Study & Evaluation Scheme with Syllabus

for

Second Year MCA (Integrated)

On

Choice Based Credit System

(Effective from the Session: 2018-19)
# MCA (INTEGRATED) SECOND YEAR, 2018-19

## SMESTER- III

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Subject Name</th>
<th>L-T-P</th>
<th>ESE Marks</th>
<th>Sessional Total</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>RCAI-301</td>
<td>Object Oriented Programming in C++</td>
<td>3-1-0</td>
<td>70</td>
<td>20 10 100</td>
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<td>2.</td>
<td>RCAI-302</td>
<td>Introduction to Web Designing</td>
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<td>3.</td>
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<td>5.</td>
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<td>Applied Linear Algebra</td>
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<td>6.</td>
<td>RCAI-351</td>
<td>Object Oriented Programming in C Lab</td>
<td>0-0-3</td>
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<td>30 20 100</td>
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<td>7.</td>
<td>RCAI-352</td>
<td>Introduction to Web Designing Lab</td>
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<td>30 20 100</td>
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<td></td>
<td>700</td>
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CT: Class Test  
TA: Teacher Assessment  
L/T/P: Lecture/ Tutorial/ Practical

## SEMESTER-IV

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Subject Name</th>
<th>L-T-P</th>
<th>ESE Marks</th>
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<th>Credit</th>
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<td>1.</td>
<td>RCAI-401</td>
<td>Computer Based Statistical Techniques</td>
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<td>2.</td>
<td>RCAI-402</td>
<td>Data Structures using C</td>
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<td>3.</td>
<td>RCAI-403</td>
<td>Fundamentals of E-Commerce</td>
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<td>4.</td>
<td>RCAI-404</td>
<td>Principles of Management</td>
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<td>5.</td>
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<td>7.</td>
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<td>Data structures using C lab</td>
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<td>Total</td>
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<td>700</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

CT: Class Test  
TA: Teacher Assessment  
L/T/P: Lecture/ Tutorial/ Practical
UNIT-I
Introduction: Introducing Object – Oriented Approach, Relating to other paradigms {Functional, Data decomposition}.
Basic concepts: Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete, operators.

UNIT-II
Classes and Objects: Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behavior of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Meta class / abstract classes.

UNIT-III
Inheritance and Polymorphism: Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric Polymorphism

UNIT-IV
Generic function: Template function, function name overloading, overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

UNIT-V
Files and Exception Handling: Streams and files, Namespaces, Exception handling, Generic Classes

References:
5. R.S. Salaria, Mastering Object-Oriented Programming with C++, Khanna Publishing House
7. Schaum's Outline, Programming with C++, TMH.

Online Course:
Course on C and CPP (Spoken Tutorial MOOC)
UNIT I  
**Networking Concepts:** Network, Importance of Network - Parts of the Network, Types of Network, Network Topology, Protocols, Types of protocols, Methods used for transmission Network Cables.

UNIT II  
**Internet: Introduction** - Brief history of Internet, Working of Internet, Applications of Internet: Application in Business sector, Application in Education sector - Requirements for Internet - using Internet - Popular terms of Internet - How to open Internet Explorer - Parts of Internet Explorer.

UNIT III  
**Introduction to HTML:** What is HTML? - Evolution of HTML - Features of HTML - Filenames in HTML - Tools required - What are Tags? - Types of tags - Attributes - Comments - Structures of HTML tag - Rules for writing a HTML program - starting a HTML document: How to open Notepad - How to open HTML page - Editing the HTML program.

UNIT IV  
**Formatting in HTML:** Introduction - Formatting tags - `<BR>` tag, `<p>` tag, `<HR>` tag – Text Formatting tags: `<B>` tag, `<I>` tag, `<U>` tag, `<BIG>` tag, `<SMALL>` tag - The `<BODY>` tag : Background, Bgcolor, Link, Text attributes - The Heading tag - The `<marquee>` tag. The `<FONT>` tag : color, face, size attributes - The `<IMG>` tag : Alt, Align, Height and width Attributes, Border attributes - Anchor tag : Creating links in HTML - Lists : Types of Lists - Table: Table - Table size- Alignment and Spacing - Frames in HTML - Attributes of `<FRAMESET>` tag - `<FRAME>` tag.

UNIT V  
**Introduction to DHTML and CSS. XML:** Introduction, transition from HTML to XML, DTD, XML schemas, building blocks of XML document, creating elements, creating attributes, creating entities.

References:

1. Ivan Baryons,” Web Enabled Commercial Application Development using. HTML, DHTML, JavaScript, Perl, CGI”, BPB.
4. A Navarro, “Mastering XML”, BPB
RCA-303 ACCOUNTING AND FINANCIAL MANAGEMENT

UNIT I:
Overview: Accounting concepts, conventions and principles; Accounting Equation, International Accounting principles and standards; Matching of Indian Accounting Standards with International Accounting Standards

UNIT II:

UNIT III
Analysis of financial statement: Ratio Analysis- solvency ratios, profitability ratios, activity ratios, liquidity ratios, market capitalization ratios; Common Size Statement; Comparative Balance Sheet and Trend Analysis of manufacturing, service & banking organizations.

UNIT IV

References;
UNIT I  
**Foundation of Information Systems:** Introduction to information system in business, fundamentals of information systems, solving business problems with information systems, Types of information systems, Effectiveness and efficiency criteria in information system.

UNIT II  
**An overview of Management Information Systems:** Definition of a management information system, MIS versus Data processing, MIS & Decision Support Systems, Concept of an MIS, Structure of a Management information system.

UNIT III  
**Concepts of planning & control:** Concept of organizational planning, The Planning Process, Computational support for planning, Characteristics of control process, The nature of control in an organization.

UNIT IV  
**Business applications of information technology:** Internet & electronic commerce, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information System for Managerial Decision Support, Information System for Strategic Advantage.

UNIT V  
**Managing Information Technology:** Enterprise & global management, Security & Ethical challenges, Planning & Implementing changes, CRM, SCM.

References:

1. O Brian, “Management Information System”, TMH  
2. Gordon B. Davis & Margrethe H. Olson, “Management Information System”, TMH.  
3. O Brian, “Introduction to Information System”, MCGRAW HILL.  
5. Jawadekar, “Management Information System”, TMH.  
RAS-307 APPLIED LINEAR ALGEBRA

UNIT-1
Fields, Vector-spaces, sub-spaces, linear-combination, linear-dependence and independence. Basis, dimensions and coordinates (each and every fact to be illustrated by suitable examples).

UNIT II:
Linear-transformation, definition and examples, matrix representation, similarity, range and kernel, and-nullity theorem and its consequences.

UNIT III:
Singular and non-singular linear transformations, sum and product of linear transformations, vector pace of linear transformations, nilpotent linear transformations.

UNIT IV:
Inner product spaces, definition and examples, orthogonality, Cauchy-Schwartz Inequality, inkowski Inequality, polarization Identity, complete orthonormal set, Bessel’s Inequality, Gram-Schmidt’s orthogonalization process.

UNIT V:
Linear functional, definition and examples, vector space of linear functional, dual vector spaces, adjoint, self adjoint, Unitary and normal operators, examples and properties, eigen values and eigen vectors, diagonalisation of linear operators, quadratic forms, principle axis theorem (without proof), some applications to engineering problems.

References:

RCAI-351 OBJECT ORIENTED PROGRAMMING LAB

LIST OF EXPERIMENTS C++

- program using functions
- functions with default arguments
- implementation of call by value, address, reference
- simple classes for understanding objects, member functions & constructors
- classes with primitive data members,
- classes with arrays as data members
- classes with pointers as data members
- classes with constant data members
- classes with static member functions
- compile time polymorphism
- operator overloading
- function overloading
- run time polymorphism
- inheritance
- virtual functions
- virtual base classes
- templates
- file handling
- sequential access
- random access

RCAI-352 INTRODUCTION TO WEB DESIGNING LAB

LIST OF EXPERIMENTS

- Practice Tags and basic structure of HTML files.
- Develop the concept of basic and advanced text formatting.
- Practice the use of multimedia components in HTML documents.
- Practice Hyper linking, Designing of webpage-Working with Frames, Forms and Controls.
- Prepare creating style sheet, CSS properties, Background, Text, Font and styling etc.
- Working with List, HTML elements box, Positioning and Block properties in CSS.
- Designing with cascading style sheet-Internal and External style sheet.
RCAI-401 COMPUTERS BASED NUMERICAL AND STATISTICAL TECHNIQUES

UNIT-I

UNIT-II
Finite differences and Interpolation: Finite Differences, Difference tables. Polynomial Interpolation: Newton’s forward and backward formula Central Difference Formulae: Gauss forward and backward formula, Sterling’s, Bessel’s, Everett’s formula. Lagrange’s Interpolation, Newton Divided difference formula, Hermit’s Interpolation for unequal intervals.

UNIT-III

UNIT-IV

UNIT-V
Curve fitting, Approximations and Regression Analysis: Method of least squares, fitting of straight lines, polynomials, exponential curves etc. Approximation of functions by Chebyshev polynomials. Linear, Non-linear and Multiple regressions.
Statistical methods: Sample distributions, Test of Significance: Chi-Square Test, t and F test.

References:
5. R. S. Salaria, Computer Oriented Numerical Methods, Khanna Publishing House
RCAI-402 DATA STRUCTURES USING C

UNIT I:

UNIT II:
Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, Deque, and Priority Queue, Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT III:

UNIT IV:
Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting. Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

UNIT V:

References:
5. R. S. Salaria, Data Structures, Khanna Publishing House

Online Course
MOOC on Algorithms and Data Structures (IIT Bombay)
UNIT I

UNIT II

UNIT III

UNIT IV
Encryption: Encryption techniques, Symmetric Encryption- Keys and data encryption standard, Asymmetric encryption- Secret key encryption, public and private pair key encryption, Digital Signatures, Virtual Private Network.

UNIT V
Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking. EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References:
2. Bajaj and Nag, “E-Commerce the cutting edge of Business”, TMH
RCAI-404 PRINCIPLES OF MANAGEMENT

UNIT I:

UNIT II:

UNIT III:

UNIT IV:

References:
RCAI-405 OPERATING SYSTEMS

UNIT-I
Operating system concepts: OS definition and services; Types and features: batch systems, multiprogramming, multitasking, parallel systems, distributed systems, real-time systems, time-sharing systems, PC systems; System Calls types, System Programs

UNIT II

UNIT III
Memory Management: Paging and Segmentation approaches, virtual memory, Demand Paging and Page Replacement algorithms; Deadlocks: necessary conditions, prevention, avoidance and recovery, banker's algorithm.

UNIT IV

UNIT V
UNIX: Essential commands and utilities, Unix files, directory structure, file security, pipe, filter, Bourne shell programming features, systems calls classification and basics (reg. file manipulation, process, signal and IPC); Linux: System components, Process management, scheduling, memory management, Networking software layers, Security, various editors, I/O devices, IPC.

References:
1. Operating System Concepts by Silberschatz and Galvin; Addison Wesley
2. Ditributed Operating Systems by Andrew S. Tannenbaum; Pearson Education
3. UNIX Concepts and Applications by Sumitabha Das; Tata MC-Graw Hill
4. Ekta Walia, Khanna Publishing House, Operating System Concepts
RCAI-451 COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES LAB

LIST OF EXPERIMENTS IN C:

- To implement floating point arithmetic operations i.e., addition, subtraction, multiplication and division.
- To deduce errors involved in polynomial interpolation.
- Algebraic and transcendental equations using Bisection, Newton Raphson,
- Iterative, method of false position, rate of conversions of roots in tabular form for each of these methods.
- To implement formulae by Bessel, Newton, Stirling, Lagrange’s etc.
- To implement method of least square curve fitting.
- Implement numerical differentiation.
- Implement numerical integration using Simpson's 1/3 and 3/8 rules, trapezoidal rule.
- To show frequency chart, regression analysis, Linear square fit, and polynomial fit.
- NOTE- Institutions are required to add four more experiments as per available expertise with them

RCAI-452 DATA STRUCTURES USING ‘C’ LAB

LIST OF EXPERIMENTS IN C:

- Sorting programs: Bubble sort, Merge sort, Insertion sort, Selection sort, and Quick sort.
- Searching programs: Linear Search, Binary Search.
- Array implementation of Stack, Queue, Circular Queue, Linked List.
- Implementation of Stack, Queue, Circular Queue, Linked List using dynamic memory allocation.
- Implementation of Binary tree.
- Program for Tree Traversals (preorder, in order, post order).
- Program for graph traversal (BFS, DFS).
- Program for minimum cost spanning tree, shortest path.