

**OUTLINES OF TESTS,
SYLLABI AND COURSES OF READINGS
CHOICE-BASED CREDIT SYSTEM**

**FOR
MCA (MASTER OF COMPUTER APPLICATIONS)
(SEMESTER SYSTEM)**

**MCA-I (Ist & IInd Semester)
[For the Session 2018-19]**

**MATA GUJRI COLLEGE
SRI FATEHGARH SAHIB-140406**

MATA GUJRI COLLEGE
SRI FATEHGARH SAHIB-140406
(An Autonomous College)

SYLLABUS, OUTLINES OF PAPERS AND TESTS
CHOICE-BASED CREDIT SYSTEM
M.C.A. (MASTER OF COMPUTER APPLICATIONS)
FIRST YEAR-FIRST SEMESTER EXAMINATIONS
Session 2018-19

CODE NO.	TITLE OF PAPER	Schedule of Teaching (Hours/Week)			Total Hours	Credits	Marks	
		L	T	P			Internal	External
MCA-111	Introduction to Information Technology	5	0	0	5	5	50	50
MCA-112	Problem Solving & Programming in C	5	0	0	5	5	50	50
MCA-113	Computer Organisation and Architecture	5	0	0	5	5	50	50
MCA-114	Mathematical Foundations of Computer Science	5	0	0	5	5	50	50
MCA-115	*Choice Based Course-I	5	0	0	5	5	50	50
MCA-116	Programming Lab-I	0	0	5	5	} 5	60	40
MCA-117	Programming Lab -II (Based on Paper MCA-112)	0	0	5	5		60	40
	Total	25	0	10	35	30	370	330

* **Choice Based Course-I:** Any one of the following papers:

1.	MCA-115C1	Communication Skills
2.	MCA-115C2	Principles & Practices of Management
3.	MCA-115C3	Accountancy and Financial Management

CONTINUOUS ASSESSMENT (THEORY PAPERS)

1.	Two tests will be conducted during a semester. Both the tests will be counted for assessment.	:	60% of the total marks allotted for continuous assessment.
2.	Assignment/Quizzes	:	20% of the total marks allotted for continuous assessment.
3.	Attendance	:	10% of the total marks allotted for continuous assessment.
4.	Class Participation and behaviour	:	10% of the total marks allotted for continuous assessment.

MCA - 111: Introduction to Information Technology

Maximum Marks: 100

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. This course offers a good understanding of the various functional units of a computer system.
2. The students are also exposed to the recent trends in computing models.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II. Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Computer Fundamentals: Block structure of a computer, classification of computers on the basis of capacity, purpose, and generations. Number System: Bit, byte, binary, decimal, hexadecimal, and octal systems, conversion from one number system to the other, Binary Arithmetic: Addition, subtraction and multiplication.

Representation of Information: Integer and floating point representation, Complement schemes, Character codes (ASCII, EBCDIC, BCD, 8421, 2421, Excess-3, Gray, Hamming)

Memory types: Magnetic core, RAM, ROM, Secondary, Cache

Input and Output Units: Functional characteristics, **Storage devices**

Graphical I/O devices: Light pen, joystick, Mouse, Touch screen, OCR, OMR, MICR. **Printers:** Impact, non-impact.

UNIT-II

Computer languages: Machine language, assembly language, higher level language, 4GL. Introduction to Compiler, Interpreter, Assembler, System Software and Application Software.

Introduction to Operating System: Functions of operating systems, Popular Operating Systems— Android, Windows, Linux, Unix, ios and their comparison

Modern Computing Models: Cloud Computing Model and Its Benefits, Grid Computing, Internet of Things (IoT), Big Data Analytics.

Introduction to Threats: Threat Sources and Targets, Types of Threats: Viruses, Worms, Trojans, Advanced Persistent Threats (APT's), Steganography, Types of Attacks: Manual, Physical, Network and Application Layer Attacks;

Digital Payment System: e- Cash, Credit/Debit Cards.

Introduction to Green Computing: ICT and the environment, Applications of Green computing, Impact of IT resources on the global environment.

Text Books:

1. D. H. Sanders, "Computers Today", McGraw Hill.
2. Satish Jain, "Information Technology", BPB.

References:

1. R. S. Salaria, "Fundamentals of Computers", Salaria Publishing House
2. David Cyganski, John A. Orr, "Information Technology Inside and Outside" Pearson Education .
3. ChetanSrivastva, "Fundamentals of Information Technology, Kalayani Publishers.
4. Petrick Norton, Fundamentals of Computers

MCA-112: Problem Solving & Programming in C

Maximum Marks: 100

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. To enable the students to solve the problems using programming technique and to implement these programming techniques to create software.
2. This course will enable the students to analyze the real life problems and write a program in C language to solve the problem. The main emphasis of the course will be on problem solving aspect.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Introduction: Algorithms and flowcharts, Structure of a C Program, Compiling and running a Program.

Elements of C – Tokens, Identifiers, Data types, Operators, expressions, I/O statements, Pre-processor directives, header files.

Control Structures: Decision control statements, Iterative statements, control break statements.

Functions: Definition and advantages of function, Classification of functions-Library functions, User defined functions, parameter passing techniques, categories of user defined functions.

Recursion: Recursion vs. Iteration, Implementation of recursion, Advantages and disadvantages of Recursion.

Storage Classes: automatic, register, external and static, illustrative examples of each storage class.

Arrays: Definition, Initialization, One dimensional arrays, Passing one dimensional arrays to functions, Two Dimensional arrays, passing two dimensional array to functions, multidimensional arrays.

UNIT-II

Strings: Defining, Initializing, Traversing, String handling using library functions and without using library functions, Passing strings to functions, array of strings.

Pointers: Address & dereferencing operators, pointer to pointer, pointer and one dimensional array, pointer arithmetic, passing pointer to functions.

Structures: Definition, accessing structure members, Array of structure, Nesting of structure, structure and pointers, passing structure to functions, Unions.

File processing: Concept of streams, Opening & Closing files, Reading and writing from the files, file opening modes.

Text Books:

1. Kerighan& Richie The C programming language (PHI Publication)
2. Byron Gottorfried Schaum's outline of programming with C.

References:

1. Kanetkar "Let Us C", BPB Publications. (Tata McGraw Hill)
2. E. Balaguruswamy Programming in ansi 'C' (Tata McGraw Hill)

MCA 113: Computer Organisation and Architecture

Maximum Marks: 100

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. The objective of this course is to make the student understand the concept of programs as sequences of machine instructions.
2. This course offers understanding the working of the control unit, memory and CPU.
3. After the completion of course, the students will be able to understand the design of logic circuits.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II. Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Logic gates, Boolean Algebra & K-Maps. Combinational logic design: half-adder/subtractor, full adder/subtractor, parallel adder Multiplexers, Demultiplexers, Decoders, Encoders. **Sequential Circuit:** (Flip flops- D, RS, JK, JK-Master-slave).

Counters (Ripple, Asynchronous, Synchronous, Mod 3, Mod 5, Decade, up/down)

Computer organization: Structure of Computer, Instruction Codes, Instruction formats (Three address, two address, one address and zero address), instruction cycle. Addressing modes.

Register Transfer and Micro operations: Register Transfer language, Arithmetic, Logic and shift micro-operations

UNIT-II

Control Memory: Design of control unit, Micro program sequencer, Micro programmed and Hardwired Control Unit. Program Interrupts, Features of RISC and CISC.

Modes of data transfer: Programmed – Initiated, Interrupt Initiated, DMA, DMA Controller, DMA transfer, Input-Output Processor (IOP), CPU-IOP Communication.

Memory system: Memory hierarchy, Main Memory ,RAM and ROM chips, Memory Address map and Connection to CPU , Auxiliary memory (Memory Tape and Disk), Associative Memory, Virtual and cache memory and related mapping. Memory Management Hardware.

Text Books:

1. M.M. Mano “Computer System Architecture”, PHI.
2. R.P.Jain “Modern Digital Electronics”, Tata Mc Graw Hill.

References:

1. J.P.Hayes: “Computer Architecture and Organizations”, Mc Graw Hill
2. Stallings “Computer Organization and Architecture” PHI.

MCA 114: Mathematical Foundations of Computer Science

Maximum Marks: 100

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. The purpose of this course is to understand and use discrete structures as a backbone of computer science.
2. This course is designed to introduce the students to the basic mathematics concept like set theory, algebraic structures, Boolean algebra, and graph theory.
3. On the completion of this course, the students will be able to explain and apply the basic methods of discrete mathematics in Computer Science.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Set Theory: Sets, Power Sets, Set Operations, Inclusion –Exclusion Principal, Cartesian Product of sets.

Logic: Proposition, Implications, Translating English sentences into logical expressions, Propositional equivalences, Predicates and quantifiers. Principal of Mathematical Induction.

Relations: Relations and Digraphs, n-array relations and their applications, Properties of relations, Representing relations, Closure of relation, Equivalence of relation, operation on relations, Partial ordering.

Functions : Functions, One to One to functions, Onto functions, Inverse and Composition of functions.

UNIT-II

Statistics: Introduction , importance and scope of statistics.

Measures of Central Tendency : Mean, Median, Mode and Quartile.

Measures of Dispersion : Range, Quartile Deviation, Mean Deviation and Standard Deviation. Correlation

Analysis : Karl Pearson's coefficient of correlation, Spearman's rank correlation.

Regression Analysis : Introduction, utility, Methods of least squares, Coefficient of Regression, Standard error of estimate, Coefficient of Determination.

Text Books:

1. Discrete Mathematics Structure: Bernard Koleman C Busby, Sharon C.Ross4th Edition. Pearson education Asia.
2. Statistical Methods: S.P Gupta, Sultan Chand and Sons.
3. Discrete Mathematics: Richard Johnsonbaugh, 5th edition Pearson Education Asia.
4. Rosen, K.H: Discrete Mathematics and Its Applications 5th Edition, TMH Publications.

References:

- 1.Elements of Discrete Mathematics: Second Edition Tata McGraw Hill.
- 2.Discrete Mathematics: SeymonLipschutz& Max Lans Lipson Tata McGraw Hill.
- 3.“Advanced Engineering Mathematics”. E.Kreyszig, 8th edition, Wiley.
4. “Advanced Engineering Mathematics”, R.K Jain & S.R.K. Lyenger, Wiley Eastern. Edition

MCA – 115 C1: Communication Skills

Maximum Marks: 100

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. The proposed syllabus will help in enhancing Business Etiquettes, Media etiquettes, Table Etiquettes.
2. This course will develop self confidence in students by enhancing their verbal and non-verbal communication skills.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II. Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Writing and Speaking English: Parts of speech, Resume Writing, Business Letters, Vowels, Diphthongs, Consonants, Consonant Clusters, Stress and Syllable, Syllable Division, Connected Speech, Making Presentations.

Getting Ready for Interviews: Corporate Dressing, Business Etiquettes, Media etiquettes, Table Etiquettes.

The Hidden Data of Communication: The Importance of feelings in communication, dealing with feelings, importance of developing assertive skills, developing self confidence, developing emotional intelligence, dealing with people.

UNIT-II

Group Activities and World of Teams: Importance of team work, working with groups, Group Discussion and Group Decision- Making

The Art of Communication: Verbal Communication-Effective Communication, Effective /Active Listening, Paraphrasing, Feedback, Non Verbal Communication-Personality Enhancement, Body Language.

Ethical Orientation: Ethical Dilemmas and Choices.

Recommended Books:

1. Infosys Campus Connect Soft Skills, Participant Manual, Infosys Technologies Ltd Bangalore.
2. The Seven Habits of highly Effective People-Stephen R. Covey.
3. Who Moved By Cheese- Dr. Spenser Johnson
4. The seven Spiritual Laws of Success – Deepak Chopra
5. I'm Ok Y'ar OK – Erric Seghal
6. Emotional Intelligence – David Goleman
7. Working With Emotional Intelligence
8. Good To Great- Jimm Collins
9. Goal – Eliyahu Goldratt
10. Only the Paranoid Survive- Andrew Grove
11. All the books in the "Chicken Soup for the Soul" series.
12. "Effective Group Discussion: Theory and Practice" by Gloria J. Galanes, Katherine Adams, John K. Brillhart
13. "Effective Presentation", 3rd Edition by Ros Jay, Antony Jay published by Pearson
14. Effective Presentation Skills(A Fifty-Minute Series Book) by Steve Mandel

MCA – 115 C2: Principles & Practices of Management

Maximum Marks: 100

Maximum Time: 3 Hrs.

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. This course enables students to take better management and planning decisions.
2. Improves Communication and Interpersonal skills.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Management :Definition, Importance and Function of Management,

Evolution of Management Thoughts : Contributions made by Taylor, Peter F Drucker, Fayol, Elton Mayo.

Planning: Types of plans, steps in planning, and process of planning,

Authority and Responsibility: Concept, Delegation of Authority, Process of Delegation.

Controlling: Its Functions, Steps and Essentials to make Controlling Effective.

UNIT-II

Motivation: Motivation, its meaning, type of motives, theories of Motivation (Maslow, Herzberg, McGregor & McClelland's).

Communication: Process, types, Communication Barriers

Leadership : Theories and Leadership Styles in Management

Interpersonal Skill: Transactional Analysis, Johari Window

Text Books:

1. L. M. Prasad, Principles & Practice of Management. Sultan Chand & Sons.

References :

1. Koontz H. and Weihrich H., Essentials of Management, Tata McGraw- Hill Publishing Co. Ltd., New Delhi, 12th Edition.
2. Stoner J., Management, Prentice-Hall of India Ltd., New Delhi, 6th Edition.
3. Luthanas F. Organizational Behaviour, McGraw-Hill, New York.
4. Robbins S.P., Organizational Behaviour, Prentice-Hall of India Ltd., New Delhi.

MCA-115 C3: Accountancy and Financial Management

Maximum Marks: 100

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. Students will be exposed to the fundamental accounting concepts.
2. Finally students will be able to manage their day to day financial matters.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Accounting concepts, conventions and principles, Double entry system of accounting, Introduction to basis books of accounts of sole proprietary concern, Journalizing of transactions, closing of books of accounts and preparation of trial balance.Final Accounts: Trading, Profit and Loss accounts and Balance sheet of sole proprietary concern (without adjustment).

UNIT-II

Financial Management: Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: Ration Analysis, Funds Flow statement and Cash flow statement (without adjustments).Costing: nature, importance and basic principles. Marginal costing: Nature, scope and importance, Break even analysis, its uses and limitations, construction of break even chart, Standard costing: Nature, scope and variances (only introduction).Computerized accounting: Meaning and advantages, Computer Programs for accounting, computer based auditing.

Text Book:

1. Anil Chowdhary, Fundamentals of Accounting and Financial Analysis, 1stEdition,Pearson Education.

References:

1. Mukherjee and M. Hanif, Financial Accounting for Management, 1stEdition,Tata McGraw Hills.
2. Ramchandran and Kakani, Financial Accounting for Management, 2ndEdition,Tata McGraw Hills.
3. T. P. Ghosh, Accounting and Finance for Managers, 1stEdition,Taxman.
4. Ashish K. Bhattacharya, Essentials of Financial Accounting, PHI, New Delhi.
5. Charles T. Horngren, Cost Accounting: A Managerial Emphasis, 14th Edition, Pearson Education.
6. M.Y. Khan, and P.K. Jain, Cost Accounting, 2nd Edition, Tata McGraw Hills.
7. P.H. Barrett, Computerized Accounting, BPB.

MCA-116: Programming Lab-I

Maximum Marks: 100

Internal Assessment:60

External Examination:40

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Practical units to be conducted: 45-55

The syllabus and course learning objectives are:

1. The objective of the course is to provide basic skills in Photoshop and CorelDraw.
2. By the end of the course a student will be capable to edit images and create documents using the features and tools available in Photoshop and Corel Draw.

Corel Draw

Topics to be covered:-

1. Creating new Document, working with Templates, Import and Export.
2. Tools of Corel draw: Working with text and lines, Artistic text, Paragraph text, Fitting text to a path, Applying effects to text.
3. Working with shapes and objects.
4. Creating Graphical special effects.
5. Working with curves, Colours and Bitmaps.
6. Working with tables.

Photoshop

Topics to be covered:-

1. Basics of Adobe Photoshop.
2. Creating new image files and opening existing files in Photoshop.
3. Understanding and handling different image file formats, changing the resolution, color, greyscales and size of the mages. Zooming & panning an image.
4. Working with multiple images, rulers, guides & grids. Creating multicolor images and using brushes, adjusting color using the panel.
5. Cropping, rotating, overlapping and superimposing photos on a page.

References

1. CorelDRAW X5 The Official Guide by Gary David Bouton, McGraw Hill Professional.
2. Adobe Photoshop CS6, Bible the comprehensive, tutorial resource – Lisa DanaeDayley, Brad Dayley - Wiley India.

MCA-117: Programming Lab-II (based on Paper MCA-112)

Maximum Marks: 100

Internal Assessment:60

External Examination:40

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Practical units to be conducted: 45-55

The syllabus and course learning objectives are:

1. To enable the students to solve the problems using programming technique and to implement these programming techniques to create software.
2. To provide the students hands on experience of “C” programming and to enhance their logical skills.

This laboratory course will mainly comprise of exercises on what is learnt under the paper **MCA-112(Problem Solving & Programming in C)**

Mata Gujri College, Sri Fatehgarh Sahib
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SYLLABUS, OUTLINES OF PAPERS AND TESTS
CHOICE-BASED CREDIT SYSTEM

M.C.A. (MASTER OF COMPUTER APPLICATIONS)
FIRST YEAR-SECOND SEMESTER EXAMINATIONS
Session 2018-19

CODE NO.	TITLE OF PAPER	Schedule of Teaching (Hours/Week)			Total Hours	Credits	Marks	
		L	T	P			Internal	External
MCA-121	Operating System	5	0	0	5	5	50	50
MCA-122	Object Oriented Programming Using C++	5	0	0	5	5	50	50
MCA-123	Relational Database Management System	5	0	0	5	5	50	50
MCA-124	Software Engineering	5	0	0	5	5	50	50
MCA-125	*Choice Based Course-II	5	0	0	5	5	50	50
MCA-126	Programming Lab-III (Based on Paper MCA-122)	0	0	5	5	} 5	60	40
MCA-127	Programming Lab-IV (Based on Paper MCA-123)	0	0	5	5		60	40
	Total	25	0	10	35	30	370	330

***Choice Based Course-II:** Any one of the following papers:

1.	MCA-125 C1	Data Communication
2.	MCA-125 C2	Organizational Behaviour & Development
3.	MCA-125 C3	Computer Oriented Numerical Methods

CONTINUOUS ASSESSMENT (THEORY PAPERS)

1.	Two tests will be conducted during a semester. Both the tests will be counted for assessment.	:	60% of the total marks allotted for continuous assessment.
2.	Assignment/Quizzes	:	20% of the total marks allotted for continuous assessment.
3.	Attendance	:	10% of the total marks allotted for continuous assessment.
4.	Class Participation and behaviour	:	10% of the total marks allotted for continuous assessment.

MCA 121: Operating System

Maximum Marks: 100

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. The objective of this course is to help students become familiar with the fundamental concepts of operating systems and provide students with sufficient understanding of operating system design.
2. Students will be exposed to use computer system resources in an efficient manner.
3. Students will be exposed in such a way as to permit the effective development, testing, and introduction of new system functions without interfering with service.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Introduction: Operating System as a resource manager, operating system services.

Processor Management: Process overview, process states and state transition.

Process Synchronization :Critical section problem, semaphores, classical synchronization problems.

CPU scheduling: Basic concepts, Scheduling Criteria, Scheduling algorithms.

Memory Management: Logical versus Physical address space, Swapping, Partition, paging, segmentation.

Virtual memory: Demand paging, Page replacement algorithms, Allocation algorithms, Thrashing.

File Management: File concept, access methods, and Directory structure – single level, two level, tree structures, acyclic graph and general graph directory. Allocation methods: Contiguous ,linked and index allocation, free space management.

UNIT-II

Deadlock: Deadlock characteristics, Prevention, Avoidance, Detection and Recovery.

Device management: Disk structure, disk scheduling, FCFS scheduling, SSTF scheduling, SCAN scheduling, C-SCAN scheduling, Selecting Disk Scheduling Algorithms.

Security: Authentication, Program Threats, System Threats and Encryption.

Introduction to distributed systems: Topology, Network types, Communication, Design Strategies.

Distributed file system: naming and transparency, remote file access.

Distributed co-ordination: event ordering, mutual exclusion, atomicity, concurrency control, deadlock handling.

Text Books:

1. Silberschatz, P.B.Galvin and G. Gagne, Operating System Concepts (6th ed.), John Wiley & Sons, Inc.

References:

1. A.S. Tanenbaum, Modern Operating Systems (2nd ed.), Prentice-Hall of India.

2. William Stallings, Operating Systems: Internals and Design Principles (5th ed.), Prentice-Hall of India.

3. Gary Nutt, Operating Systems: A Modern Approach (3rd ed.), Addison Wesley.

4. Infosys Campus Connect Foundation Program Volume:1 – 3, Education & Research Department, Infosys Technologies Ltd , Bangalore.

MCA 122: Object Oriented Programming Using C++

Maximum Marks: 100

Maximum Time: 3 Hrs.

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. To provide information about concepts of OOPS.
2. By the end of the course a student will be capable to design and develop different computer software applications and will be able to implement various algorithms in programming languages for research purpose.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Object-Oriented Programming Concepts: Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming concepts of an object and a class, implementation of a class, encapsulation, abstraction, inheritance, overloading, polymorphism.

Standard Input/Output: Concept of streams, input/output using overloaded operators >> and << and formatting using manipulators- endl, dec, oct, hex, setbase, setw, setfill, setprecision.

Classes and Objects: Specifying a class, creating class objects, accessing class members, defining member functions, static data members, static member functions.

Constructors and Destructors: Need for constructors and destructors, parameterized constructors, constructor with default arguments, friend functions.

Pointers and Dynamic Memory Management: Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using *new* and *delete* operators.

UNIT-II

Operator Overloading and Type Conversion: Overloading operators, rules for overloading operators, overloading of unary and binary operators.

Inheritance: Introduction, defining derived classes, forms of inheritance- single inheritance, multilevel inheritance, hierarchical inheritance, multiple inheritance, hybrid inheritance.

Polymorphism: Concept of binding - early binding and late binding, virtual functions, pure virtual functions.

Exception Handling: Review of traditional error handling, exception handling mechanism-try, throw and catch constructs, multiple catch blocks, catch all exceptions.

Templates and Generic Programming: Template concepts, Function templates, overloading function templates, illustrative examples.

File handling: File streams, creating objects of ifstream, ofstream and fstream, reading and writing text files, file opening modes.

Text Books:

1. D. Ravichandran, "Programming with C++", TMH.
2. Herbert Schildt, C++ : The Complete Reference, Tata McGraw-Hill.
3. Paul Deitel and Harvey Deitel, C++ How to Program, Pearson Education.

References:

1. Robert Lafore, Object Oriented Programming in C++, Pearson Education.
2. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley Publication Co.

MCA-123: Relational Database Management System

Maximum Marks: 100

Maximum Time: 3 Hrs.

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. To provide comprehensive coverage of the problems involved in database design, in-depth coverage of data models and database languages, and a survey of implementation techniques applied in modern DBMS.
2. To provide practical skills of conceptual/logical database design and general familiarity with the problems and issues of database management.
3. To develop skills that is appropriate for Database Administrators, Database Application Developers, Database Specialists, and DBMS developers.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Introduction to DBMS: Basic concepts of Database and DBMS, Master and Transaction Files..

Traditional Approach to Information Processing: Characteristics and Limitations. Components of DBMS Environment, Database Schema and Instance. Advantages of DBMS, Disadvantages of DBMS. Difference between Centralized and Distributed databases. Three Level architecture of DBMS, Mapping between different levels, Data Independence .DBMS Users, Data Dictionary.

Data Models: Definition, Object Based Logical Model: E-R model: Definition, Entity and Relationship, cardinality of a relationship, E-R Diagram Notations, Modelling using E-R Diagrams, Aggregation, Generalization, Specialization, Transforming E-R Model into Physical database Design, merits and demerits of E-R Modelling.

Record Based Logical Models: Hierarchical Model, Network Model, Relational Data Model: Operations, Implementation, Advantages and Disadvantages of record based logical models. Comparison between Hierarchical, Network and Relational Model.

RDBMS : Definition, Types of keys. Relational Integrity Rules, CODD's Rules.

Relational Algebra: definition, Types of relational operator. Relational Calculus: definition, Tuple and Domain oriented Relational Calculus.

Integrity: Domain, Entity and Referential.

Normalization: Definition, Need, Functional Dependency, Full Functional Dependency, Partial Dependency, Transitive dependency, Multivalued Dependency, Join Dependency, Types of Normal Forms, Merits and Demerits of Normalization.

UNIT-II

Introduction to other database systems: SQL Lite, MySQL

Query Processing & Transaction Processing Systems: Batch, On-line, Real time, Transaction Properties, Locking, Granularity of Locking, Intent Locking, Deadlock, Time stamping.

Security: Privileges, Granting and Revoking Privileges and roles.

Recovery: Transaction Log: Deferred Update.

Concurrency: Definition, Possible Problems: Lost Update, Dirty read, Incorrect Summary, Phantom Record, Immediate Update, Check-Points, Shadow Paging.

Text Books:

1. Elmasry, Navathe, "Fundamentals of Database System", Pearson Education.
2. Henry F. Korth, A Silberschhatz, "Database Concepts," Tata McGraw Hill.

References:

1. C.J. Date , " An Introduction to Database Systems", Pearson Education.
2. Oracle SQL Complete Reference", Tata McGrawHill.
3. Infosys Campus Connect Foundation Program Vol-2, Education & Research Department, Infosys Technologies Ltd , Bangalore.

MCA-124: Software Engineering

Maximum Marks: 100

Maximum Time: 3 Hrs.

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. To study how to plan and manage projects at each stage of the software development life cycle.
2. To train software project managers and other individuals involved in software project planning and tracking and oversight in the implementation of the software project management process.
3. To understand successful software projects that support organization's strategic goals.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed

UNIT-I

Introduction to Software Engineering: Problem Domain, Challenges, Software Engineering Approach;

Software Development process: Process Characteristics, Process Models : Waterfall, Prototype, Spiral, Iterative Enhancement; Project Management Process, The Inspection process, Software Configuration Management Process, Requirements Change .Management Process. Software Process Planning, Effort Estimation, Project Scheduling and Staffing ,Risk Management.

Software Requirements Analysis and Specification: Analysis Approaches, Characteristics and Components of SRS, Validation, Metrics.

Software Design: Design Principles, Module level concepts, Design Notation and Specification, Structured Design Methodology, Verification, Metrics, OO Analysis and OO Design, OO Concepts, Object –oriented Design Methodology approach.

Coding: Programming practice, Verification: code reading, reviews, static analysis, and symbolic execution.

UNIT-II

User-Interface Design: Introduction to User-Interface Design, Elements, Design Principles, Design Tips and Techniques, Good v/s Bad Interface. **Software Metrics:** Software Measurement and Metrics, Designing Software Metrics, Classification of Software Metrics, Issues in Software metrics,

Software Quality: Quality concepts, Software Quality Assurance Group, Activities, ISO 9000. Capability Maturity Model, Six-Sigma, Metrics for Software Quality, McCabe's cyclomatic complexity metric.

Software Testing: Objectives, Principles, Test case design, White-Box testing and Black-Box testing techniques : Equivalence class partitioning, Boundary value analysis, cause-effect graphing, Graph Based Testing and mutation testing.

Testing: Testing techniques, metrics for OO testing : CK metric suite, Lorenz and Kidd's metric suite, Debugging. Software Re-engineering: Basics of Software Re-engineering, Re-engineering Process Model, Legacy Systems.

Text Book:

1. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publications.

References:

1. Roger. S. Pressman, "Software Engineering - A Practitioner's Approach", Fifth Edition, McGraw Hill.
2. Rohit Khurana, "Software Engineering : Principles and Practices", Vikas Publishing House.
3. P.Jalota,"An Integrated Approach to Software Engineering ", Narosa Publications.

MCA-125 C1: Data Communication

Maximum Marks: 100

Maximum Time: 3 Hrs.

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. This course will make the students learn about different types of data transmission and data encoding techniques.
2. By the end of the course , students will be able to create networks using various data transmission facilities.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed

UNIT-I

Introduction to Data Communications: Analog & Digital data, Analog and Digital signals, Periodic and Aperiodic signals, Introduction to Amplitude, Frequency, Phase, Bit Interval, Bit rate. Transmission Impairments-Attenuation. Distortion, Noise, Electromagnetic spectrum.

Data Encoding: Analog Data- Analog Signals: Amplitude Modulation, Frequency Modulation, Digital Data-Digital Signals: Unipolar, Polar-NRZ, RZ, Biphasic (Manchester and Differential Manchester), Bipolar schemes, Digital Data-Analog Signals : Amplitude shift keying, Frequency shift keying, Phase shift keying. Analog Data-Digital Signals : Pulse amplitude modulation and Pulse code modulation.

Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing.

UNIT-II

Switching: Circuit Switching- circuit switching concepts, space division switching-crossbar switch and multistage switch, Packet switching- Packet switching principles, routing in packet switching.

Error Detection & Correction: Nature of Errors-Single bit and burst errors, Error detection methods- Parity check, Cyclic Redundancy Check, Checksum, Error correction methods-Hamming Code.

Asynchronous Transfer mode (ATM): Design goals, ATM Architecture, Transmission Path, Virtual Path, Virtual Circuit, ATM Layers, Mobile Adhoc Networks.

Text Books:

1. Data Communications & Networking by Forouzan, Tata McGraw Hills.
2. Data & Computer Communications by William Stallings, Pearson Education

References:

1. Infosys Campus Connect Foundation Program Volume:1 – 3, Education & Research Department, Infosys Technologies Ltd , Bangalore.

MCA 125 C2: Organizational Behaviour and Development

Maximum Marks: 100

Maximum Time: 3 Hrs.

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. To develop organizational skills among the students.
2. Students will learn different motivation theories which will help to make them confident to solve problems effectively.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II . Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Organization Behaviour: Defining OB Features and Importance, Models of OB, Challenges & Opportunities for OB. Understanding and Managing Individual Behaviour. **Personality:** Concepts, Theories and determinants of Personality **Perception:** nature and importance, the Perception process, perception. **Attitude:** Concepts, Sources, types, Cognitive Dissonance theory, work related attitudes. Values and Beliefs.

UNIT-II

Motivation: meaning, type of motives, theories of Motivation (Marlow, Herzberg, McGreger& McClelland's)

Group Dynamics: introduction, types of Groups, theories of Group Formation, Approaches to Intergroup Relationship: Likert's Approach, Thompson's Approach. **Organisational Development:** Definition, need, assumptions, values of OD, Process of OD, consultant-client relationship: definition, issues in consultant-client relationship.

Text Books:

1. Stephen P. Robbins Organisational Behaviour, Pearson Education,

References:

1. Nilakant V, Managing Organisational Change, Sage Publications, Chennai.
2. Fred Luthaus, Organisations Behaviour, McGraw Hill.
3. R.W. Griffn & Moohead . Organisational Behaviour, Jaico Books.
4. French ,Bell, Vohra, Organisation Development, Pearson publication.

MCA 125 C3: Computer Oriented Numerical Methods

Maximum Marks: 100

Maximum Time: 3 Hrs.

Internal Assessment:50

External Examination:50

Minimum Pass Marks: 40%

Lectures to be delivered: 45-55

The syllabus and course learning objectives are:

1. The objective of this course is to make students familiar with numerical methods so that they are able to do numerical analysis and to solve based problems.
2. Students will learn Numerical differentiation, Integration, Interpolation and curve fitting.

A) Instructions for paper-setter

The question paper will consist of three units I, II and III. Unit I and II will have four questions from the each unit of the syllabus and will carry 10 marks each. Unit III will consist of questions from whole syllabus and will be of 2 marks each.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from unit I and II. Unit III is compulsory.
2. Use of scientific calculator is allowed.

UNIT-I

Computer Arithmetic and Solution of Non-Linear Equations : Introduction – Floating Point Arithmetic and Errors: Floating point represent of Numbers – Sources of Errors – Non-Associativity of Arithmetic – Propagated Errors – Pitfalls in Computation. Solution of Non-Linear equations: Bisection – Fixed point – Regula-falsi – Newton's Raphson – Secant method. Convergence criteria of Iterative methods.

Solution of simultaneous Linear Algebraic Equations and ordinary differential equations : Cramer's Rule - Gauss elimination method – Pivoting Strategies - Gauss Jordan method – Jacobi Iterative method – Gauss Seidal method –Comparison of Direct and Iterative methods.

UNIT-II

Interpolation and Curve Fitting : Problem of Interpolation - Langranges method of Interpolation – Inverse Interpolation – Newton's interpolation formulae – Error of the Interpolating Polynomial - Interpolation at equally spaced points : Forward and Backward differences – Newton's forward and backward difference formulas. Fitting of polynomials and other curve - Least square approximation of functions - linear and polynomial regressions.

Numerical differentiation and Integration : Differentiation based on polynomia fit - Numerical integration using Simpson,s rule and Gaussian quadratic formula - Numerical solution of differential equations of the form $dy/dx=f(x,y)$ using Euler,s method and Runge-Kutta methods.

Text Books:

1. Numerical methods for Scientific and Engineering Computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

References:

1. Elementary Numerical Analysis by Samuel D.Conte and Cart de Boor, McGraw Hill International Edition.
2. Numerical methods for Science and Engineering, PHI by R.G.Stanton
3. Computer based numerical algorithms by E.V.Krishnamoorthy
4. Introduction to Numerical Analysis by E.Atkinson

MCA-126: Programming Lab-III (Based on Paper MCA-122)

Maximum Marks: 100

Internal Assessment:60

External Examination:40

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Practical units to be conducted: 45-55

The syllabus and course learning objectives are:

1. To enable the students to practically apply and use the OOPs concepts.
2. By the end of the course a student is expected to design and develop different computer software applications and will be able to implement various algorithms in programming languages for research purpose.

This laboratory course will mainly comprise of exercises on what is learnt under the papers: **MCA-122 (Object Oriented Programming Using C++)**

MCA-127 Programming Lab-IV (Based on Paper MCA-123)

Maximum Marks: 100

Internal Assessment:60

External Examination:40

Minimum Pass Marks: 40%

Maximum Time: 3 Hrs.

Practical units to be conducted: 45-55

The syllabus and course learning objectives are:

1. To provide comprehensive coverage of the problems involved in database design, in-depth coverage of data models and database languages, and a survey of implementation techniques applied in modern DBMS.
2. To provide practical skills of conceptual/logical database design and general familiarity with the problems and issues of database management.
3. To develop skills that is appropriate for Database Administrators, Database Application Developers, Database Specialists, and DBMS developers.

This laboratory course will mainly comprise of exercises on what is learnt under the paper **MCA-124 (Relational Database Management System)**