WITH EFFECT FROM THE ACADEMIC YEAR 2015-2016

MCA THREE YEARS COURSE

SCHEME OF INSTRUCTION AND EXAMINATION
M.C.A Ist   YEAR

FACULTY OF INFORMATION TECHNOLOGY

SEMESTER – I

SI No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Duration in hrs	Scheme of Examination		Credits
			Periods per week			Maximum Marks		
			L/T	D/P		Univ. Exam	Sessionals	
THEORY								
1	CS 601	Discrete Mathematics	3	-	3	80	20	3
2	MAT 602	Probability and Statistics	3	-	3	80	20	3
3	CS 603	Computer Programming and Problem Solving	3	-	3	80	20	3
4	CS 604	Elements of Information Technology	3	-	3	80	20	3
5	CM 605	Economics Analysis	3	-	3	80	20	3
PRACTICALS								
1	CS 631	Programming Lab - I (C Programming Lab)	-	3	3	50	25	2
2	CS 632	Programming Lab - II (IT Workshop)	-	3	3	50	25	2
		TOTAL	15	6		500	150	19

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SCHEME OF INSTRUCTION AND EXAMINATION
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FACULTY OF INFORMATION TECHNOLOGY

SEMESTER – II

SI No.	Syllabus Ref. No.	Subject	Periods per week		Duration in hrs	Maximum Marks		Credits
			L/T	D/P		Univ. Exam	Sessionals	
THEORY								
1	CM 651	Accounting & Financial Management	3	-	3	80	20	3
2	CS 652	Principles of Object Oriented Programming	3	-	3	80	20	3
3	CS 653	Management Information Systems	3	-	3	80	20	3
4	CS 654	C++ and Data Structures	3	-	3	80	20	3
5	CS 655	Computer Organization	3	-	3	80	20	3
PRACTICALS								
1	CS 681	Programming Lab – III (OOP Lab)	-	3	3	50	25	2
2	CS 682	Programming Lab – IV (C++ Programming Lab)	-	3	3	50	25	2
		TOTAL	15	6		500	150	19

CS 601   **DISCRETE MATHEMATICS**

Instruction	3 Periods per week
Duration	3 Hours
University Examination	80 Marks
Sessional	20 Marks

UNIT- I
Mathematical Logic - Statements and notation connectives, Equivalence of statement formula, Theorem proving – Introduction to predicate calculus.
Relations – Binary relations and digraphs, special properties of Binary relations, Equivalence relations, Ordered relations, Lattices and Enumerations, Operations of relations.

UNIT -II
Functions – Definitions and properties of functions, Inductively defined functions, partial functions, Hashing functions, Recursion.
Boolean Algebra – Definition and properties, Lattices, Boolean functions, Normal forms. Disjunctive Normal Forms (DNF). Conjunctive Normal Forms (CNF). Principal DNF, Principal CNF, Applications to switching networks, applications to logic.

UNIT –III
Recurrence Relations – First-order linear recurrence relation, Second-order linear homogeneous recurrence relations with constant coefficients, Non-homogeneous recurrence relations
Algebraic structures – Definition, Examples and Properties
Groups: Definition, Examples and elementary properties, Homomorphism, Isomorphism and Cyclic groups.

UNIT - IV
Elementary combinatory – sets, operations on sets, Venn diagram, basics of counting combinations and permutations without repetitions, unlimited repetitions, constrained repetitions.
Binomial coefficients, Binomial and Multinomial theorems, principle of inclusion and exclusion.

UNIT -V
Graph Theory: Basic concepts, Isomorphism and sub graphs, trees and their properties, spanning trees, directed trees, binary trees.
Planar graphs, Euler's formula, multigraphs and Euler Circuits.
Hamiltonian graphs, chromatic numbers, four color problem, network flows.

Suggested Reading:
1. Jr. P. Tremblay and R Manohar "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1987.
2. Jol L. Moth, Abraham Kondel, Theoddar P. Paker – Discrete Mathematics for Computer Scientists and Mathematicians PH 1976.
3. Ralph P. Grimaldi – Discrete and Combinatorial Mathematics – 5th Edition, Pearson, 2004.

MAT 602   **PROBILITY AND STATISTICS**

Instruction   3 Periods per week
Duration   3 Hours
University Examination   80 Marks
Sessional   20 Marks

UNIT-I
Data Validation and Information Abstraction: Methods of collecting data efficiently, Gathering information from data charting.

UNIT-II
Probability: Laws of Probability, Probability distributions, Discrete, Equiprobable, binomial, Poisson.

UNIT-III
Continuous Distributions: Rectangular, normal, gamma and beta.

UNIT-IV
Statistical Methods : Frequency distributions, Mathematical Expectation, Moments, Skewness and Kurtosis.

UNIT-V
Correlation and Regression, Introduction to tests of Significance, u, t, x tests.

Suggested reading:
1. S.C. Gupta and V.K. Kapoor, " Fundamentals of Mathematical Statistics" , 1989.
2. William Mendenhall, Robert J. Beaver, Barbara M.. Beaver, " Introduction to Probability and Statistics", Thomson Brooks / Cole, Eleventh Edition, 2003.\
3. Richard A. Johnson, "Probability and Statistics for Engineers", Prentice Hall of India, Seventh Edition, 2005.

CS 603   **COMPUTER PROGRAMMING AND PROBLEM SOLVING**

Instruction   3 Periods per week
Duration   3 Hours
University Examination   80 Marks
Sessional   20 Marks

UNIT – I

Introduction to Computer Programming: Computing Environments, Computer Languages, Creating and Running Programs, Number Systems (Binary, Octal, Decimal, Hex), Representation of numbers (fixed and floating point)

Algorithms and Flow charts : Definition of Algorithms, examples, Symbols used in Flow chart, examples.

Introduction to C Language - Background, C Identifiers, Data Types, Operators, Variables, Constants, Input / Output, Expressions, C Programs, Precedence and Associativity, Evaluating Expressions, Type Conversion, Statements, Bitwise Operators.

UNIT-II

Selection: Logical Data and Operators, if-else, switch Statements, Standard Functions.

Repetition: loops, while, for, do-while statements, Loop examples, break, continue, go to.

Arrays - Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two-Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection, Bubble, Insertion Sorts.

UNIT – III

Functions: Designing Structured Programs, Functions Basics, User Defined Functions, Inter Function Communication, Standard Functions, Scope, Storage Classes-auto, Register, Static, Extern, Scope Rules, and Type Qualifiers.
Recursion- Recursive Functions, Terminating Condition, Quick & Merge Sort Techniques, Preprocessor Commands.

UNIT - IV

Pointers - Introduction, Pointers to Pointers, Compatibility, L value and R value, Arrays and Pointers, Pointer Arithmetic and Arrays
Call-by-reference: Pointers for Inter-Function Communication, Passing Arrays to a Function,
Dynamic Memory Allocation: Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command-line Arguments.
Strings - Concepts, C Strings, String Input / Output Functions, Arrays of Strings, String Manipulation Functions.

UNIT - V

The Type Definition (type def), Enumerated Types

Structure: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures. Unions.

Input and Output: Files, Streams, Standard library Input Output Functions, Character Input Output Functions.

Suggested Reading:
1. Rajaraman V, The Fundamentals of Computer, 4th Edition, Prentice Hall of India, 2006
2. Kernighan BW and Ritchie DM, The C Programming Language, 2nd Edition, Prentice Hall of India, 2006.
3. J.R. Hanly and E.B. Koffman, Problem Solving and Program Design in C, Pearson Education, 2007.
4. B. A. Forouzan and R.F. Gilberg, C Programming & Data Structures, Cengage Learning, 2007.

CS 604   **ELEMENTS OF INFORMATION TECHNOLOGY**

Instruction	3 periods per week
Duration of university Examination	3 hours
University Examination	80 Marks
Sessional	20 Marks

UNIT-I

Introduction to Information Technology: Information concepts & Processing: Basic concepts of IT, data Processing, data and information
Elements of computer system: Classification, history and types of computers.
Hardware: CPU, Memory unit, I/O devices, auxiliary storage devices, data representation
Software: System and Application s/w and utility packages.
Programming Languages: classification, Machine code, Assembly Language, higher level languages, fourth generation languages. Translators: Assembler, Compiler and Interpreter.

UNIT –II

Operating systems: Concept as resource manager and coordinator of processor, devices and memory. Concept of priorities, protection and parallelism. Command interpreter, Typical commands of Linux/MS Windows

Communications: Client server systems, Computer networks, network protocols, LAN, WAN, Internet facilities through WWW, Mosaic, Gopher, html, scripting languages, communication channels, factors affecting communication among devices.

UNIT-III

Files & Databases: Data Storage hierarchy, File management systems, database management systems, types of data base organizations, features of database management systems.

Information integrity & computer security: Perverse software, concepts and components of security, Preventive measures and treatment.

UNIT-IV

Information System analysis & design: system study review, problem definition, system analysis, system design.

Management Information systems: information need of managers, developing a management information system, planning &decision making practices supported by an MIS.

UNIT-V

Computers impact on society & Range of applications: scientific, educational, industrial, business, multilingual applications.

Suggested Reading:
1. Sanders, D.H. "Computers Today" McGraw Hill. 1988.
2. Prof. Vikram Singh, "Impact of Information & Communication Technology on public life" (1st Edition) Lakshmi Publications, 2009
3. Trainer T., et , "Computers" (4th Edition) McGraw Hill, 1994

CM 605   **ECONOMIC ANALYSIS**

Instruction   3 periods per week
Duration of university Examination   3 hours
University Examination   80 Marks
Sessional   20 Marks

UNIT-I
The nature and scope of Managerial Economics, Fundamental concepts of managerial economics.

UNIT-II
Demand Analysis, concepts of demand, demand elasticity's.

UNIT -III
Production and cost analysis and principles: Production function, single output isoquantum, average cost curve – Laws of returns – Laws of supply, Price determination under different competitive situations.

UNIT-IV
National income : Concepts, measurement and determinants.
Planning : The machinery for planning in India, Salient features of India's Five, Year plans.

UNIT-V
Indian Financial Systems, Functions and role of Reserve Bank of India. Conventional Banks and Industrial Finance. Term "lending Financial Institutions-role and functions.

Suggested Reading:
1. Dhiraj Bhatacharya & Pranab Chakraborti, "Fundamentals of Business Economics", A.H. Wheeler & Co. (P) Ltd., 1986.
2. Barry Keating & J. Holton Wilson, "Managerial Economics". Biztantra, Second Edition, 2003.
3. Dominick Salvatore, "Managerial Economics", Thomson, Fourth Edition, 2001.

CS 631　　　　　　　　　**PROGRAMMING LAB - I**
　　　　　　　　　　　　　　(C PROGRAMMING LAB)

Instruction　　　　　　　　　　　　　　　　　3 periods per week
Duration of university Examination　　　　　 3 hours
University Examination　　　　　　　　　　　50 Marks
Sessional　　　　　　　　　　　　　　　　　 25 Marks

1. Finding the maximum and minimum of given set of numbers

2. Finding Roots of a Quadratic Equation

3. Sin x and Cos x values using series expansion

4. Conversion of Binary to Decimal, Octal, Hex-Decimal and vice versa

5. Generating a Pascal triangle

6. Program using Recursion - Factorial, Fibonacci, GCD, Quick Sort and Merge Sort

7. Matrix addition and multiplication using arrays

8. Programs for Bubble Sort, Selection Sort, Insertion Sort

9. Programs on Linear Search and Binary Search

10. Functions for string manipulations

11. Finding the No. of characters, words and lines from a given text file

12. Program to open a file and copy the contents of it into another file.

PROGRAMMING LAB - II
(IT Workshop)

CS 632

Instruction	3 periods per week
Duration of university Examination	3 hours
University Examination	50 Marks
Sessional	25 Marks

Syllabus:

1. System Assembling , Disassembling and identification of Parts / Peripherals
2. Operating System Installation – Install Operating Systems like Windows, Linux along with necessary Device Drivers.
3. MS-Office / Open Office
   a. Word – Formatting Page Borders, Reviewing Equations, symbols
   b. Spread Sheet – organize data, usage of formula graphs charts
   c. Power point – features of power point, guidelines for preparing an effective presentation
   d. Access – creation of database, validate data
4. Network Configuration & Software Installation : Configuring TCP/IP, proxy and firewall settings. Installing application software system software & tools.
5. Internet and World Wide Web-Search Engines. Types of search engines, netiquette, Cyber hygiene.
6. Trouble Shooting – Hardware trouble shooting, Software trouble shooting.
7. MATLAB – basic commands, subroutines, graph plotting
8. LATEX – basic formatting, handling equations and images.

Suggested Reading:
1. K. L. James, Computer Hardware, Installation, Interfacing Troubleshooting and Maintenance, Eastern Economy Edition.
2. Gary B.Shelly, Misty E Vermaat and Thomas J. Cashman, Microsoft Office 2007 Introduction Concepts and Techniques, Windows XP Edition, 2007, Paperback.
3. Leslie Lam port, LATEX-User's Guide and Reference manual, Pearson, LPE, 2nd Edition.
4. Rudraprathap, Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers, Oxford University Press, 2002.
5. Scott Mueller's, Upgrading and Repairing PCs, 18th Edition, Scott. Mueller, QUE, Pearson, 2008.
6. Cherry l A Schmidt, The Complete Computer Upgrade and Repair Book, 3rd Edition , Dream tech.
7. Vikas Gupta, Comdex Information Technology Course Tool Kit , WILEY Dream tech.
8. ITL Education Solutions Limited, Introduction to Information Technology, Pearson Education.

CS 651   ACCOUNTING AND FINANCIAL MANAGEMENT

Instruction   3 periods per week
Duration of university Examination   3 hours
University Examination   80 Marks
Sessional   20 Marks

UNIT-I
An overview of Accounting cycle – Basic concepts and conventions – Books of Account – Terminal statement.

UNIT-II
Financial statement analysis and interpretation – Ration analysis.

UNIT-III
Working capital – Sources and uses – Funds flow and cash flow analysis – Management of Inventory.

UNIT-IV
Capital Budgeting – Techniques for evaluation – Cost of capital – Computation of specific costs, and weighted average cost of capital.

UNIT-V
Analysis of costs and their behavior – Cost volume – Profit analysis Variable costing and absorption costing.
Budgets-Flexible Budgeting – Long and Short term forecasting.

Suggested Reading:
1. James. C. Van Horne, "Fundamentals of Financial Management", Pearson Edition, Eleventh Edition, 2001.
2. Khan MY, Lain PK, "Financial Management", Tata McGraw Hill, Second Edition, 1993.
3. Maheswari SN, "Management Accounting and Financial Control", Sultan Chand & Co.
4. Gupta G. Radhaswamy M, "Advanced Accountancy", Sultan Chand, & Sons.

CS 652   **PRINCIPLES OF OBJECT ORIENTED PROGRAMMING**

Instruction	3 periods per week
Duration of university Examination	3 hours
University Examination	80 Marks
Sessional	20 Marks

UNIT-I
Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Oriented Concepts, Benefits of Object Oriented Development.

Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements, Classes, Methods, Inheritance, Packages and Interfaces.

UNIT-II
Exception Handling, Multithreaded Programming, 110 basics, Reading console input and output , Reading and Writing Files, Print Writer Class, String Handling.

UNIT-III
Exploring Java Language, Collection Overview, Collections Interfaces, Collection Classes, Iterators, Random Access Interface, Maps, Comparators, Arrays, Legacy classes and Interfaces, String Tokenizer, Bit Set, Date, Calendar observable, Timer.

UNIT-IV
Java I/0 classes and Interfaces, Files, Stream and Byte Classes, Character Streams, Serialization.

UNIT-V
GU [and Event Driven Programming : Applet Class, Event Handling, Delegation event model, event classes, event listener Interfaces. Customizing Frame Windows, GUI Programming Basics, Text Related GUI Components, Layout Managers, Effective use of Nested panels, Other GUI components, Menus and Handling Mouse Events.

Suggested Reading:
1. Patrick Naughton "JAVA 2, The Complete Reference" Tata McGraw Hill, 2005.
2. Richard A. Johnson, "Java Programming and Object-Oriented Applications Development" Cengage Learning, India edition, 2009.
3. John Dean and Raymond Dean " Introduction to Programming with JAVA A Problem Solving Approach", McGraw Hill, 2008.
4. Joe Wigglesworth and Paula McMillan, " Java Programming : Advanced Topics" Cengage Learning, 3rd Edition, 2009.

CS 653   MANAGEMENT INFORMATION SYSTEMS

Instruction   3 periods per week
Duration of university Examination   3 hours
University Examination   80 Marks
Sessional   20 Marks

UNIT-I
An Introduction to concepts of System and Organizations. Strategic uses of Information Technology, Business Process in Engineering and Information Technology.

UNIT-II
Applications of Operational Information Systems to Business, Tactical and Strategic Information System to Business.

UNIT-III
Information Systems Planning, approach to System Building Alternative Application Development.

UNIT-IV
Managing Knowledge, Knowledge Management in the Organization, Enhancing Management Decision-Making, DSS, GDSS, and ESS.

UNIT-V
Management of Information Systems, Information System security and control, Ethical issue, managing firm infrastructure and Enterprise system.

Suggested Reading:
1. Robert Schultheis, Mary Summer, " Management Information Systems – The Manager's view", Tata McGraw Hill, Fourth Edition, 2006.
2. Kenneth C. Loudon, Jane P Loudon, "Management Information System", Prentice Hall, 2008.
3. Ralph Stair, George Reynolds "Principles of Information Systems", Cengage Learning 2008.
4. James A, O'Brien, "Management Information Systems", Tata McGraw Hill, Sixth Edition, 2004.

CS 654   **C++ AND DATA STRUCTURES**

Instruction	3 periods per week
Duration of university Examination	3 hours
University Examination	80 Marks
Sessional	20 Marks

UNIT - I

Introduction to C++: Programming paradigms, Object Oriented Programming Concepts, Advantages and Applications of OOPs.
Functions: Call by value, call by reference, Inline Functions, Function Overloading, Recursion,
Arrays: Introduction to Arrays, Arrays in functions, Programming with Arrays and multidimensional Arrays

UNIT - II
Defining classes: Classes, Abstract data types. Friend Functions and Member Functions. Constructors, Destructors, Strings, Pointers and Dynamic Arrays.

UNIT – III
Operator overloading.

Inheritance: The notation of inheritance, derived classes, overriding, Virtual Base Class. Virtual functions, Polymorphism, Exception Handling, Function Templates, Class Templates.

UNIT-IV
Introduction to Linear Data Structures: Linear Lists, Stacks, Queues using Array Representation and Linked Representation, Applications of Stacks and Queues, Hashing, Collision Resolution.

UNIT – V
 Non-Linear Data Structures: Binary Trees, properties, Representation, and Traversals, AVL Trees, Operations on AVL Trees, B-Trees.
Graphs: Definition, Representation, Traversals.

Suggested Reading:
1. Walter Savitch, Problem Solving with C++, 6th Edition, Pears Education Publishing, 2009.
2. Bjarne Stroustrup, The C++ Programming Language, 3rd Edition, Pearson Education.
3. Sartaj A Sahani, Data Structures and Algorithms, Tata McGraw Hill, 2013,

CS 655   **COMPUTER ORGANIZATION**

Instruction   3 periods per week
Duration of university Examination   3 hours
University Examination   80 Marks
Sessional   20 Marks

UNIT-I
Digital Logic Circuits: Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip Flops, Sequential Circuits.
Digital Components: Integrated Circuits, Decoder, Multiplexers, 'Registers, Shift Registers, Binary counter, Memory unit.
Data Representation: Data types, Complements, Fixed and Floating Point Representation, Other binary codes and error Detection codes**.**

UNIT-II
Register Transfer and Micro operations: Register Transfer language, Register transfer, Bus and Memory Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations and Arithmetic logic shift unit.
Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycles, Memory Reference Instructions, Input, Output and Interrupts, Design of Accumulator logic.

UNIT-III
Programming the Basic Computer: Introduction, Machine Language, Assembly Language, The Assembler, Programming Arithmetic and Logic Operations, Subroutines, and input-output, Programming.
Micro programmed Control: Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.

UNIT-IV
Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, RISC.
Parallel Processing: Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline.
Computer Arithmetic: Addition and Subtraction, Multiplication algorithms, Division Algorithms, Floating point arithmetic operations, decimal arithmetic unit, and decimal arithmetic operations.

UNIT-V
Input – Output Organization : Peripheral Devices, I/O output interface, Asynchronous data transfer, Modes of transfer, Priority Interrupt, DMA, Input output Processor, Serial Communication.
Memory Organization: Memory Hierarchy, Main Memory, Cache Memory.

Suggested Reading:

1. M. Morris Mano, "Computer System Architecture", Pearson Education Asia, Third Edition, 1993.
2. Mile Murdocca, Vincent Heuring, " Computer Architecture and Organization", John Wiley & Sons, 2007.
3. Sivarama P Dandamudi "Fundamentals of Computer Organization and Design", Wiley Dream Tech Publishers, 2003.
4. William Stallings, "Computer Organization & Architecture", Pearson Education, Sixth : Edition, 2003.
5. G.V.Anjaneyulu, "Computer Organization", Himalaya Publishing House.

Programming Lab-III

CS 681   **(OOP LAB)**

Instruction   3 periods per week
Duration of university Examination   3 hours
University Examination   50 Marks
Sessional   25 Marks

1. A program to illustrate the concept of class with constructors, methods and overloading.
2. A program to illustrate the concept of inheritance and dynamic polymorphism.
3. A program to illustrate the usage of abstract class.
4. A program to illustrate multithreading.
5. A program to illustrate thread synchronization.
6. A program to illustrate Exception handling.
7. A program to illustrate user-defined Exceptions
8. A program to demonstrate use of User-defined Packages.
9. A program using String Tokenize.
10. A program using Linked list class
11. A program using Tree Set class
12. A program using Hash Set and Iterator classes
13. A program using Map classes.
14. A program using Enumeration and Comparator interfaces.
15. A program using File and Filename Filter
16. A program to illustrate the usage of Byte and Character I/O streams.
17. A program to illustrate the usage of Serialization.
18. Program using Data class.
19. An application involving GUI with different controls, menus and event handling.
20. A program to implement an applet.

Programming Lab-IV

CS 682   **(C++ PROGRAMMING LAB)**

Instruction	3 periods per week
Duration of university Examination	3 hours
University Examination	50 Marks
Sessional	25 Marks

1. Call-by-Value and Call-by-Reference example programs

2. Program on Function Overloading

3. Program on Inline Functions and Default Arguments

4. Program to check Identity Matrix, Upper Triangular and Lower Triangular Matrices

5. Program to find A U B using Dynamic Memory Allocation

6. Implementation of Rational Numbers using classes

7. Program on Complex Numbers Class.

8. Implementation of Matrix Class.

9. Programs on Constructors, Destructors, and Friend Functions

10. Programs on Inheritance, Virtual Functions, Dynamic Polymorphism

11. Programs on Operator Overloading and Templates

12. Implementation of Stacks using Arrays

13. Program on Linear Lists using Arrays

14. Implementation of Queues using Linked Representation

15. Program on Single Linked List Operations

16. Program on Binary Tree Traversal Techniques