object Oriented Programming – McGraw Aill International Editions –.
- A.V.Aho, J.D. Ullman, J.E.Hopcraft : Data Structures and Algorithms – AddisionWelsley Pub.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Seminar to analyse the performance of various algorithms using time complexity & space complexity .
- Algorithm Design: Students write logic for the given problem and submit as assignmen
- Students created mini projects on Phone directory applications using Linear Data Structures.
- Students to present demo on sorting algorithm , Linked List and Stack with Yarn and Paper Bags.
- MCQ on Graph and Tree Data Structure.
- Students to prepare assignment on hashing technique.

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B.C.A

ALLIED II - MATHEMATICS FOR COMPUTER APPLICATIONS

COURSE CODE: 14UMAT305	**YEAR/SEMESTER: I/ II**	**MAXIMUM MARKS:100**
COURSE TYPE:THEORY	**CREDITS: 5**	**TOTAL TEACHING HOURS: 75**

COURSE OBJECTIVES:

- To provide a solid foundation in functional concepts of mathematics
- To acquire logical & analytical skills for further studies & its applications to the required fields

UNIT I

Sets, Relations, Functions

Sets, Relations & Functions: Cartesian product; Relation –Equivalence relation-Partition – Partial Order relation; Functions –Inverse functions- composition of functions-Properties of functions -Set Operations and Venn diagram

(15 Hrs)

UNIT II

Permutation and combination

Permutation & combinations – Lattices – Boolean algebra -Laws of Boolean algebra

(15 Hrs)

UNIT III

Matrices

Matrices –Types of matrices –Matrices Operations – Inverse of matrix – Solution to Linear system of equations (matrix inversion & Cramer's rule)

(15 Hrs)

UNIT IV

Coding Theory

Introduction, Hamming distance, Encoding a message, Group codes, Procedure for generating group codes, Decoding and error correction.

(15 Hrs)

UNIT V

Mathematical Logic and Tautology

Mathematical Logic –Proposition – Logical operators, Truth table –Conditional & Bi-conditional Operators; Converse, Inverse & Contra-positive statements, Tautology & Contradiction, Laws of Algebra of Proposition, testing the validity of arguments.

(15 Hrs)

TEXTBOOKS

- Dr.A.Singaravelu, Dr.M.P.Jeyaraman (2011). Discrete Mathematics. Meenakshi Agency.
- P.R.Vittal(2003). Mathematical Foundations. Margham publications.
- T.Veerarajan Discrete Mathematics(2007), Tata McGraw-Hill Publishing Company, NewDelhi.

REFERENCE BOOKS

- Dr. M.K.Venkataraman ,Dr.N.Sridharan, N.Chandrasekaran(2003). Discrete Mathematics. National publishing Company.
- J.P.Tremblay, R.Manohar(1997), Discrete Mathematics structures with applications to computer science. Tata Mc Graw Hill, Revised edition.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- **Worksheet:** on sets and relations to illustrate the relativity of objects.
- **Assignment:** Decode data and find the presence of transmission errors will help students to learn encoding and decoding techniques and contribute new algorithms globally.
- **Glossary of formulas:** Remeberance of equivalence Laws in tautology.

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B.C.A

CORE V –DATABASE MANAGEMENT SYSTEMS

(COMMON TO B.C.A, B.Sc. COMPUTER SCIENCE)

COURSE CODE: 14UCSC312/14UCSC312P	**YEAR/SEMESTER : II/ III**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY 8& PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- Develop an understanding of the classic data models.
- Become familiar with the concepts of managing databases.

UNIT I

Introduction

Database Concepts - Database System Applications – Database systems versus File Systems – View of Data – Data Models – Database Languages – Database users and Administrators – Transaction Management – Database system Structure – Application Architecture. E-R Model – Basic Concepts-Constraints-keys – E-R Diagram- Reduction of E-R Schema- UML- Design of an E-R Database Schema

(8 Hrs)

UNIT II

Various relational models

Relational model - Relational Algebra- Extended Relational-Algebra Operations – Modification of the Database – Views - Tuple Relational Calculus-Domain Relational Calculus

(7 Hrs)

UNIT III

SQL

Relational Database - SQL – Basic structure – DDL – DML – DCL - Set Operations – Aggregate functions - Sub Queries – Join Relation –Views – Cursors – Triggers - PL/SQL – Procedural Constructs – Functions - Procedures – Packages - Embedded SQL – Dynamic SQL.

(7 Hrs)

UNIT IV

Integrity and normalization

Integrity & Security – Domain Constraints – Referential Integrity – Assertion-Triggers-Authorization in SQL – Relational Database Design – 1^{st},2^{nd},3^{rd},4^{th},BCNF Normal forms, Decomposition

(7 Hrs)

UNIT V

Distributed systems

Database System Architecture-Centralised and Client Server Architecture-Server System Architecture-Parallel Systems-Network types-Distributed Systems.

(7 Hrs)

TEXT BOOK

- A.Silberschatz , H.F.Korth and Sudharsan , Database System Concepts – Forth Edition-TMH International Edition

REFERENCE BOOKS

- Gerry M. Litton, Introduction to Database Management – A Practical Approach – S.Chand & Company Ltd. New Delhi.
- Fred R. McFadden, Jeffery A. Hoffer, Mary B.Prescott, Modern Database Management – Fifth Edition – Pearson Education.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Draw ER - Students submit ER diagram as assignment on any real-time databases.
- Workbook on SQL Queries – This helps them to have hands-on to extract data from different tables.
- Quiz on Database Management Systems

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B.C.A

RDBMS - PRACTICAL

LIST OF PROGRAMS

SQL

a. Data Definition Language :Data Types ,Constraints,Views
b. Data Manipulation Language :
   i. Operators : Arithmetic ,Comparison,Logical,Set
   ii. Function :Numeric,Character,Date,Group
   iii. Joins
c. DCL : Grant ,Revoke
d. Data Transaction : Commit ,Rollback

PL/SQL

a. Simple PL/SQL block with control structures
b. Cursors:Implicit/Explicit
c. Exception
d. Stored Procedure & Functions

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B.C.A

CORE VI - OPERATING SYSTEMS

COURSE CODE: 14UCSC316	YEAR/SEMESTER: II/ III	MAXIMUM MARKS:100
COURSE TYPE: THEORY	CREDITS: 4	TOTAL TEACHING HOURS: 60

COURSE OBJECTIVES:

- To have an overview of different types of operating systems
- To know the components of an operating system.
- To have a thorough knowledge of process management
- To have a thorough knowledge of storage management
- To know the concepts of I/O and file systems.

UNIT – I

Introduction

Views and Goals-Types of System- OS Structure - Components - Services - System Structure - Layered Approach - Virtual Machines - System Design and Implementation. Process Management: Process - Process Scheduling - Cooperating Process - Treads - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.

(12 Hrs)

UNIT – II

Process Synchronization

Critical-Section Problem - Synchronization Hardware - Semaphores Classical Problems of Synchronization - Critical Region - Monitors. Deadlocks: Characterization- Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

(12 Hrs)

UNIT – III

Memory Management

Address Binding - Dynamic Loading and Linking - Overlays - Logical and Physical Address Space - Contiguous Allocation - Internal & External Fragmentation. Non-Contiguous Allocation: Paging and Segmentation Schemes - Implementation - Hardware-Protection - Sharing - Fragmentation.

(12 Hrs)

UNIT – IV

Virtual Memory

Demand Paging - Page Replacement - Page Replacement Algorithms - Thrashing. File System: File Concepts - Access Methods - Directory Structures - Protection Consistency Semantics - File

System Structures - Allocation Methods - Free Space Management.

(12 Hrs)

UNIT – V

I/O System

Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming I/O Requests to Hardware Operations - Performance. Secondary Storage Structures: Protection - Goals - Domain - Access matrix - The Security Problem - Authentication - Threats - Threat Monitoring - Encryption.

(12 Hrs)

TEXT BOOK

- Silberschatz P.B.Galvin, Gange(2011) eighth edition, *Operating System Concepts*, Addison-Wesley Publishing Co.

REFERENCE BOOKS

- H.M.Deitel(2007), *An Introduction to Operating Systems,* Second edition, Addison Wesley, 1990
- A.S.Godbole(2011) third edition - *Operating systems* –TMH publishing Company Limited

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Students submit an assignment on latest trends of OS in the market. This helps to build and design new OS.
- Roleplays to implement the concept of deadlocks.
- Students to submit assignment on performance of scheduling algorithms
- Students to solve realtime deadlock problems and give solutions to its recovery

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B.C.A

CORE VII - DATA STRUCTURES

COURSE CODE: 14UCSC311	**YEAR/SEMESTER: II/ III**	**MAXIMUM MARKS:100**
COURSE TYPE: THEORY	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**

COURSE OBJECTIVES:

- Understand the meaning asymptotic time complexity analysis
- Understand the underlying organization of various important data structures
- Interpret and develop simple hashing functions.

UNIT – I

Arrays and ordered Lists

Abstract data types – asymptotic notations – complexity analysis – Arrays –- Representation of array-operations on arrays – ordered lists – polynomials.

(10 hrs)

UNIT – II

Stacks and Queues

Linked lists: Singly linked list – doubly linked lists - Circular linked list, General lists- stacks – Queues – Circular Queues – Evaluation of expressions

(12 Hrs)

UNIT – III

Trees

Trees – Binary Trees – Binary Tree Traversal – Binary Tree Representations – Binary Search Trees - threaded Binary TreeS-- Application of trees (Sets)

(12 Hrs)

UNIT – IV

Graphs

Representation of Graphs – Graph implementation – graph Traversals - Minimum Cost Spanning Trees – Shortest Path Problems- Application of graphs.

(12 Hrs)

UNIT – V

Sorting and Searching

Sorting – Bubble Sort, Insertion Sort, Quick Sort , Merge Sort, Selection Sort, Heap Sort

Searching – Linear search, Binary search - Hashing Techniques – Hash and Search – Tree Hashing – Chaining – Hashing Functions – Division method – Digit Analysis – Folding – Mid Square Method.

(14 Hrs)

TEXT BOOKS

- Seymour Lipshutz(2011). *Schaum's Outlines - Data Structures with C* – McGraw Hill.
- E.Horowitz, S.Sahani(2010). *Fundamentals of Data Structures* - Galgotia.

REFERENCE BOOKS

- Gregory L. Heileman – *Data Structures, Algorithms and Object Oriented Programming* – McGraw Aill International Editions –.
- A.V.Aho, J.D. Ullman, J.E.Hopcraft : *Data Structures and Algorithms* – Addision Welsley Pub.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Seminar to analyse the performance of various algorithms using time complexity & space complexity .
- Algorithm Design: Students write logic for the given problem and submit as assignmen
- Students created mini projects on Phone directory applications using Linear Data Structures.
- Students to present demo on sorting algorithm , Linked List and Stack with Yarn and Paper Bags.
- MCQ on Graph and Tree Data Structure.
- Studens to prepare assignment on hashing technique.

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(Effective for the batch of Candidates admitted in 2015- 2016)

B.C.A

ALLIED III - FUNDAMENTALS OF FINANCIAL ACCOUNTING

COURSE CODE: 14UCOM327 & 14UCOM327P	**YEAR/SEMESTER : II/ III**	**MAXIMUM MARKS: 100**	**THEORY: 80**
			PRACTICAL: 20
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 5**	**TOTAL TEACHING HOURS: 75**	**THEORY: 55Hrs**
			PRACTICAL: 20 Hrs

COURSE OBJECTIVES:

- To facilitate the understanding of Accounting in general
- To give a comprehensive understanding of the system of Financial Accounting
- To understand the intermediate concepts for assets liabilities and stockholder's equity
- To develop skill, related to problem solving and critical thinking

UNIT – I

Meaning and scope of Accounting, Basic Accounting concepts and conventions – Objectives of Accounting Transactions – Double Entry Book Keeping - Journal, Ledger, Preparation of Trial Balance.

(9 Hrs)

UNIT – II

Preparation of Final Accounts of a sole trading Concern – Adjustments – Closing Stock, Outstanding and Prepaid items, Depreciation, Provision of Bad debts, Provision for discount on debtors, Interest on capital and drawings. (Simple Problems)

(9 Hrs)

UNIT – III

Classification of errors- Rectification of Errors– Preparation of suspense Account. Bank Reconciliation Statement (Only simple Problems)

(9 Hrs)

UNIT – IV

Depreciation- Meaning, Causes, Types-Straight Line Method- Written Down Value Method (Change in method excluded)

(9 Hrs)

UNIT – V

Company Accounts- Issue of shares and debentures for cash and consideration other than cash at par, premium and discount–forfeiture and re-issue. Preparation of company final accounts and balance sheet T-20 P-80 (9 Hrs)

TEXT BOOKS

- Advanced Accounting – R.L.Gupta & V.K.Gupta
- Financial Accounting – T.S.Reddy & A.Murthy

REFERENCE BOOKS

- Advanced Accounting – Shukla & Grewal
- Financial Accounting – Jain & Narang
- Financial Accounting – P.C. Tulsian
- Corporate Accounting – R.L.Gupta & V.K.Gupta
- Corporate Accounting – T.S.Reddy & A.Murthy

ACTIVITY PLANNER:

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

1. Mystery Box: Pick a chit to find out the transaction given and pass the Journal Entry for the same.
2. Presentation on the types of Subsidiary books
3. Preparation of Financial Statements of a sole proprietorship
4. Group Discussion - Reason out the need for Reconciliation statement
5. Rapid fire quiz on the topic Depreciation
6. Discuss the reason for depreciation on a given product
7. Prepare a prospectus for an Imaginary Company
8. Mock-stock activity.
9. ThinkPairShare on fundamentals of preparing final accounts

ACCOUNTING SOFTWARE I - PRACTICAL

UNIT I
Computerized Accounting
Installing Tally-Features & Procedure for Installing Tally-Changing default settings
Introduction to Tally-Opening screen of tally-Creating company-Selecting company-shutting a company-altering company- configuration company

UNIT II
Inventory Information
Creation of stock group (Displaying, altering and deleting groups)-Stock items (Displaying, altering and deleting item)-Units of measure

UNIT III
Accounting Information
Ledger-single and multiple ledgers (Displaying, altering and deleting ledger)

UNIT IV
Vouchers
Vouchers in tally-Contra Vouchers-Purchases Vouchers-Sales vouchers-Payments-Receipt Voucher-Journal Voucher

UNIT V
Display Menu
Display Menu- Trial Balance, Profit & Loss account and Balance Sheet

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B.C.A

ELECTIVE I – HYPERTEXT PREPROCESSOR AND MYSQL

(COMMON TO B.C.A. & B.Sc. COMPUTER SCIENCE)

COURSE CODE: 15UCSC303	**YEAR/SEMESTER: II/ III**	**MAXIMUM MARKS:100**
COURSE TYPE: PRACTICAL	**CREDITS: 5**	**TOTAL TEACHING HOURS: 75**

COURSE OBJECTIVES:

- Understand the basics of using PHP.
- Use it to build dynamic web pages.
- Determine how simple database queries can be constructed using MySQL and PHP.
- Implement the basics of MySQL database tables by adding, changing and deleting data using PHP and HTML forms.

Hypertext processor (PHP)

- Introduction to HTML
- Control structures.
- operators
- Built in functions-String, Math, Array functions
- Functions
- Create forms using Get and Post Method
- Graphics
- Php and Mysql Connectivity

MySQL

- Creating a database
- Creating a table
- Inserting records in a table
- Altering the table structure.
- Deleting data from table
- Updating data from table.
- Select command
- Where clause
- Aggregate functions
- Numeric functions (Absolute, ceiling, floor, modulo, round off, square, Square Root, power)
- Constraints

- Group By, Having
- Operators (and, or, not between, In , not in, is null, is not null, like, Order By)
- String Functions (Lower, Upper, Replace, left-trim, right-trim, substring, Length, rename)
- Drop (table, database)
- Truncate
- Sub Queries , Alias

TEXT BOOKS

- Christopher Johnes & Allison Holloway – Underground PHP – Oracle Press – 2007
- Gaborhojtsy – PHP Manual – PHP Documentation Group
- Learning MySQL – Seyed M.M. Tahaghoghi, Hugh Williams – O'Reilly Media Inc., 2007.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- **Test: Check the familiarity of using tags and debugging skills**
- **Form Design: Create interactive forms using PHP / MySQL.**
- **Project - Web site development: Dynamic web site development with PHP and MySQL**
- **Query Analyzer: SQL querying skilss tested.**

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B.C.A

CORE VIII - SOFTWARE ENGINEERING WITH UML

COURSE CODE: 14UCSC323 & 14UCSC323P	**YEAR/SEMESTER : II/ IV**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

After studying this course, the students should be able to

- Acquire knowledge about software engineering, its tools and techniques and how these are used to engage the unique challenges of this still emerging discipline and profession.
- Grasp the principles of Software Engineering and its application to software development.
- Analyze Software Engineering problems in terms of basic Software Engineering principles and practices and effect solutions based on these approaches.

UNIT I

Introduction – Software Crisis – Software Myths - What is Software Engineering? – Terminologies – Role of management in Software Development.

(7 Hrs)

UNIT II

Software Life Cycle Models- Software Requirement Analysis and Specifications – SRS template.

(7 Hrs)

UNIT III

Software Project Planning- Software Design- Design Template

(7 Hrs)

UNIT IV

SOFTWARE METRICS-SOFTWARE RELIABILITY- RELIABILITY MODEL

(7 HRS)

UNIT V

SOFTWARE TESTING-SOFTWARE MAINTENANCE

(8 HRS)

TEXT BOOK

- K.K. Aggarwal & Yogesh Singh – Software Engineering – Programs - Documentation – Operating procedures – New Age International Publishers - Revised 3rd Edition – 2008.

REFERENCE BOOKS

- Roger S Pressman – Software Engineering – A practitioner Approach – McGraw Hill 6th Edition.
- Ian Sommerville – Software Engineering – Addison Wesley

ACTIVITY PLANNER

(These activities are only indicative, the Faculty member can innovate)

- Report on Software crisis
- Role play : Elicitation techniques
- Research paper publication on topics related to software planning
- Metrics Evaluation for a code.
- Project : Students identify a project on their and they apply software testing concepts.
- Assignment on UML diagrams

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B.C.A

UNIFIED MODELLING LANGUAGE – PRACTICAL

LIST OF PROGRAMS

1. Application using Use cases
2. Application using Sequence diagram
3. Application using Collaboration diagram
4. Application using Class Diagram
5. Application using Components
6. Application using State Transition Diagram
7. Application using Deployment view

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B.C.A

CORE IX - RESOURCE MANAGEMENT TECHNIQUES

(COMMON TO B.C.A, B.Sc. COMPUTER SCIENCE)

COURSE CODE: 14UMAT329	**YEAR/SEMESTER: II/ IV**	**MAXIMUM MARKS:100**
COURSE TYPE: THEORY	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**

COURSE OBJECTIVES:

- Understand the major capabilities and limitations of deterministic operations research modeling as applied to problems in industry or government
- Be able to recognize, formulate and, using prepared computer packages, solve allocation models of static or dynamic type.

UNIT – I

Basics of operations research:

Characteristics of OR- OR and Decision Making- Application areas of Operations Research- Linear programming- formulations and Graphical solution canonical and standard terms of Linear programming problem- Algebraic solution – simplex method – Charne's method of penalties- Concept of duality- properties of duality.

(14 Hrs)

UNIT – II

Transportation model:

Definition- formulation and solution of transportation models- NWCR, LCM and Vogel's approximation method- Assignment model: Definition of Assignment model- formulation- Hungarian method

(12 Hrs)

UNIT – III

Sequencing problems:

Processing each of n jobs through m machines- processing n jobs through 2 machines- processing n jobs through 3 machines- processing n jobs through m machines- processing 2 jobs through m machines (Graphical method)- traveling salesman problem.

(10 Hrs)

UNIT – IV

Game theory and Simulation

Characteristics of games- Maximin, Minimax criteria of optimality- Dominance property- algebraic and graphical method of solution of solving 2x2 games. Simulation: Definition-

Limitation- Various methods of obtaining random numbers (additive, multiplicative and mixed types of congruence random number generators).

(12 Hrs)

UNIT – V

Networks:

Fulkersons's rule- PERT computation and CPM computation.

(12 Hrs)

TEXT BOOKS

- Prem Kumar Gupta and D.S. Hira –Operations Research –S. Chand and Comp Ltd. – Third Edition
- Dr. P.R. Vittal - Introduction to Operations Research – Margham Publications

REFERENCE BOOKS

- Sundaresan Ganapathy - Resource Management Techniques –AR Publications
- Hamdy A Taha – Operations Research – Prentice Hall of India- Sixth Edition

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Students submit assignments about Operations Research and its applications.
- Testing the problem solving skill: Students write weekly test to solve problems
- Students solve problem using simulation method

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B.C.A

CORE X - OBJECT ORIENTED PROGRAMMING USING C++

COURSE CODE: 14UCSC314 & 14UCSC314P	**YEAR/SEMESTER : II/ IV**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- Acquire the knowledge in object oriented programming
- To recognize the components of C++ programming
- Create and solve modular programs

UNIT – I

Introduction to OOPs

Principles of Object Oriented Programming (OOP) – Software Evaluation – OOPs Paradigm – Basic Concepts of OOPs – Benefits Of OOPs – Applications of OOPs.

(5 hrs)

UNIT – II

Introduction to C++

Tokens – keywords – identifiers – variables – operators – manipulators – expressions and control structures. Pointers – function prototyping, parameter passing in functions – values return by functions – inline functions – friend and virtual functions.

(10 hrs)

UNIT – III

Class & Objects

Classes and Objects – Constructors And Destructors – Operator Overloading – Type Conversions – Types Of Constructors – Function Overloading.

(7 Hrs)

UNIT – IV

Inheritance

Types of Inheritance – Virtual Functions and Polymorphism – Constructors in Inheritance – Mapping Console I/O Operations.

(7 Hrs)

UNIT – V

Files

File Streams – File Operations –File Pointer- Error Handling During File Operations - Command Line Arguments.

(7 Hrs)

TEXT BOOK

- E. Balagurusamy(2008), *Object Oriented Programming with C++*, Tata McGrawHill Publishing Company Ltd.

REFERENCE BOOKS

- Schildt(2003), *C++: The Complete reference*, TMH 4th Edition.
- Robert Lafore(2009), Object Oriented Programming in Microsoft C++, Galgotia publication 4th Edition.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Debugger- Students able to correct syntax errors in the logic given.
- BuildClass - Students able to apply OOP concepts on real world applications and design classes
- Lecture Manual - Students submit an assignment on important concepts

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B.C.A

OBJECT ORIENTED PROGRAMMING USING C++ - PRACTICAL

LIST OF PROGRAMS

1. Write programs in C++ for the following
2. Implement stack using arrays
3. Program using friend functions
4. Program using function overloading
5. Implement Overloading of unary operator
6. Implement Overloading of binary operator
7. Implement Single Level Inheritance
8. Implement Multilevel Inheritance
9. Implement Multiple Inheritance
10. Marksheet processing using files
11. Implement stack using templates
12. Program to implement exception handling

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B.C.A

ALLIED IV - FUNDAMENTALS OF COST AND MANAGEMENT ACCOUNTING

COURSE CODE: 14UCOM342 & 14UCOM342P	**YEAR/SEMESTER : II/ IV**	**MAXIMUM MARKS: 100**	**THEORY: 80**
			PRACTICAL: 20
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 5**	**TOTAL TEACHING HOURS: 75**	**THEORY: 55 Hrs**
			PRACTICAL: 20 Hrs

COURSE OBJECTIVES:

- To facilitate the understanding of Accounting in general
- To give a comprehensive understanding of the system of cost and management Accounting
- To develop skill, related to problem solving and critical thinking

UNIT – I

Cost Accounting –Definition –Meaning and Objectives –Distiinction between Cost and Financial Accounting –Elements of Cost and Preparing of Cost Sheet and Tender-Management Accounting –Definition and objectives –Distinction between Management and financial Accounting.

(9Hrs)

UNIT – II

Fund flow and Cash Flow analysis-Schedule of changes in working capital-Preparation of Fund Flow and cash flow statements. Importance of Fund Flow and Cash Flow statements. Difference between Fund Flow and Cash Flow.

(9Hrs)

UNIT – III

Ratio Analysis-Utility and Limitations of Accounting Ratios-Calculation of Accounting Ratios. Ratio Analysis for liquidity, solvency, profitability and leverage.

(9Hrs)

UNIT – IV

Marginal costing: Break-even analysis- P/V Ratio-Margin of safety- Applicsation of Marginal costing. Decision Making Problems.

(9Hrs)

UNIT – V

Budget and Budgetary Control. Preparation of Different budgets. Cash andFlexible budget.T-20 P-80

(9Hrs)

TEXT BOOK

- S.N.Maheshwari - Cost and Management Accounting.

REFERENCE BOOKS

- T.S.Reddy & HariPrasad Reddy - Cost and Management Accounting.
- Jain & Narang - Cost and Management Accounting.

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B.C.A

ACCOUNTING SOFTWARE II - PRACTICAL

STOCK GROUPS:

Creating Single stock groups-Multiple stock groups-creating, Displaying, Altering Multiple stock groups.

STOCK CATEGORIES:

Single, creating, Displaying, altering and deleting Stock category-Multiple-Creating, Displaying and altering multiple stock categories.

STOCK ITEMS:

Single- creating stock item Multiple- creating godowns- Displaying and altering multiple stock items.

GODOWNS:

Single- Creating and displaying godowns – altering multiple godowns

REPORTS:

Balance sheet-Ratio Analysis-inventory books- Statement of inventory cash/funds flow-summary details.

ACTIVITY PLANNER:

(These activities are only indicative, the Faculty member can innovate)

1. Assume a product of your choice to calculate the cost per unit
2. Debate on costing of existing product using principles of costing
3. Think Pair Share - Analyse the inflow and outflow of cash of a company
4. Mystery Box: Pick a chit to find out the transaction given and analyse its impact on working capital
5. Divide as groups and make decisions for a company by analysing their financial ratios
6. Assignment on different ratios which improves problem solving skills
7. Case Study analysis - Find out maximum contribution at a particular level of activity which gives maximum profit
8. Prepare a budget for an occasion.
9. Group Presentation on the inputs after analysing a given company's budgetary decisions.
10. Presentation - Student's suggestions on methods to control/reduce cost for the product given

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B.C.A

ELECTIVE II -INTERDISCIPLINARY ELECTIVE
WEB DESIGN USING OPEN SOURCE TECHNOLOGY

COURSE CODE: 11UELE302R	YEAR/SEMESTER: II/IV	MAXIMUM MARKS: 100
COURSE TYPE: PRACTICAL	CREDITS: 5	TOTAL TEACHING HOURS: 75

COURSE OBJECTIVES:

- To create and design websites using GUI based Open Source Software, an alternate open source tool for Macromedia Dreamweaver.

UNIT – I

Open Source Technology-Introduction –Difference between GUI based Open Source Software and HTML Editors -Creating Web Pages Using GUI based Open Source Software - Formatting Paragraphs, Headings, And Lists

UNIT– II

Adding images to your web page-Working with table of contents on your web page-working with templates-updating or removing table of contents-Working with templates-Setting page properties-meta tags-colors and background

UNIT – III

Adding tables to your web page-inserting table- changing a tables's properties-Adding deleting rows, columns and cells-Changing the default table editing behaviour-selecting table elements-Moving, copying and deleting tables-converting text into a table

UNIT – IV

Creating Links-Creating links within same page-Creating links to other pages-Adding XFN information within your links-using images as links-removing or discontinuing links-Publishing your web pages

UNIT – V

Casading Stylesheets-Using inline styles-internal stylesheet- external stylesheet-Creating Stylesheet with Firefox-Creating rules for stylesheet

LIST OF PROGRAMS

1. Create a webpage to show the usage of various formatting tags.
2. Create a webpage to display the usage of Nested Ordered / Unordered List. Use
3. Create a webpage to illustrate the usage of images and hyperlinks.

4. Create a webpage to show the navigation within a page.
5. Create a time table using row and column span.
6. Create a webpage to illustrate frame targeting.
7. Create a webpage to illustrate nested frames.
8. Create a webpage to show the usage of inline frames.
9. Create a webpage to demonstrate horizontal and vertical frame.
10. Create a webpage to show the image as hyperlink.
11. Create an Employee form to accept employee personal details (Use all form elements)
12. Create a table with the cells having
    - Image
    - Formatted text
    - List
    - Hyperlink
13. Create a webpage to demonstrate the usage of Internal/inline styles
14. Create a webpage to demonstrate the usage of External style sheet

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- **Strive to Thrive**-Students are provided with hardcopies of brochures and newspaper contents which will design using html code.
- **IDE Seeker:** Student to find opensource tools available to create websites and to develop the website using the same
- **Clear the odd:** students are divided into groups and one group creat a webpage with minor mistakes and the other group should correct it,

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B.C.A

Choice Based Credit System
Course of Study for the batch of Candidates admitted in 2014 – 2015

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(Effective for the batch of Candidates admitted in 2014- 2015)

B.C.A

CORE XI – PROGRAMMING IN JAVA
(COMMON TO B.C.A. & B.Sc. COMPUTER SCIENCE)

COURSE CODE: 14UCSC330 & 14UCSC330P	**YEAR/SEMESTER : III/ V**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- To understand the concepts of Object Oriented Programming
- To become proficient programmers through the java programming language
- To learn the various classes and methods in Java.

UNIT – I

Introduction

Introduction to Java-Features of Java-Object Oriented Concepts-Lexical Issues-Data Types – Variables – Arrays – Operators - Control Statements – Classes – Objects – Constructors - Overloading method - Access control - static and fixed methods - Inner classes -Inheritance-Overriding methods-Using super-Abstract class.

(The Complete Reference Java 2 – Chapter 1,2,3,4,5,6,7,8)

UNIT – II

Packages & Threads

Packages-Access Protection-Importing Packages-Interfaces-Exception Handling-Throw and Throws-Thread-Synchronization-Messaging-Runnable Interface-Inter thread communication-Deadlock-suspending, resuming and stopping threads-Multithreading.

(The Complete Reference Java 2 – Chapter 9,10,11)

UNIT – III

I/O Stream & Files

I/O Streams-File Streams-String Objects-String Buffer-Char Array-Java Utilities-Collections interface-Collection classes-Enumeration –Vector -Stack –Hashtables - String class

(The Complete Reference Java 2 – Chapter 12(pg.no 313-331),ch: 13, ch:15 (pg.no 439-457, 484-497))

UNIT – IV

Working with windows

Working with windows using AWT Classes - Class Hierarchy of Window and Panel - AWT controls - Layout Managers – Menus- Menu Bars - Dialog Boxes- File Dialog-Applets-Life cycle of Applet-Types of Applets-Event handling- -Applet tags

(The Complete Reference Java 2 – Chapter 19, 20, 21(pg. no 687-712), ch: 22(pg. no. 735-790)

UNIT – V

JDBC Objects

The concept of JDBC- JDBC driver types- JDBC Packages- Overveiw of JDBC process- Database Connection-Statement Objects-Resultset –Java Servlets: Java servlets and CGI programming – A simple java servlet- Anatomy of java servlet- Reading data from a client –Reading HTTP request and response header. (The Complete Reference J2EE – chapter 6, 10pg.no(347-364)

TEXT BOOKS

- P.Naughton and H.Schildt –Java 2 (The Complete Reference) –fifth Edition [Chapters 1-11, Ch 12(Pg.no. 313-331), Ch: 13, ch: 15 (Pg.no 439-457, 484-497) , Chapter 18(Pg.no 573 -587,608-611) , Chapter 19, 20, 21(Pg. no 687-712), Ch: 22(Pg. no. 735-790)]
- Jim Keogh – The Complete Reference J2EE – Tata McGraw Hill Edition 2002.

REFERENCE BOOKS

- Cay S. Horstmann, Gary Cornell – Core Java 2 Volume I –Fundamentals-Addision Wesley
- K.Arnold and J.Gosling –The Java Programming Language-Second Edition

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- **Project :** Build Real time java applications using GUI.
- Students to prepare unit wise lab Manual. This helps them to have good knowledge on programming concepts.
- Program Design: Students write logic for the given problem and submit as assignment
- Programming Test on AWT classes.
- Students are to debug simple programs to understand java syntax.
- Students solved exercise questions from basic to complex exercise for each unit.
- Roleplays to implement the concept of JDBC.

- Team based Project: Projects based on Applets were implemented for real time applications

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B.C.A

PROGRAMMING IN JAVA - PRACTICAL

LIST OF PROGRAMS (24 HOURS)

APPLICATION

1. Program to illustrate i) constructors ii) inheritance iii) overloading and overriding
2. Implementation of Packages, interfaces, Exception handling
3. Implementation of concurrent and synchronized threads.
4. Implementation of string and string buffer classes and methods.
5. Implementation of stack and vector.
6. Implementation of file read and writes operation.

APPLET PROGRAMS

7. Working with Frames and various controls
8. Working with Dialogs and Menus
9. Working Panel and Layout
10. Incorporating Graphics
11. Working with applets
12. Working with Images

Database Connectivity:

13. Application using jdbc connectivity

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B.C.A

CORE XII - WEB TECHNOLOGY

(COMMON TO B.C.A. & B.Sc. COMPUTER SCIENCE)

COURSE CODE: 14UCSC332 & 14UCSC332P	**YEAR/SEMESTER : III/ V**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- Understand the use of stylesheets in HTML.
- Use JavaScript in the HTML document.
- Understand the server based concepts and scripting with ASP.NET.
- Program for the web.

UNIT I

Internet basic

Introduction to HTML – List – Creating Table – Linking document – Frames – Forms and Form Controls – Graphics to HTML Doc – Style sheet basic – Adding style to document – Creating Style sheet rules – Style sheet rules – Style sheet properties – Font – Text – List – Color and background color – Box and Display properties.

(7 Hrs)

UNIT II

Introduction to javascript

Advantage of JavaScript – JavaScript syntax – Datatype – Variable – Array – Operator and Expression – Looping Constructor – Function.

(7 Hrs)

UNIT III

Javascript document object model

Introduction – Object in HTML – Event Handling – Window object – Document Object – Browser Object – Form Object.

(7 Hrs)

UNIT IV

ASP.Net

ASP.Net Language Structure – Page Structure – Page event, properties and Compiler Directives. HTML Server Controls – Anchor, Tables, Forms. Basic Web Server Controls – Labels, Textbox, Button, Image, Links, Check & Radio button lists, Drop down list, Data Repeater. (8 Hrs)

UNIT V

Controls in asp.net

Validator Controls - Datagrid control – Working with data – OLEDBConnection class, command class, transaction class, data adapter class, and data set class – Cookies – Application Issues – Error Handling.

(7 Hrs)

TEXT BOOKS:

- T.A.Powell, Complete Reference HTML, TMH
- J. Jaworski, Mastering Javascript, BPB Publications, 1999
- Greg Buczek–ASP.NET Developers Guide– Tata McGraw–Hill Edition

REFERENCE BOOKS :

- Hersh Bhasin–Microsoft ASP.NET Professional Projects, Prentice Hall of India Pvt .Ltd.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Assignment on Web page creation: Students to identify any website and write an assignment on various tags and CSS used in the website
- Javascript assignment on DOM
- Spot Assessment : Students will be asked to create a web form using HTML server controls, web server controls & Rich controls for the given sample website.
- Writing asp page with validations and exception handling
- Project: Create dynamic and interactive web pages using the OLEDB connection.

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B.C.A

WEB TECHNOLOGY - PRACTICAL

LIST OF PROGRAMS (24 Hours)

1. Create a home page for your college. Make use of images and hyperlinks.
2. Create a web page to display your bio data. Make use of tables (with rowspan and colspan) wherever necessary.
3. Create a web page to categorize the subjects you learnt in your UG semester wise with the help of bullets and numbering.
4. Create a web page to display your personal diary which contains yours friends names, address and e-mail id. (with the link to the email address). Display the heading as PERSONAL DIARY. Make use of horizontal rulers.
5. Write a script to create an array of list of courses offered in your college and display them.
6. Write a function in Javascript that takes a string and display the number of vowels and consonants in that string.
7. Create a simple calculator using form fields.
8. Create a home page that has links to two different files that has details about your personal information and academic information. The user should not click the link to move to the pages. The page should be loaded on mouse over itself.
9. Create a home page that displays an advertisement html file in a new window without address bar, tool bar and status bar. This window should unload after 30 seconds.
10. Display an mobile advertisement at the bottom of the web form which contains purchase details
11. Create an array containing the titles of five new movies. Use this array as a data source for a drop down list and display the selected movie title to the user when the user clicks submit button.
12. Create a Web form using ASP.NET Controls for student information system.
13. Create a web form that accepts input using the calendar control.
14. Create a web form that makes use of the validation controls.
15. Create an Online Library Transaction Web form using ASP.NET Controls.

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B.C.A

CORE XIII - DATA MINING

(COMMON TO B.C.A, B.Sc. COMPUTER SCIENCE)

COURSE CODE: 14UCSC326	**YEAR/SEMESTER: III/ V**	**MAXIMUM MARKS:100**
COURSE TYPE: THEORY	**CREDITS: 4**	**TOTAL TEACHING HOURS:60**

COURSE OBJECTIVES:

- To understand the concept of Data Mining
- To understand various Data mining tasks & techniques
- To discuss the applications of Data mining in various fields

UNIT I

Data Mining

Introduction: What is Data Mining ? –Motivating Challenges – Origins of Data Mining – Data Warehousing - Data Mining tasks.(Jiawei Han, Micheline Kamber (2011),*Data Mining Concepts and Techniques* ,Morgan Kauffman Publishers).

DATA: TYPES OF DATA – DATA QUALITY – DATA PREPROCESSING .(PANG NING TAN,MICHAEL STEINBACH ,VIPIN KUMAR (2005), INTRODUCTION TO DATA MINING, ADDISON WESLEY)

(10 HRS)

UNIT II

Classification

Introduction – Decision Tree construction algorithms – ID3 – CART– Pruning – Bayesian classification – Rule based classification – K-Nearest Neighbor classification. .(Jiawei Han, Micheline Kamber (2011),*Data Mining Concepts and Techniques* ,Morgan Kauffman Publishers)

(15 Hrs)

UNIT III

Association Rule Mining

Introduction – Automatic discovery of Association Rules in Transaction databases – Apriori algorithm – Shortcomings – FP Growth algorithm (K.P.Soman, Shyam Diwakar, V.Ajay(2006) *Insight into Data Mining: Theory & Practice* Prentice Hall of India)

(15 Hrs)

UNIT IV

Cluster Analysis

Introduction – Partitional Clusterings – K- Means - k-Medoids – Modern Clustering Methods – BIRCH– DBSCAN – CHAMELEON.(K.P.Soman, Shyam Diwakar, V.Ajay(2006) *Insight into Data Mining: Theory & Practice* Prentice Hall of India)

(15Hrs)

UNIT V

Applications of Mining

Text Mining, Web Mining, Spatial Data Mining, Multimedia Mining. Applications of Data Mining in Banking industry & Healthcare *(Data Mining* (2004), BPB publications, BPB Editorial Board) (10 Hrs)

TEXT BOOKS

- Jiawei Han, Micheline Kamber (2011),*Data Mining Concepts and Techniques* ,Morgan Kauffman Publishers
- Pang Ning Tan,Michael Steinbach ,Vipin Kumar (2005), *Introduction to Data Mining,* Addison Wesley
- K.P.Soman, Shyam Diwakar, V.Ajay(2006) *Insight into Data Mining: Theory & Practice* Prentice Hall of India
- *Data Mining* (2004) , BPB publications ,BPB Editorial Board

REFERENCE BOOK

- Ian H.Witten & Eibe Frank(2011) *Data Mining , Practical Machine Learning Tools and Techniques,* Morgan Kaufmann series

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Data Preprocessing: Students should collect data on any topic and preprocess data for analysis
- Apply Data mining tool: Use any of the data mining tool to perform classification / Clustering algorithm for any given data set
- Assignment: Build association rule for transaction database
- Research paper writing and publication
- Peer Teaching: Types of Mining

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B.C.A

CORE XIV – CLOUD COMPUTING

(COMMON TO B.C.A & B.Sc. COMPUTER SCIENCE)

COURSE CODE: 14UCSC325	**YEAR/SEMESTER: III/ V**	**MAXIMUM MARKS:100**
COURSE TYPE:THEORY	**CREDITS: 4**	**TOTAL TEACHING HOURS:60**

COURSE OBJECTIVES:

- Learn basic concepts of Mobile Computing.
- An overview of Cloud computing.

UNIT – I

Introduction to Cloud Computing

Cloud Computing – Definition – SPI Framework – Software Model – Cloud Services Delivery Model – Deployment Models – Key drivers – Impact on Users – Governance in the cloud – Barriers to Cloud Computing Adoption in the enterprise. Examples of Cloud Service Providers: Amazon Web services – Google – Microsoft Azure Services Platform – Sun Open Cloud Platform.

(10 Hrs)

UNIT – II

Virtual Machines Provisioning and Migration Services

Introduction and Inspiration -Background and Related Work-Virtual Machines Provisioning and Manageability-Virtual Machine Migration Services-VM Provisioning and Migration in Action -Provisioning in the Cloud Context -Future Research Directions- The Anatomy of Cloud Infrastructures -Distributed Management of Virtual Infrastructures- Scheduling Techniques for Advance Reservation of Capacity- Capacity Management to meet SLA Commitments.

(10 Hrs)

UNIT – III

Map Reduce Programming & Infrastructure Security

Introduction – Map Reduce Programming Model - Major Map Reduce Implementations for the Cloud- Map Reduce Impacts and Research Directions. Infrastructure Security: The Network Level -Infrastructure Security: The Host Level -Infrastructure Security: The Application Level.

(10 Hrs)

UNIT –IV

Data Security, Identity and Access Management

Data security and storage: Aspects of Data Security -Data Security Mitigation -Provider Data and Its Security. **Identity And Access Management**:Trust Boundaries and IAM - Why IAM? -IAM Challenges-IAM Definitions-IAM Architecture and Practice-Getting Ready for the Cloud -Relevant IAM Standards and Protocols for Cloud Services -IAM Practices in the Cloud-Cloud Authorization Management-Cloud Service Provider IAM Practice. (10 Hrs)

UNIT – V

Security and privacy

Security Management: Standards – Security Management in the Cloud – Availability Management – Access Control. Privacy: What is Privacy – Data Life Cycle – Key Privacy Concerns – Who is responsible for protecting Privacy – Privacy Risk Management – Legal and Regulatory Implications. (10 Hrs)

TEXT BOOKS

- Tim Mather – Subra Kumaraswamy – Shahed Latif (2010*). Cloud Security and Privacy* — OREILLY
- Rajkumar Buyya, James Broberg, Andrzej Goscinski(2011),*CLOUD COMPUTING Principles and Paradigms*, John Wiley & Sons, Inc., Hoboken, New Jersey

REFERENCE BOOK

- Ronald L. Krutz and Russell Dean Vines(2010)- *Cloud Security* — Wiley – India

ACTIVITY PLANNER

(These activities are only indicative, the Faculty member can innovate)

- **Web Assignment:** Students search for various services provided by google and Amazon and submit the report.
- **Case study:** about Security in Social media.
- Presentation: Students narrate the service provisioning and managing techniques in classroom
- Act and Learn: Students divide into groups and demonstrate the working of mapper and reducer functions.
- **Class test:** Surprise test to test the level of understanding.

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B.C.A

CORE – XV XML AND ITS APPLICATIONS

COURSE CODE: 14UCSC340 & 14UCSC340P	**YEAR/SEMESTER : III/ VI**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- Understands Opportunities, Technical Platforms & Technical limitations of today's E-commerce
- Understand Secure e-payments
- Apply E-commerce in real-world
- Develop robust, XML applications
- Learn XML Web services technology

UNIT – I

Introduction to XML

What is XML – XML versus HTML –XML Terminology - XML Standards – XML Schemas – XML Syntaxes : XML Syntax checking – The idea of Markup – XML Structure – Organising information in XML – Creating Well-formed documents – XML Namespace - Document Type Definitions: Introduction – Document Type Declaration – Element Type Declaration – Attribute declaration – Conditional Sections – Limitations of DTD.

(7 Hrs)

UNIT – II

XML schemas

Introduction to schema – Complex Types – Grouping of data – Simple types – Deriving types – Attributes - Cascading Style sheets(CSS) – Need for CSS - Classification of Stylesheet – Features and Usage - Extensible Stylesheet Language(XSL): Introduction – XSL Transformation – XML Path Language – XSLT – XSL-FO.

(7 Hrs)

UNIT – III

XML and Java

Basics of parsing – JAXP – XML and JAVA – CASESTUDY - XML and ASP.NET: Introduction XML Reader – XML Writer – Extracting data from a database as an XML Document. Webservices and AJAX: Webservices – AJAX.

(7 Hrs)

UNIT – IV

Modes of Electronic Commerce:
Overview – Electronic Data Interchange (EDI) **– Security threats to safe Electronic Commerce:** Security Overview –Intellectual property threats- Electronic Commerce threats – CERT.

Approaches to safe Electronic Commerce: Overview – Secure Transport Protocols – Secure Transactions – Secure Electronic Payment Protocol (SEPP) – Secure Electronic Transaction (SET) – certificates for Authentication – Security on Web Servers & Enterprise Networks.

(8 Hrs)

UNIT – V

Electronic Payment Systems: Basics – Electronic Cash – Electronic Wallets – Smart cards – Credit & Charge cards.
Internet / Intranet security issues and solutions – Need for computer security – Specific intruder approaches – Security Strategies – Security tools.

(7 Hrs)

TEXT BOOKS

- Daniel Minoli & Emma Minoli (1999). *Web Commerce Technology Handbook*. Tata McGraw Hill Edition.
- Atul Kahate(2009). *XML and Related Technologies*. Pearson Education.

REFERENCE BOOKS

- Ravi Kalakota & Andrew B. Whinston. *Frontiers of Electronic Commerce*.
- Gary P. Schneider & James T.Perry(2000). *Electronic Commerce.* Course Technology(Thomson Learning).
- Simon North, Paul Hermans(1999). *Teach Yourself XML in 21 Days*. SAMS TechMedia FIRST EDITION.
- Steven Holner (2009). *XML – A Beginner's Guide.* Tata McGraw-Hill Edition.
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ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- Work Book exercises:Students execute simple XML programs to gain knowledge in programming structure.
- Conduct quiz to recollect terminologies related to emerging trends in XML web services
- Quiz on various electronic payment systems

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B.C.A

XML PROGRAMMING LAB

LIST OF PROGRAMS (24 Hours)

1. Application using XML para, ENTITY and CDATA sections.
2. Design a simple email message using XML.
3. Application using Enumerated, String and Tokenized Attribute types.
4. Application using a DTD in the given XML document.
5. Application using a DTD to deal with numbered , bulletlist.
6. Design a DTD for a basic Web Home page.
7. Create a simple letter in XML using the letter DTD.
8. Application using XML Links.
9. Application using Event-Driven programming
10. Application using XSL linked to the XML document
11. Application using XML linked with JAVA
12. Application using XML linked with ASP.NET
13. Application using Web services and AJAX.

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B.C.A

CORE XVI - SHELL PROGRAMMING

COURSE CODE: 14UCSC338 & 14UCSC338P	**YEAR/SEMESTER : III/ VI**	**MAXIMUM MARKS: 100**	**THEORY: 60**
			PRACTICAL: 40
COURSE TYPE: THEORY & PRACTICAL	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**	**THEORY: 36Hrs**
			PRACTICAL: 24 Hrs

COURSE OBJECTIVES:

- Understand Linux Operating System
- Understand what is Shell and how to create Shell programs
- Work with the vi editor
- Use Shell metacharacters : $*, $#
- Debug Shell programs
- Use command line arguments

UNIT I

Linux introduction and File System

Basic Features, Advantages, Basic Architecture of Linux System, Kernel, Shell. Linux File System-Boot block, Super block, Inode table, Data blocks, File accessing mechanism, System startup and shut-down process, init and run levels. Manual help, Getting system information using uname, host name. Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir,mv, pwd, wc, file, find, more, less, creating and viewing files using cat, file comparisons – diff, cmp & comm, disk related commands, Mathematical commands- bc, expr, factor. General purpose commands – date, cal.

(8 Hrs)

UNIT II

Process

Understanding Processes in Linux-process fundamentals, connecting processes with pipes, tee, Redirecting input output, , Background processing, managing multiple processes, changing process priority with nice, scheduling of processes at command, cron, batch commands, kill, ps, who, sleep, touch. Editing files with vi and vim editor.

(7 Hrs)

UNIT III

System administration

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 disable user's accounts, creating and mounting file system, file security -& Permissions, becoming super user using su, Backup and restore files- cpio ,tar,gzip,gunzip,zip,unzip

(7 Hrs)

UNIT IV

SHELL BASICS

Various types of shell available in Linux, comparisons between various shells, shell programming in bash, Shell variables, system shell variables, shell keywords, Input and output command, conditional and looping statements, case statements, command line arguments, Creating Shell Scripts. Connecting to MySQL using shell, running SQL queries from a shell script

(7 Hrs)

UNIT V

SIMPLE FILTER COMMANDS AND REGULAR EXPRESSIONS

Simple Filters - Pr, Head, Tail, Cut, Paste, Sort, Uniq, Tr. Filter Using Regular Expressions – Grep, Egrep, Fgrep Sed And Awk Programming-Formatting Output, Variables And Expressions, Comparison Operator, Arrays And Control Flow

(7 HRS)

TEXT BOOKS

- Sumitabha Das - UNIX – Concepts & Applications –TataMcGraw Hill Publications - Third Edition..
- Cristopher Negus **-** Red Hat Linux 9 Bible – IDG Books India Ltd.

REFERENCE BOOK

- Graham Glass & King Ables **-** Unix for programmers and users – Pearson Education India - Third Edition.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- ExploreUnix - Students submit an assignment on various commands, its syntax and usage. This helps them to understand and apply the unix administration
- Workbook on Unix Commands
- Tests in Glossary of Terms
- ShellScript - This activity helps students to write simple shell programming code

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B.C.A

SHELL PROGRAMMING – PRACTICAL

LIST OF PROGRAMS (24 Hours)

Implementation of Commands

- File and directory commands
- Disk commands
- Process commands
- Study of Editors
- vi editor
- stream editor

Implementation of Filters

- cut
- paste
- sort
- grep
- egrep
- fgrep
- awk programming

Shell Scripts

- Bourne again shell

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B.C.A

CORE XVII - RESOURCE MANAGEMENT TECHNIQUES (COMMON TO B.C.A & B.Sc. COMPUTER SCIENCE)

COURSE CODE: 14UMAT329	**YEAR/SEMESTER: III/ VI**	**MAXIMUM MARKS: 100**
COURSE TYPE:THEORY	**CREDITS: 4**	**TOTAL TEACHING HOURS: 60**

COURSE OBJECTIVES:

- Understand the major capabilities and limitations of deterministic operations research modeling as applied to problems in industry or government
- Be able to recognize, formulate and, using prepared computer packages, solve allocation models of static or dynamic type.

UNIT I

Basics of operations research

Characteristics of OR- OR and Decision Making- Application areas of Operations Research-Linear programming- formulations and Graphical solution canonical and standard terms of Linear programming problem- Algebraic solution – simplex method – Charne's method of penalties- Concept of duality- properties of duality.

(14 Hrs)

UNIT II

Transportation model

Definition- formulation and solution of transportation models- NWCR, LCM and Vogel's approximation method- Assignment model: Definition of Assignment model- formulation- Hungarian method. (12 Hrs)

UNIT III

Sequencing problems

Processing each of n jobs through m machines- processing n jobs through 2 machines- processing n jobs through 3 machines- processing n jobs through m machines- processing 2 jobs through m machines (Graphical method)- traveling salesman problem. (10 Hrs)

UNIT IV

Game theory

Characteristics of games- Maximin, Minimax criteria of optimality- Dominance property- algebraic and graphical method of solution of solving 2x2 games. Simulation: Definition- Limitation- Various methods of obtaining random numbers (additive, multiplicative and mixed types of congruence random number generators) (12 Hrs)

UNIT V

Networks

Fulkersons's rule- PERT computation and CPM computation. (12 Hrs)

TEXT BOOKS

- Prem Kumar Gupta and D.S. Hira –Operations Research –S. Chand and Comp Ltd. – Third Edition
- Dr. P.R. Vittal - Introduction to Operations Research – Margham Publications

REFERENCE BOOKS

- Sundaresan Ganapathy - Resource Management Techniques –AR Publications
- Hamdy A Taha – Operations Research – Prentice Hall of India- Sixth Edition

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

- **Assignment:** Students submit an assignment about Operations Research and its applications.
- **Assignments:** To solve problems in Linear Programming Problem, graphical method, Simplex method, transportation problem, Assignment problem, PERT & CPM.
- **Network the Activities:** Classroom activity to form a network diagram for real time activities .
- Assignment: Sequencing Problem and Game theory and Simulation
- **knowledge Testing**: Unitwise Class test to solve the problems.

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B.C.A

CORE XVIII - PROJECT

COURSE CODE: 14UMIP301	YEAR/SEMESTER: III/ VI	MAXIMUM MARKS: 100
	CREDITS: 4	

COURSE OBJECTIVES:

This course gives Practical training in design and implementation of a single mini problem.

COURSE OUTLINE:

Each student will develop and implement individually application software based on EMERGING LATEST TECHNOLOGIES.

ACTIVITY PLANNER

List of activities for Employability / Skill Development / Entrepreneurship Skill Development

(These activities are only indicative, the Faculty member can innovate)

Develop Analytical, Communication, Presentation skills for conduct of full time research Strive training:Identifying and building the correct specification.