6.   MCA PROGRAMME

6.1   MODES OF PROGRAMME:
- o   Regular Mode(3yrs, 2yrs)

6.2   ELIGIBILITY:

MCA (3 years duration)

Recognized bachelor degree of minimum 3 years duration in any discipline with at least 60% marks (55% for SC/ST) in aggregate. Mathematics must be studied at 10+2 level or at graduation level, and has also appeared in the entrance test to be conducted by the university.

Mode of Selection: Admission shall be made on the merit of the entrance test to be conducted online by the University across India.

MCA Lateral Entry (2 years duration)

Recognized bachelor degree of minimum 3 years duration in BCA, B.Sc. (IT/ Computer Science)with atleast 60% marks (55% for SC/ST) in aggregate. Mathematics must be studied at 10+2 level or at graduation level, and has also appeared in the entrance test to be conducted by the university.

Mode of Selection: Admission shall be made on the merit of the entrance test to be conducted **offline** by the University at Patiala.

6.3   REGULAR MODE

6.3.1   Duration of the Programme:

The programme is spread over a period of three years consisting of six semesters. The first year is exempted for candidates admitted through lateral entry in the second year. The students study courses for five semesters at the University and do a Software Development Project (SDP) in the sixth semester in some reputed industry.

6.3.2   Number of Seats: 90

In addition to above seats, 1% over and above seats are reserved for children of employees of Thapar University. The candidates seeking admission under this category are required to satisfy the eligibility as mentioned above at 6.2.

6.3.3   Distribution of Seats:

(a) First year

General	SC/ST	PH	Total
64	23	3	90 (+ 14 FN/NRI seats. Refer section 11 for eligibility & other conditions)

(a) Second year through lateral entry

General	SC/ST	PH	Total
12	5	1	18

In addition to above, vacant seats of first year shall also be offered through Lateral entry.

Note: In case a candidate is eligible for both MCA (3 years) and MCA (2 years) then he/she is required to apply separately for each program.

GENERALINFORMATIONREGARDINGMCAENTRANCETESTINCLUDINGENTRANCETEST SYLLABUS

I   MCA (3 year program)

Duration ofTest   :3Hrs
No.ofQuestions   : 150
There will be objectivetype questions.1/4th marksshall be deducted for wronganswer.

Section-I:Mathematics(60Questions)

1.**Geometry:**Two-Dimensional;straightlines,circlesandconicsections,Three-Dimensional;straightlines andspheres.

2. **Algebra**: Set theory, Relations, Mappings and its applications, Permutations andCombinations.

3.**Calculus**: Limits, ContinuityandDifferentiability,Rolle'sandMeanvalue theorems,Differentiation, Partial Differentiation, Maxima and Minimaof functionsofoneandtwovariable. Successive differentiation.Integration by using substitution,partial fraction and by parts, Definiteintegralandits properties,Applicationsofdefiniteintegraltoevaluatelengthandareaofsimple planecurves.

4.**VectorAnalysis:**Scalarandvectorproductsoftwo,three andfourvectorsandtheir applications**.**

5.**Statistics,ProbabilityandLinearprogramming**: MeasuresofCentraltendency, Dispersion, SkewnessandKurtosis.CorrelationandRegression. Basic concepts ofprobability,Conditionalprobability,Baye'stheorem, Discrete and continuous distributions (Binomial, Poisson, and Normaldistributions), Fundamentalsoflinearprogrammingproblems,Graphicalsolution,Simplexmethod anditsvariants.

6.**Matrices:** Typesofmatricesrankofamatrix,solutionofsystemoflinear equations,CayleyHamiltontheorem, Inverseofamatrix,Determinantandits properties.

7. **NumericalAnalysis:** Solutionofnon-linearequationsusingiterativemethods, Interpolation(Newton's,Lagrange'sandForwardformulae),NumericalIntegration(T rapezoidalandSimpsonRule).

Section-II:ComputerAwareness(50Questions)

o **Computer Basics** : Organization of a computer, Central Processing Unit (CPU),input/outputdevices,computermemory,memoryorganization,back-up devices,Categories ofComputers.

- o **DataRepresentation**:Representationofcharacters,integers,andfractions, binary and hexadecimalrepresentations, Binary Arithmetic: Addition, subtraction, division, multiplication, floating point representationof numbers,normalizedfloatingpointrepresentation,Boolean algebra:truth tables,Venndiagrams.

- o **BasicsofCProgrammingandOperatingSystems:**Computerprogramming inC: datatypes,loopandcontrolstatements,functions.Fundamentalsof operatingsystems:multiprogramming,multitasking,Multiprocessing and timesharingsystems.

- o **Networking and Internet :** Categories of Computer Network, Network topologies,Network media,ConceptsofLAN,MANandWAN,Search Engines,Basic internetapplications.

Section-

III:AnalyticalAbility,CommunicationSkillsandGeneralKnowledge:

(40Questions)

Thequestions inthissection will cover logicalreasoning,quantitative reasoning, visual-spatialreasoningandCommunication skills.Thissectionshall alsocontain questionstotestthegeneralknowledge aboutbusiness,finance,industry, transportation, scientific inventions, information technology, governance,healthcare,culturaldimensionsetc.

II   MCA (2 year program)

Duration of Test: 3 Hrs

No. of Questions : 150

Question paper will have multiple choice questions. There will be a negative marking of 25% for each wrong answer.

Section-I:Mathematics (40 questions)

1.Geometry: Two dimensional-straightlines,circlesandconicsections; Three dimensional-straightlines andspheres.

2. Mathematical Foundation for Computer Science: Set theory, Permutation and combinations; Relations, Properties and representation of relations, Transitive closure, Partial ordering relation, Special types of lattices and finite Boolean algebra; Functions and their applications, Recurrence relations, Algebraic structures (semi-group and groups), Graphs and their representation, Connected graphs and spanning tree, Proposition and logical connectives, Conditional and biconditional statements, Rules of inference using statement calculus, Quantifiers and inference theory using predicate calculus

3.VectorAnalysis: Scalarandvector products of two, three and four vectors, and theirapplications**.**

4.Statistics, Probability and Linear Programming: Measures ofcentral tendency, Dispersion, Skewnessandkurtosis, Correlationandregression, Basic concepts of probability, Conditional probability, Baye's theorem, Discrete and continuous distributions (Binomial, Poisson, and

Normaldistributions),Fundamentalsoflinearprogrammingproblems,Graphicalsolution,Simplexmethod anditsvariants.

5.Matrices: TypesofmatricesRankofamatrix,Solutionofsystemoflinearequations,Cayley Hamilton theorem,Inverseofamatrix,Determinantanditsproperties.

6.Numerical Analysis: Solution ofnon-linear equationsusingiterativemethods, Interpolation (Newton,LagrangeandForwardformulae),NumericalIntegration(TrapezoidalandSimpsonRule).

Section-II:ComputerScience (75 questions)

1. C Programming: Fundamentals, Identifiers and keywords, Data types, Declarations, Standard and formatted input-output statements, Operators and Precedence, Control statements, Storage classes, Pre-processors, Functions, Recursion, Arrays and strings, Pointers, Structure and union, File handling.

2. Operating Systems: Fundamentals, Process management, CPU scheduling algorithms, Memory management- paging, segmentation, demand paging; Deadlocks- prevention, avoidance, detection and recovery; Process synchronization, File management, Disk scheduling, I/O devices.

3. Computer Organization and Architecture: Number system, Karnaugh map, Combinational circuits, Sequential circuits, Instruction cycle, Addressing modes, Parallel processing, Instruction pipeline, Memory hierarchy, Cache memory, Virtual memory- paging and segmentation.

4. Data Structures: Algorithm complexity, Big O notation, Arrays, Linked Lists, Stacks, Recursion, Queues, Binary search trees, Threaded tree, AVL, B-trees, B+ trees, Graphs- BFS, DFS, applications of graphs; Searching and sorting algorithms, Hashing.

5. Object Oriented Programming: Basic concepts of object-oriented programming, Classes and objects in C++, Static member functions, Inline and friend functions, Constructors and destructors, Function overloading, Operator overloading, Type conversions, Inheritance, Virtual functions and polymorphism, Files and streams, Exception handling.

6. System Analysis and Design: Categories of information systems, Structured analysis method, System prototype method, SDLC, Feasibility study, Requirements gathering, Data flow diagrams, Data dictionaries, Decision tables, Decision trees, Design of input, Design of output, Program structure chart, Coupling, Cohesion, Span of Control, Module size, and Shared modules.

7.Networking and Internet: Categories of computer network, Network topologies, Network media, Concepts of LAN, MAN and WAN, OSI and TCP/IP reference model, Classless and classful addressing, IPv4, Search Engines, Basic Internet and intranet applications.

Section-III:AnalyticalAbility, Communication Skills and General Knowledge: (35 questions)

Logicalreasoning,quantitativereasoning,visual-spatialreasoning, communication skills,general knowledge about scientific inventions and information technology.