

Annexure to Notification No.F(Pres-Syllabi.PG-CBCS)Acad/KU/14 dated 15-05-2014
Syllabus for MCA 1st to 6th semester

Choice based Credit System (CBCS)

Scheme and course structure for

MCA 1st semester effective from academic session 2014 and onwards

Semester-I						
Course Code	Course name	Paper category	Hours / Week			Credits
			L	T	P	
MCA14101CR	Programming Concepts in C / C++	Core	3	0	0	3
MCA14102CR	Database Systems	Core	3	0	0	3
MCA14103CR	Lab for C/C++	Core	0	0	6	3
MCA14104CR	Lab for Database Systems	Core	0	0	6	3
MCA14105EA	Discrete Mathematics	Elective (Allied)	3	0	0	3
MCA14106EA	Linear Algebra	Elective (Allied)	3	0	0	3
MCA14107EA	Computer Fundamentals and Applications	Elective (Allied)	3	0	0	3
MCA14108EA	Technical Communication	Elective (Allied)	3	0	0	3
MCA1409EEA	Computer Architecture	Elective (Allied)	3	0	0	3
MCA14110EA	Programming Languages	Elective (Allied)	3	0	0	3
MCA14111EO	Open elective (To be selected from outside department)	Elective (Open)	4	0	0	4
MCA14112EO	Open elective (Offered for students from outside department)	Elective (Open)	4	0	0	4
24 Credits=31 Contact Hours						

Structure of CBCS (3 Credit) Curriculum for MCA 1st Semester

Core:

MCA14101CR: Programming Concepts in C / C++

MCA14102CR: Database Systems

MCA14103CR: Lab for C/C++

MCA14104CR: Lab for Database Systems

Electives: (any 4) Any one of these

MCA14105EA: Discrete Mathematics

MCA14106EA: Linear Algebra

Any three of these

MCA14107EA: Computer Fundamentals and Applications

MCA14108EA: Technical Communication

MCA14109EA: Computer Architecture

MCA14110EA: Programming Languages

MCA14111EO: Open elective (To be selected from outside department)

MCA14112EO: Open elective (Offered for students from outside department)

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Course No:- MCA14101CR

Course Title: Programming Concepts Using C / C++

Unit I

Arrays: Declaration; initialization; 2-dimensional and 3-dimensional array, passing array to function, strings and string functions, and character arrays.

Pointers: variables, swapping data, swapping address v/s data, misuse of address operators, pointers and arrays , pointers to pointers , strings , pointer arithmetic, additional operators , portability, pointers to functions, using pointers with arrays , void pointers .

Structures and unions: syntax and use, members, structures as function arguments, structure pointers, array of structures as arguments, passing array of structure members, call by reference.

Unit II:

Functions; prototype, passing parameters, storage classes, identifier visibility, Recursive functions. Command-line arguments. Scope rules, Multi-file programming, Introduction to macros.

File processing in C and C++.

Introduction to graphics, graphic initialization, graphic modes, drivers, basic drawing functions, Animations- concept and implementation, Building graphical user interface.

Unit III

Introduction to classes and objects; Constructor; destructor; Operator overloading; Function overloading; function overriding; friend function; copy constructor;

Inheritance; Single , Multiple, and Multilevel Inheritance;

Virtual function and Polymorphism: Dynamic binding, Static binding; Virtual functions; Pure virtual function; concrete implementation of virtual functions; Dynamic binding call mechanism; Implementation of polymorphism; virtual destructors.

Unit IV

Templates: Function Templates, Class Templates, Member Function Template and Template Arguments, Exception Handling, Standard Template Library

Reference Books:1.

FOSTER AND FOSTER “C by discovery” RRI penram.

YASHWANT KANETKAR “Let us C” PHI.

E. BALAGURUSWAMI “Programming in ANSI C” Tata McGraw Hill.

BJARNE STROUSTRUP “The C++ programming language” Pearson Education.

HERBERT SCHILD “C++ The complete Reference” Tata McGraw Hill.

ROBERT LAFORE “Object orientation with C++ Programming” Waite Group.

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Course No:- MCA14102CR

Course Title: Database Systems

Unit I

Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Architecture, Data Mining and Information Retrieval, Database Models and Comparison, Relation Algebra, ER Model, CODDS Rules, Normalization..

Unit II

Introduction to SQL, Data Types, Data Definition Language, Data Manipulation Language, Transaction Control Language, Integrity Constraints, SQL Functions, Set Operators and Joins, View, Synonym and Index, Sub Queries and Database Objects, Locks and SQL Formatting Commands.

Unit III

Introduction to PLSQL, Architecture, Data Types, Control Structures, Concept of Error Handling, Cursors and Database Triggers, Subprograms and Packages.

Unit IV

Data Storage and Querying using various storage structures, Indexing and Hashing, Query Processing and Optimization. Transaction Management Concepts, Concurrency Control and Recovery.

Reference Books:

William Page, "Using Oracle 9i – Special Edition", Que/PHI.

Database System Concepts by A. Silbershatz, H.F. Korth and S. Sudarshan, 6th edition, 1997, McGraw-Hill, International Edition.

Ivan Bayross, "SQL & PL/SQL Using Oracle 8i & 9i with SQLJ", BPB.

Desai.B , "An introduction to Database Concepts", Galgotia Publications, N.Delhi

Dates.C, " An introduction to Database Systems", Pearson Education, Asia

MCA14103CR

Lab for C/C++

MCA14104CR

Lab for Database Systems

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Syllabus for MCA 1st to 6th semester

Course No: MCA14105EA

Course Title: Discrete Mathematics

UNIT I

Proposition, Logic, Truth tables, Propositional Equivalence, Logical Equivalence, Predicates and Quantifiers, Sets: operations on sets, Computer representation of sets, Functions: Domain, Range, One-to-One, Onto, Inverses and Composition, Cardinality of a Set, sequences and summations, The growth of functions . Methods of Proof: Different methods of proof, Direct Proof, Indirect Proof, Mathematical Induction for proving algorithms.

UNIT II

Counting: Basic Counting Principle, The Pigeon-Hole Principle, Permutation, combinations, repetitions, discrete probability, Advanced Counting Techniques: Inclusion-Exclusion, Applications of inclusion-exclusion principle, recurrence relations, solving recurrence relation. Relations: Relations and their properties, Binary Relations, Equivalence relations, Diagraphs, Matrix representation of relations and digraphs, Computer representation of relations and digraphs, Transitive Closures, Warshall's Algorithm.

UNIT III

Partially Ordered Sets (Posets), External elements of partially ordered sets, Hasse diagram of partially ordered set, isomorphic ordered set ,Lattices: Properties of Lattices, complemented Lattices.

Graph theory: Introduction to graphs, Graph Terminology Weighted graphs, Representing Graphs, Connectivity of Graphs: Paths and Circuits, Eularian and Hamiltonian Paths, Matrix representation of graphs. Graph Coloring.

UNIT IV

Trees: Rooted trees, Application of trees: Binary Search Trees, Decision Trees, Prefix Codes, Tree traversal, trees and sorting, spanning trees, minimal spanning trees.

Finite Boolean algebra, Functions on Boolean algebra, Boolean functions as Boolean polynomials. Groups and applications: Subgroups, Semigroups, Monoids, Product and quotients of algebraic structures, Isomorphism, Homomorphism,

Text Book :

KENNETH H. ROSEN "Discrete Mathematics and Its Applications" The Random House/Birkhauser Mathematics series

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Reference Books:

LIU "Elements of Discrete Mathematics " Tata McGraw Hill

SCHAUMS "Discrete Mathematics " Tata McGraw Hill

KOLMAN/REHMAN "Discrete Mathematical Structures " Pearson Education

NICODEMI "Discrete Mathematics " CBS

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Course No: MCA14106EA
Course Title: Linear Algebra

UNIT-I

Systems of Linear Equations. Matrices. Matrix Multiplication. Algebraic Properties of Matrix Operations. Special Types of Matrices and Partitioned Matrices. Echelon Form of a Matrix. Solving Linear Systems. Elementary Matrices. Finding The Inverse of a Matrix. Equivalent Matrices. Determinants. Properties of Determinants. Cofactor Expansion. Inverse of a Matrix (via its determinant). Other Applications of Determinants (Cramer's rule).

UNIT-II

Vectors in The Plane and in 3-Space. Vector Spaces. Subspaces. Span and Linear Independence. Basis and Dimension. Homogeneous Systems. Coordinates and Isomorphism. Rank of a Matrix. Inner Product Spaces. Gram-Schmidt Process. Orthogonal Complements.

UNIT-III

Linear Transformations and Matrices. Kernel and Range of a Linear Transformation. Matrix of a Linear Transformation. Similarity. Transformations Sparse Matrices and Iterative Methods

UNIT-IV

Eigenvalues and Eigenvectors. Diagonalization and Similar Matrices Diagonalization of Symmetric Matrices. Markov Matrices. Complex Matrices and FFTs Numerical Linear Algebra

References:

1. SERGE LANG : Introduction to Linear Algebra, Springer Verlag.
2. S. KUMARESAN : Linear Algebra A Geometric approach, Prentice Hall of India Private Limited.
3. M. ARTIN : Algebra, Prentice Hall of India Private Limited.
4. K. HOFFMAN and R. KUNZE : Linear Algebra, Tata McGraw Hill, New Delhi.
5. GILBERT STRANG : Linear Algebra and its applications, International Student Edition.
6. L. SMITH : Linear Algebra, Springer Verlag.
7. A. RAMACHANDRA RAO and P. BHIMA SANKARAN : Linear Algebra, Tata McGraw Hill, New Delhi.
8. T. BANCHOFF and J. WERMER : Linear Algebra through Geometry, Springer Verlag New York, 1984.
9. SHELDON AXLER : Linear Algebra done right, Springer Verlag, New York.
10. KLAUS JANICH : Linear Algebra.
11. OTTO BRETCHER : Linear Algebra with Applications, Pearson Education.
12. GARETH WILLIAMS : Linear Algebra with Applications, Narosa Publication.

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Course No: MCA14107EA

Course Title: Computer Fundamentals and Applications

Unit-I

Generations of Computers, PC Family of Computers, Different I/O devices; Introduction to Operating System, Overview of Different Operating Systems, Functions of Operating System; Fundamentals of Disk Operating System (DOS), Understanding DOS prompt, Working with DOS commands, Config.sys and Autoexec.bat files.

Unit II

Introduction to Windows, Working with Accessories (Notepad, WordPad and Paint); Personalizing Windows, Installing and Removing Applications; Boot Options & Concept of Registry.

Unit III

Introduction to Office Tools: Word Processing, Advantages of Word Processing, Fundamentals of MS-Word, Working with Menus and Toolbars, Introduction to Macros. Overview of Excel, Working with Cells, Creating Worksheets, Working with Formulae Bar. Introduction to PowerPoint, Creating and Designing Slides, Working with Hyperlinks & Animation.

Unit IV

PC Management: Disc Management Tools, PC tools, Norton utilities, Disk Doctor; Introduction to Computer Security, Viruses, Virus Detection, Prevention & Cure Utilities. Using Internet: Shared Folders; Browsers, E-Mails, Attachments; Search Engines,

Suggested Readings:

1. Taxali, PC Software, 2005, Tata McGraw Hills, New Delhi.
2. Suresh K. Basandra , Computers Today, 2005, Galgotia Publications.
3. P. K. Sinha , Computer Fundamentals,2005, BPB, New Delhi.
4. Peter Norton, Inside the PC, 2001, SAMS Tech Media.
5. Sanjay Saxena, MS Office for Everyone, 2005, Vikas Publications.
6. Peter Dyson, Understanding PC Tools, AET Publications.
7. Peter Dyson, Understanding Norton Utilities, AET Publications.

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Course No:-MCA14108EA

Course Title: Technical Communication

Unit I

Basics of Technical Communication, Barriers to Communication, Technology in Communication. Communicating in the Workplace: Problem Solving in Workplace Communication, Guidelines for writing with a computer, Human factors in the communication failure, Solving the persuasion problem. Guidelines for ethical communication. Guidelines for organizing a collaborative team, Peer reviewing and editing.

Unit II

Active Listening : Introduction , types of listening, Traits of a good listener , Active versus Passive listening , Implications of a good listening .Introduction to Effective Presentation strategies , Defining purpose , analyzing audience and locale , organizing contents , preparing outline , visual aids , understanding nuances of delivery ,kinesics , proxemics , paralinguistics ,chronemics ,sample speech. Interviews: introduction, Objectives, types of interviews, Job interviews. Group Communication: Introduction, Group discussion, Organizational Group discussions, meetings conferences

Unit III

Words and Phrases , Dictionary and Thesaurus , Elements of style , Sentence construction , guidelines for effectiveness, Paragraph development , Central components of a paragraph , length and techniques for paragraph development.

The art of condensation , steps for effective précis writing , samples and guidelines , Reading comprehension , purpose and reading rate , reading comprehension, reasons for poor comprehension, improving comprehension skills , techniques for good comprehension.

Unit IV

Visual Design and usability elements ,Designing Pages and Documents, Adding a document supplements, testing the usability of your document.

Memo reports and Electronic Mail : Purpose of memo reports , Elements of a usable memo Interpersonal considerations in writing a Memo , Common types of memo report. E-mail , Guidelines for using electronic mail, Letters and Employment correspondence , How applicants are screened for personal qualities , electronic job hunting , guidelines for surviving a job interview , Technical definitions : Purpose , level of detail , expansion methods , Purpose and general model of Technical description ,Elements of usable description .Procedure and processes , Proposal and analytical reports, Recording and documenting research findings.

Reference Books:

1. Meenakshi Raman and Sangeeta Sharma, “Technical Communication”, Oxford University Press
2. William Pfeiffer, Padmaja ”Technical Communication A Practical Approach” , Pearson Education.

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Course No:- MCA14109EA

Course Title: Computer Architecture

UNIT I

Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic - integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication - shift-and-add, Booth multiplier, carry save multiplier, etc. Division - non-restoring and restoring techniques, floating point arithmetic. Boolean algebra, simplification of Boolean expressions, k-map, tabulation method. Implementation of Boolean functions with logic gates.

UNIT II

Sequential logic , flip - flops , registers , up/down counters , BCD/Binary counters, Analysis and design of synchronous sequential systems, state assignment, races and hazards. Introduction to threshold logic & relay circuits. Introduction to switching devices. Positive and Negative logic of OR, AND, NOR, NAND. Exclusive OR and Exclusive NOR gates. RTL, DTL, DCTL, TTL, RCTL, ECL, HTL, MOS and CMOS logic circuit and their realization. Speed and delay in logic circuit and their realization. Fan-in, Fan-out, wired-or, wired-and, and noise immunity

UNIT III

CPU control unit design: hardwired and micro-programmed design approaches, Case study - design of a simple hypothetical CPU. Memory system design: semiconductor memory technologies, memory organization.

Peripheral devices and their characteristics: Input-output subsystems, I/O transfers - program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes - role of interrupts in process state transitions.

UNIT IV

Performance enhancement techniques

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs block size, mapping functions, replacement algorithms, write policy.

References:

David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Elsevier.

Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw Hill.

John P. Hayes, Computer Architecture and Organization, McGraw Hill.

William Stallings, Computer Organization and Architecture: Designing for Performance, Pearson Education.

Vincent P. Heuring and Harry F. Jordan, Computer Systems Design and Architecture, Pearson Education.

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Course No:- MCA14110EA

Course Title: Programming Languages

Unit I

The role of Programming Languages: Towards Higher Level Languages programming paradigms, Language implementation. Language Description: Syntactic Structures, Expression Notations, Abstract Syntax trees, Lexical Syntax, Context free grammars , grammars for expression. Imperative Programming: Structured Programming, Syntax directed control flow, Design considerations, handling special cases in loops, programming with invariants, proof rules for partial correctness, control flow in C

Unit II

Data Representation : The role of types , basic types , arrays , records , unions and variant records , Sets , Pointers , Two String tables , types and error checking. Procedure Activations: Introduction to Procedures, parameter passing methods, scope rules for names, nested scope in source text, activation records, lexical scope: procedures as in C

Objected oriented programming : Constructs for program structuring , Information hiding , Program design and modules , modules and defined types , class declarations in C++ , dynamic allocation in C++ , templates : Parameterized types , Implementation of Objects in C++., Inheritance , derived classes and information hiding

Unit III

Functional Programming : Language of expressions , types, values and operations , approaches to expression evaluation , lexical scope , type checking, Function declaration by cases , Functions as first-class values ,Implicit types , data types exception handling , Scheme , a dialect of Lisp , the structure of lists , list manipulation, Simplification of expressions. Logic Programming , Computing with relations , Introduction to Prolog , data structures in Prolog , Programming techniques , controls in Prolog, Cuts

Unit IV

An introduction to concurrent Programming : Parallelism in hardware , Streams : implicit synchronization , concurrency as interleaving, Liveliness properties , safe accesses to shared data concurrency in ADA .

Language Description : Semantic Methods , Synthesized attributes, Attribute grammars , natural semantics , Denotational Semantics , Equality of Pure Lambda terms , Substitution revisited , Computation with pure lambda terms , programming constructs as lambda terms , the typed lambda calculus , polymorphic types

Reference Books:

1. Ravi Sethi ,“ Programming Languages ,Concepts and Constructs”, Pearson Education
2. Freidman, Wand ,Haynes, ”Essentials of Programming Languages”, PHI.

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MCA14111EO Open elective (To be selected from outside department)

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MCA14112EO Open elective (Offered for students from outside department)