

**Post Graduate Department of Computer Sciences,
The University of Kashmir,
Srinagar - 190006**



Page No. 1-42

Main subjects of MCA 1st semester - 2011

S.No	Subject code	Subject Name	Theory Max	Theory min	Internal max	Internal min	External max	External min
1	100*	Computer Fundamentals and Applications	75	30	25	10	-	-
2	101	Microprocessor , ALP and its Applications	75	30	25	10	-	-
3	102	Technical Communication	75	30	25	10	-	-
4	103	Advanced Programming Concepts in C / C++	75	30	25	10	-	-
5	104	Advanced Database Management Systems	75	30	25	10	-	-
6	105	Discrete Mathematics	75	30	25	10	-	-
7	106	Lab for 103	-	-	25	10	50	20
8	107	Lab for 101/104	-	-	25	10	50	20
TOTAL			375	-	175	-	100	-
Grand total			650					

**For non BCA students only*

Main subjects of MCA 2nd semester - 2011

S.No	Subject code	Subject Name	Theory Max	Theory min	Internal max	Internal min	External max	External min
1	201	Advance Computer Systems	75	30	25	10	-	-
2	202	Data and File Structures	75	30	25	10	-	-
3	203	Numerical and Statistical Computing	75	30	25	10	-	-
4	204	Design and Analysis of Algorithms	75	30	25	10	-	-
5	205	Advanced Data Communication	75	30	25	10	-	-
6	206	Lab for 202	-	-	25	10	50	20
7	207	Lab for 203	-	-	25	10	50	20
TOTAL			375	-	175	-	100	-
Grand total			650					

Main subjects of MCA 3rd semester - 2019

S.No	Subject code	Subject Name	Theory Max	Theory min	Internal max	Internal min	External max	External min
1	301	Advanced Operating Systems	75	30	25	10	-	-
2	302	Optimization Techniques	75	30	25	10	-	-
3	303	Computer Graphics	75	30	25	10	-	-
4	304	Computer Networks , Protocols and Programming	75	30	25	10	-	-
5	305	Software Engineering & Management	75	30	25	10	-	-
6	306	Lab for 301	-	-	25	10	50	20
7	307	Lab for 304	-	-	25	10	50	20
TOTAL			375	-	175	-	100	-
Grand total			650					

Main subjects of MCA 4th semester - 2019

S.No	Subject code	Subject Name	Theory Max	Theory min	Internal max	Internal min	External max	External min
1	401	Organization Behavior and Personal Management	75	30	25	10	-	-
2	402	Object Oriented Modeling Analysis and Design	75	30	25	10	-	-
3	403	Data Warehousing and Data Mining	75	30	25	10	-	-
4	404	System Software Design	75	30	25	10	-	-
5	405	Elective I	75	30	25	10	-	-
6	406	Lab for 403/Elective	-	-	25	10	50	25
7	407	Lab for 404	-	-	25	10	50	25
TOTAL			375	-	175	-	100	-
Grand total			650					

Elective - I (Optional paper of 4th semester)

S.No	Subject code	Subject Name	Theory Max	Theory min	Internal max	Internal min	External max	External min
1	408	Windows Programming using C#	75	30	25	10	-	-
2	409	Pervasive Computing	75	30	25	10	-	-
3	410	Programming Language Paradigm	75	30	25	10	-	-
4	411	Management Information Systems	75	30	25	10	-	-
5	412	Theory of Computation & Formal Languages	75	30	25	10	-	-
6	413	Advanced Unix/Linux Programming	75	30	25	10	-	-

Main subjects of MCA 5th semester - 2013

S.No	Subject code	Subject Name	Theory Max	Theory min	Internal max	Internal min	External max	External min
1	501	Java Programming	75	30	25	10	-	-
2	502	Modeling & Simulation	75	30	25	10	-	-
3	503	Artificial Intelligence & Neural Networks	75	30	25	10	-	-
4	504	Web Programming	75	30	25	10	-	-
5	505	Elective II	75	30	25	10	-	-
6	506	Lab for 501/502	-	-	25	10	50	20
7	507	Lab for 504	-	-	25	10	50	20
TOTAL			375	-	175	-	100	-
Grand total			650					

Elective II (Optional paper of 5th semester)

S.No	Subject code	Subject Name	Theory Max	Theory min	Internal max	Internal min	External max	External min
1	508	Wireless and Mobile Communication	75	30	25	10	-	-
2	509	Bio-Informatics	75	30	25	10	-	-
3	510	Digital Image Processing	75	30	25	10	-	-
4	511	Quality Assurance and Testing	75	30	25	10	-	-
5	512	Design & Development of Embedded Systems	75	30	25	10	-	-
6	513	Network Security & Cryptography	75	30	25	10	-	-

Project of 6th semester - 2013

S.No	Subject code	Subject Name	Theory Max	Theory min	Internal max	Internal min	External max	External min
1	600	Project	-	-	150	75	200	100

Structure of Curriculum

1st Semester (2011)

- i. 100* Computer Fundamentals and Applications
- ii. 101 Microprocessor , ALP and its Applications
- iii. 102 Technical Communication
- iv. 103 Advanced Programming Concepts in C / C++
- v. 104 Advanced Database Management Systems
- vi. 105 Discrete Mathematics
- vii. 106 Lab for 103
- viii. 107 Lab for 101/104

* Course No. 100 is Compulsory for those students who have not studied computer fundamentals in their Bachelor's Degree, however the marks scored will not be accounted for totaling purposes.

2nd Semester (2011)

- i. 201 Advance Computer Systems
- ii. 202 Data and File Structures
- iii. 203 Numerical and Statistical Computing
- iv. 204 Design and Analysis of Algorithms
- v. 205 Advanced Data Communication
- vi. 206 Lab for 202
- vii. 207 Lab for 203

3rd Semester (2012)

- i. 301 Advanced Operating Systems
- ii. 302 Optimization Techniques
- iii. 303 Computer Graphics
- iv. 304 Computer Networks , Protocols and Programming
- v. 305 Software Engineering & Management
- vi. 306 Lab for 303
- vii. 307 Lab for 304

4th Semester (2012)

- i. 401 Organization Behaviour and Personal Management
- ii. 402 Object Oriented Modeling Analysis and Design
- iii. 403 Data Warehousing and Data Mining
- iv. 404 System Software Design
- v. Elective I
- vi. 406 Lab for 403/Elective I
- vii. 407 Lab for 404

MCA Syllabus –P.G. Dept. of Computer Science, University of Kashmir

Elective's for 4th Semester

- viii. 408 Windows Programming using C#
- ix. 409 Pervasive Computing
- x. 410 Programming Language Paradigm
- xi. 411 Management Information Systems
- xii. 412 Theory of Computation & Formal Languages
- xiii. 413 Advanced Unix/Linux Programming

5th Semester (2013)

- i. 501 Java Programming
- ii. 502 Modeling & Simulation
- viii. 503 Artificial Intelligence & Neural Networks
- iii. 504 Web Programming
- iv. Elective II
- v. 506 Lab for 501/502
- vi. 507 Lab for 504

Elective's for 5th Semester

- vii. 508 Wireless and Mobile Communication
- viii. 509 Bio-Informatics
- ix. 510 Digital Image Processing
- x. 511 Quality Assurance and Testing
- xi. 512 Design & Development of Embedded Systems
- xii. 513 Network Security & Cryptography

6th Semester (2013)

- i. Project seminar
- ii. Project Work with Dissertation

Note : This revised syllabus shall be implemented from the academic session 2011 as follows :-

- 1st and 2nd Semester - Academic Session 2011
- 3rd and 4th Semester - Academic Session 2012
- 5th and 6th Semester - Academic Session 2013

Semester - I → 2011

Course No: 100

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.

Course No: 101

Course Title : Microprocessor , ALP and its applications.

Unit I

IBM-compatible Personal Computer , Re-programmable. Microcomputers, General Architecture of Micro-computer, System Evaluation of Intel Microprocessor Architecture , Software Model of 8088 / 8086 Microprocessor , Memory Add. Space and Data Organization, Data Types, Segment Registers, Memory Segmentation Dedicated, reserved and General use of Memory, generating an Memory Address, Pin-out diagram of 8086 Microprocessor.

Unit II

The Microcomputer Organization, Assembly Language Programming Development on PC, Instruction Set, Addressing Modes, 8086 Instruction set, Using Trace & Go Commands. Integer Instructions and Computations, Data Transfer, Arithmetic, Logic Shift, Rotate Instruction, Flag Control, Compare, Control Flow & Jump, Subroutine & Subroutine Handling Instructions, Loop & Loop Handling, String & String Handling Instructions. Statement Syntax for a source Program, Assembler Directives, Assembling, Linking, Loading & executing a run Module.

Unit III

Core-Special purpose I / O Interfaces, Byte-only Input / Output ports using Isolated I / O, Input / Output handshaking & Parallel Printer Interfaces, Memory Mapped I/O, DMA Controller, Serial Communication Interface, Programming Communication Interfaces Controller. Interfacing I/O devices to microprocessor, programmable peripheral interface, programmable interrupt controller, Development of Monitor program. Sensors and transducers, analogue signal processing, multiplexes and demultiplexers, sample-and-hold circuits, ACD and DAC devices

Unit IV

Interrupt, Mechanism, Types & Priority, Interrupt Vector table, Interrupt Instruction, Enabling/Disabling of Interrupts, External Hardware-Interrupt Interface Signals/Interrupt Sequence. Software Interrupts, Non-Maskable Interrupts, Reset, Internal Interrupt, Real Mode.

8086 / 8088 Microprocessors & their I/P & O/P Interfaces, 8086 / 8088 Microprocessor's Minimum Mode, Maximum Mode Systems and Interface Signals, Electrical Characteristics, System Clock, Bus Cycle & Unit States, Hardware Organization of the memory address space, Address Bus Codes, Memory Control Signals, Read & Write Bus Cycles, Memory Interface Circuits, Transfers Types of I/O, Isolated I/O interfaces, I/O Data Transfers & Instruction, I/O Bus Cycles.

Reference Books:

1. DOUGLAS HALL "Microprocessors and Interfacing" Tata McGrawHill.
2. LIU, GIBSON et al "Microcomputer system The 8086/8088 Family" PHI.
3. PAL CHAUDHURI "Computer Organization and Designing" PHI.
4. MORRIS MANO "Computer System Architecture" Pearson Education.
5. GILMORE "Microprocessors" Wiley/ Tata McGraw Hill.

Smiles

Course No: – 102

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.

Course No: – 103

Course Title: Advanced 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.

1. FOSTER AND FOSTER "C by discovery" RRI penram.
2. YASHWANT KANETKAR " Let us C " PHI.
3. E. BALAGURUSWAMI "Programming in ANSI C" Tata McGraw Hill.
4. BJARNE STROUSTRUP " The C++ programming language" Pearson Education.
5. HERBERT SCHILD " C++ The complete Reference" Tata McGraw Hill.
6. ROBERT LAFORE "Object orientation with C++ Programming" Waite Group.

Course No: – 104

Course Title: Advanced Database Management Systems

Unit I

Elementary Database Concepts. Hierarchical, Relational, Network and OO Database Architectures and their comparison. Data Models : EER model and relationship to the OO model, Object Oriented data model and ODMG standard, Other data models – NIAM, GOOD, ORM. Query Optimisation: Query Execution Algorithms, Heuristics in Query Execution, Cost Estimation in Query Execution, Semantic Query Optimisation.

Unit II

Transaction Processing Concepts, Transaction and System Concepts, Desirable Properties of a Transaction, Schedules and Recoverability, Serializability of Schedules, Transaction Support in SQL, Recovery Techniques, Database Backup, Concurrency control, Locking techniques for Concurrency Control, Concurrency Control Techniques, Granularity of Data Items.

Unit III

Client Server Concepts, 2-Tier and 3-Tier Client Server Systems, Client/Server Architecture and the Internet, Client /Database Server Models, Technology Components of Client Server Systems, Application Development in Client Server Systems. Distributed Databases: Reliability and Commit protocols, Fragmentation and Distribution, View Integration, Distributed database design, Distributed algorithms for data management, Heterogeneous and Federated Database Systems.

Unit IV

Deductive Databases: Recursive Queries, Basic inference Mechanism for Logic Programs, Deductive Database Systems, Deductive Object Oriented Database Systems. Commercial and Research Prototypes: Parallel database, Multimedia database, Mobile database, Digital libraries, Temporal database.

Text Book: Fundamentals of Database Systems (3 edition), Elmasri R. and Navathe S.B., 2000, Addison Wesley, Low Priced Edition.

Reference Books:

1. William Page, "Using Oracle 8i – Special Edition", Que/PHI.
2. Ivan Bayross, "SQL & PL/SQL Using Oracle 8i & 9i with SQLJ", BPB.
3. Desai.B , "An introduction to Database Concepts", Galgotia Publications, N.Delhi
4. Database System Concepts by A. Silbershatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill, International Edition.
5. Dates.C , " An introduction to Database Systems", Pearson Education, Asia.

Course No: 105
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, Digraphs, 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, Multigraphs and Weighted graphs, Representing Graphs, Connectivity of Graphs: Paths and Circuits, Eulerian 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: Monoids, semigroups, Product and quotients of algebraic structures, Isomorphism, homomorphism , automorphism, Normal subgroups ,Codes and group codes.

TextBook :

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

Reference Books:

1. LIU "Elements of Discrete Mathematics " Tata McGraw Hill
2. SCHAUMS "Discrete Mathematics " Tata McGraw Hill
3. KOLMAN/REHMAN "Discrete Mathematical Structures " Pearson Education
4. NICODEMI "Discrete Mathematics " CBS