### MAHARSHI DAYANAND UNIVERSITY ROHTAK

**Scheme of Examination and Syllabus of B. Sc. (Hons.)**

**Computer Science Part - I, II , III**

**B.Sc. (Hons.) Computer Science First Year**

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<th>Max. Marks</th>
<th>Continual Internal Exam. Duration (hours)</th>
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<tr>
<td>BSC 101</td>
<td>Computer Fundamentals and Programming</td>
<td>4</td>
<td>75</td>
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<tr>
<td>BSC 102</td>
<td>Mathematics-I</td>
<td>4</td>
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<td>BSC 103</td>
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<td>BSC 104</td>
<td>Analog Electronics</td>
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<td>BSC 105</td>
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<td>BSC 106</td>
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<td></td>
<td>Softwares Lab. based on paper BSC 101 and Software Tools</td>
<td>8 hours</td>
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<tr>
<td>BSC 107</td>
<td>Practicals Analog Electronics Lab. based on Paper BSC 104</td>
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<td>BSC 108</td>
<td>Data and File Structure</td>
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<tr>
<td>BSC 109</td>
<td>Structured Systems Analysis &amp; Design</td>
<td>4</td>
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<td>25</td>
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<tr>
<td>BSC 110</td>
<td>Mathematical Foundations of Computer Science</td>
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<td>25</td>
</tr>
<tr>
<td>BSC 111</td>
<td>Digital Electronics</td>
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<td>75</td>
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<tr>
<td>BSC 112</td>
<td>Electromagnetics and Basics</td>
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<tr>
<td>BSC 113</td>
<td>Practicals- Software Lab. based on BSC 108 Software Tools</td>
<td>8 hours</td>
<td>75</td>
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<tr>
<td>BSC 114</td>
<td>Practicals- Digital Electronics Lab. based on BSC 111</td>
<td>8 hours</td>
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### B.B.Sc. (Hons.) Computer Science: Second Year

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<th>Paper No.</th>
<th>Title</th>
<th>Periods per week</th>
<th>Max. Marks</th>
<th>Continual Assessment (hours)</th>
<th>Duration</th>
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<tbody>
<tr>
<td>BSC 201</td>
<td>Computer System Architecture</td>
<td>4</td>
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<tr>
<td>BSC 202</td>
<td>Algorithms &amp; Advanced Data Structures</td>
<td>4</td>
<td>75</td>
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<td>3</td>
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<tr>
<td>BSC 203</td>
<td>Microprocessors-I</td>
<td>4</td>
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<td>25</td>
<td>3</td>
</tr>
<tr>
<td>BSC 204</td>
<td>Data base System</td>
<td>4</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>BSC 205</td>
<td>Practical Software Lab. based on BSC 202 &amp; BSC 204 and Software Tools</td>
<td>8 hours</td>
<td>75</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>BSC 206</td>
<td>Practical Microprocessor Programming and Interfacing Lab. based on BSC 203</td>
<td>8 hours</td>
<td>75</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>BSC 207</td>
<td>Operating Systems Organisation and UNIX</td>
<td>4</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>BSC 208</td>
<td>Software Engineering</td>
<td>4</td>
<td>75</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>BSC 209</td>
<td>Object Oriented Design and Programming</td>
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<td>25</td>
<td>3</td>
</tr>
<tr>
<td>BSC 210</td>
<td>Theory of Computation</td>
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<tr>
<td>BSC 211</td>
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<td>4</td>
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<tr>
<td>BSC 212</td>
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<td>4</td>
</tr>
</tbody>
</table>

### B.Sc. (Hons.) Computer Science: Third Year

<table>
<thead>
<tr>
<th>Paper No.</th>
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<th>Max. Marks</th>
<th>Continual Assessment (hours)</th>
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<tbody>
<tr>
<td>BSC 301</td>
<td>Data Communication and Networks</td>
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<tr>
<td>BSC 302</td>
<td>Computer Graphics</td>
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<td>25</td>
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<tr>
<td>BSC 303</td>
<td>Principals of Visual and Windows Programming</td>
<td>4</td>
<td>75</td>
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</tr>
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Note: Software Tools include: appropriate software packages.

Note: Examiner(s) is/are requested to set eight questions, covering the whole Syllabus in each paper, out of which the candidate will be required to attempt only five questions.
BSC (Hons.) Computer Science Part- I

BSC-101  Computer Fundamentals and Programming

Max. Marks  External : 75
(Theory) Internal : 25
Time allowed : 3 hrs.

Computer Fundamentals:
Number System: decimal, Octal, binary and hexadecimal,
Representation of intergers, fixed and floating points, character
representation : ASCII, EBSDIC Functional units of computer,
I/O devices, primary and secondary memories.

Programming Fundamentals
Algorithm developments. Techniques of problem solving. Flow
charting, Stepwise refinement. Algorithms for searching,
Sorting (exchange and insertion), merging of ordered lists.

Programming:
Representation of integers, characters, reals,
Data types: constants and variables; Arithmetic
expressions, Assignment statement. Logical expression,
Sequencing, Alteration and iteration, Arrays String processing,
Sub-programs, Recursion, Files and pointers. Structured
programming concepts: Top down Design, Development of
efficient programmes: Programs Correctness: Debugging and
testing of programs.

BSC-102  Mathematics-I

Max. Marks  External : 75
(Theory) Internal Assessment : 25
Time allowed : 3 hrs.

Differentiation and partial differentiation of vector functions,
Derivative of sum, dot product and cross product of two
vectors, gradient, divergence and curl System of circles,
standard equations and properties of parabola. Ellips and
Hyperbola.

BSC-103  Mathematics-II

Max. Marks  External : 75
(Theory) Internal : 25
Time allowed : 3 hrs.

The real number system as a complete ordered field,
Neighbourhood, open and closed sets, limit points of sets,
Bolzano Weierstrass theorem.

Limits, continuity, sequential continuity, algebra of
continuous functions, Continuity of complete functions,
continuity on (a,b) implying boundedness, Intermediate value
theorem, Inverse function theorem, Uniform continuity.

Sequence convergent sequence, Cauchy sequence,
Monotonic sequence, Subsequence, limit superior and limit
superior and limit inferior of sequence.

Infinite series convergence of series, positive term series,
Comparison tests, Cauchy’s nth root test, Dalembert’s ratio
test, Raabe’s test, auchy’s integral test, Alternating series,
Absolute and conditional convergance. Taylor’s series and Maclaurin’s series.

(for Sin X, Cos X, log (1+X)^m) Application of Mean value theorem to monotone functions and inequalities, Maxima and Minima, Indeterminate forms.

Note : The emphasis should be on computer applications.

**BSC -104 : Analog Electronics**

**Max. Marks**
- External : 75
- (Theory) Internal : 25
- Time allowed : 3 hrs.

Diode characteristics : junction- diode, breakdown diode, semiconductor photodiode, tunnel diode, characteristics; photovoltaic effect; Light Emitting Diode.

Diode circuits : clipping circuits; components; sampling gates; rectifiers; capacitors filters.

Transistor circuits : bipolar transistor; field effect transistor; transistor biasing and thermal stabilizing; transistor amplifier at low frequencies, transistor amplifier at high frequencies, multistages amplifier; feedback amplifier, stability and circulation; operational amplifier Linear analog circuits : analog integration and differentiation electronics analog computation; active filters; integrated circuit tuned amplifier; cascaded : video-amplifier. Nonlinear analog system : Comparators, sample-hold circuits; precision AC/DC converter; logarithmic amplifier, wave form generator; schmitt trigger.

**Note** : The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

**BSC -105 : Behavioural & Communication Skills**

**Max. Marks**
- External : 75
- (Theory) Internal : 25
- Time allowed : 3 hrs.

Motivation : Characteristics of motivation, process of motivation, Maslow’s needs hierarchy, Achievement motivation, Affiliation motivation. Power motivation, Expectancy Theory of motivation (Ch.7 Costley Book).

Foundation of Group Behaviour :
- Definition and classifying groups, stages of group development External conditions imposed in the group, Group member resources, Group structure, Group Cohesiveness (Ch. 9 Robbins).

Leadership :
- Nature and definition, theories of leadership, Styles of Leadership behaviour, The managerial Grid, Fielder’s contengency approach. Leadership effectiveness (Ch. 10 Costley, Ch. 11 Robbins).

Power Politics and Conflict :
- Bases and sources of power, Power Tactics, Power in groups, Politics : Power in action, implications for performance and satisfaction, (Ch. 12, Robbins).

Organizational Stress and its management :
- Stress, Stress and its consequences, potential sources of stress management strategies, implications for performance and satisfaction on (Ch. 18, Robbins).

Process of Communication :
- The importance of communication, Barriers of effective communication, Effective listening (Ch. 5, Costley).

Communication Affectiveness in Organizations :
- Changing management concepts in communication, Practices to improve communication (Ch. 6, Costley).
Communication and Group Decision Making: Direction of communication, formal vs informal network decision making, Group decision making, group vs the individual, group-think and group-shift, group decision making techniques. (Ch.10, Robbins).


Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC -108: Data & File Structure
Max. Marks External: 75
(Theory) Internal: 25
Time allowed: 3 hrs.

Data Structures:
Linear and list structures: Arrays, stacks, queues and lists, Sequential and linked structures. Simple linked lists, circular linked lists, doubly linked lists, inverted lists, threaded lists.
Operations on all these structures and applications.
Arrays: Multi dimensional arrays, sequential allocation, address calculations, sparse arrays.
Tree Structures: Trees, binary trees, trees traversal algorithms, threaded trees, binary search trees, trees in search algorithms, B-tree E-tree and applications.

File Structure:
Physical storage devices and their characteristics, constituents of a file viz. fields, records, fixed and variable length records, primary and secondary keys, File operations, Basic file system operations.
BSC -110 : Mathematical Foundation of Computer Science

Max. Marks  External : 75
(Theory) Internal : 25
Time allowed : 3 hrs.

Set : Cardinality, counting, operations.
Foundations : Boolean functions, permutation functions.
Induction : Principles of Mathematical induction Format’s Theorem (Without proof).
Exponentiation : (How to complete first exponentiation) Adventages of logarithmic algorithms over linear algorithms Big Oh” notation, Binomial coefficients, lexicographic order.
Number theory : GCD, Euclidean algorithms Fibonacci Numbers complixity, congruences and equivalence relations, public key Encryption schemes.
Graph Theory : Graphs, trees and LAN Minimum distance trees, Minimum weight & Minimum distance spanning trees, recursive procedures.
Recursion : Merge sort, Insertion sort, Bubble sort, Decimal to Binary.
Recurrence relations : LHRR, LHRRWCCS, DCRR.

BSC -111 : Digital Electronics

Max. Marks  External : 75
(Theory) Internal : 25
Time allowed : 3 hrs.

Logic circuit hardware : basic logic gates - AND, OR, NOT, NOR, EX-OR, Logic, DTL, RTL,TTL, ECL, COMS, logic circuits, fanout, propagation delay, noise immunity of logic circuits.
Electric field, Potential due to charge distribution and due to a dipole,

Electric potential energy, Flux, Gauss’s law, Electric field in a dielectric,

Energy stored in electric field, Magnetic field due to a current carrying conductor, Bio Savant law, Magnetic force on a current Lorenz force, Displacement vector, Boundary condition, Electromagnetic, Induction, Faradays Law of Induction.

Electromagnetism:
Modification of Ampere’s Law, Equation of continuity and displacement current, Maxwell’s equations, Wave equations and its plane wave solution, Nature of electromagnetic waves transversality and polarisation wave at a plane interface between dielectrics, Fresnel formulae, Total internal reflection, Waves in conducting media, Metallic Reflection (normal incidence).

Skin depth, wave guides, Modes in rectangular wave guides, Energy flow and attenuation in wave guides, resonant cavities, Power loss in a cavity, Optical fibre, Numerical aperture, Propogation of electromagnetic waves in misotropic media, Maxwell’s equations in Microscopic media (plasma), Characteristics plasma frequency, Propagation of electromagnetic waves in ionosphere.

Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

Register transfer and Micro-operations, Register Transfer Language, Bus and memory, Transfers, Arithmetic Logic Micro operations, Shift Micro operations.

Basic Computer Organization and Design: Instructions and Instruction Codes, Computer Instructions, Instructions, Input-Output and Interrupts, Complete Computer, Description, Programming the basic Computer.

Microprogrammed Control: Control memory, Address Sequencing, Microprogram Example, Design of Control Unit.

Central Processing Unit: General Regsiter Organisation, Stack Organization, Instruction Formats, Addressing Modes Data Transfer and Manipulation, Program Control, Reduced Instruction set Computer, Pipeline and Vector Processing Parallel Processing, Pipelining, Arithmetic Pipeline RISC Pipeline, Vector Processing, Arrays Processors.


BSC. - 202 Algorithms and Advanced data Structures

Max. Marks External : 75
(Theory) Internal : 25 
Time allowed : 3 hrs.


NP Complete Problem : complexity classes P and NP, examples of problem in the NP class.

Parallel algorithms : Parallelism, PRAM and other, models, Parallel algorithms finding maximum element in a list, merging and sorting.

Data rate of channel : analog and digital communications, asynchronous and synchronous transmission; data encoding techniques : modulation techniques; multiplexing : T1/E1 carrier systems; transmission medium; transmission errors, error-detection & correction codes.

Network classification and data communication services : Local area networks, metropolitan Area Network, wide area networks, wireless networks, Internetwork; Switched multimegabit Data Service, X.25, Frame Relay; narrowband and broadband ISDN, Asynchronous Transfer Modes.


Medium Access sublayer : CSMA/CD & ethernet, token ring, FDDI : IEEE standards for LAN and MAN : state Internetworks TDMA and VSAT.

Introduction to Network Programming.

Note : The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 203 Microprocessor

Max. Marks External : 75
(Theory) Internal : 25 
Time allowed : 3 hrs.

Evolution of microprocessor : Intel series of microprocessors; Motorala series of microprocessors Microprocessor architecture; Arithmatric and Logic Unit ; Control Unit; General purpose registers; external system bus architecture; example of 8085 microprocessor architecture. Memory Interfacing : memory devices ; memory decoding ; 8085 memory interfacing.

Basic I/O; interfacing I/O; mapped I/O; Memory mapped I/O; I/O port address decoding schemes of 8085; data transfer schemes synchronour, asynchronous, interrupt, programmable; direct Memory Access data transfer, 8255 programmable peripheral interface; 8279 programmable keyboard and display interface; 8253 programmable keyboard and display interface;8253 programmable timer; 8237/8257 DMA controller; interfacing of above chips with 8085 microprocessors. Assembly languages of 8085 microprocessor.

BSC. - 204 Database Systems

Max. Marks External : 75
(Theory) Internal : 25 
Time allowed : 3 hrs.

Data Modelling for a database : records and files, abstraction and data integration.
Database Management System: the three level architecture DBMS, Components of a DBMS.

Data Models and thier Implementation Relational, Network, Hierarchial.

Relational Data Manipulations: Relational Algebra, Relational Calculus, SQL.

Relational Database Design Relational Functional Dependencies; Finding keys; 1st to IIIrd NFs BCNF, Lossless Join and Dependency preserving decomposition, computing closures of setFD’s finding keys.

Query Processing: General Strategies for query processing query optimization, query processor.

Concepts of security concurrency and recovery. Database Design Project: definition and analysis of existing systems, preliminary and final design, testing and implementation, Operation and tuning.

Use of relational DBMS package for class project.

Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 207 Operating System Organization and Unix.

Max. Marks External: 75
(Theory) Internal: 25
Time allowed: 3 hrs.

Operating systems overview: Operating system as an extended machine & resource manager: Operating systems classifications: Operating systems modes and system calls; Operating systems architecture.

Processor management functions: process model, hierarchies and implementation; process states and transitions, multiprogramming multitasking, multithreading; levels of schedulers and scheduling algorithms micro-kernal architecture.

Memory Management functions: memory management of single user operating system; memory management for multi-user operating system position, swapping, paging, segmentation, virtual memory.

Device management functions: I/O devices and controllers interrupt handlers, device independent I/O software user-space I/O sofware; disk scheduling; clock hardware software; terminal input/output software.

File management functions: file naming, structure, types, access mechanisms, attributes and operations, hierarchical directory systems, Directory structures and directory operations; file space allocations; file sharing file locking; symbolic links; file protection and security; distributed file systems.

Concurrent Programming: sequentia and concurrent process: precedence graph, Bernsterins condition, time dependency and critical code section, mutual exclusion problem; classical process co-ordination problems: deadlock handling, interprocess communication.

This course should be taught in the Context of Unix operating system.

Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 208 Software Engineering

Max. Marks External: 75
(Theory) Internal: 25
Time allowed: 3 hrs.

Software engineering definition and paradigms, A generic view of Software engineering.
Requirements analysis: Statement of system scope, isolation of top level processes and entities and their allocation to physical elements, refinement and review. Analyzing a problem, creating a software specification document, review for correctness, consistency and completeness.

Designing software solutions: Refining the software Specification Application of fundamental design concept for data, architectural, and procedural designs using software blue paradigm, creating requirements and quality.

Software Implementation: Relationship between design and implementation; implementation issues and programming support environment; Coding the procedural design; Good coding style and review of correctness and readability.

Software testing: Role of testing and its relationship to quality assurance; Nature and limitation of software testing; Software testing methods.

Software Maintenance: Maintenance as part of software evaluation, reasons for type of maintenance (Perspective adoptive, corrective), designing for maintainability, techniques for maintenance.

Comprehensive examples using available software platforms/case tools, Configuration Management.

Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 209 Object Oriented Design and Programming

Max. Marks External: 75
(Theory) Internal: 25
Time allowed: 3 hrs.

Introduction to Object Oriented Modelling, Modeling techniques Object Oriented Design, Object design comparison of methodologies (SA/SD, OMT, USD), Design implementation, Object Oriented languages, Programming in C++, Application in database, compilers, animation and Business.

Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 210 Theory of Computation

Max. Marks External: 75
(Theory) Internal: 25
Time allowed: 3 hrs.

Concept of alphabet, string, language, basic operations on language: union, intersection, on complementation, kleene star; regular languages: regular expressions, nondeterministic and deterministic finite automata and their equivalence, pumping theorem, design and implementation of a lexical analyzer generator, context free languages: context free grammar, deterministic and nondeterministic push down automata, pumping theorems for context free languages, topdown and bottom up parsing techniques, design and implementation of an LALR parser; Models of Computation: Turing Machine and RAM, equivalence of variance of standard. Turing Machine mode: Universal Turing Machine, solving problems on Turing machines, Turing acceptability and Turing decidability, Unsolvability of problems (halting problem and others).

Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.
BSC. - 301 Data Communication and Networks

Max. Marks External : 75
(Theory) Internal : 25
Time allowed : 3 hrs.

Data Communication: Concepts of data, signal, channel bandwidth, bit-rate and band rate; Fourier analysis, maximum data-rate of channel: analog and digital communications, asynchronous and synchronous transmission; data encoding techniques: modulation techniques: multiplexing; TI/TE carrier systems: transmission medium; transmission error detection & correction codes.

Network classification and data communication services: Local area networks, metropolis Area Network, wide area networks, wireless network Internetwork, Switched Multimegabit Data Service X.25 Frame Relay; narrow band and broad band ISDN, Asynchronous Transfer Modes.


Medium Access sublayer: CSMA/CD & ethernet, token ring FDDI; IEEE standards for LAN and MAN; state litenetworks TDMA and VSAT.

Introduction to Network Programming.

Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 302 Computer Graphics

Max. Marks External : 75
(Theory) Internal : 25
Time allowed : 3 hrs.

Development of computer graphics: basic graphics system and standards; Raster Scan and Random Scan graphics; continual refresh and storages displays; display processors and character generators; colour display techniques; frame buffer and Bitbit operations concepts in raster Graphic Points, lines and curves; scan conversion; line-drawing algorithms; circle and ellipse generation; polygon filling; conic-section generation; antialiasing.

Two dimensional viewing; basic transformations; co-ordinate systems; windowing and clipping; segments, interactive picture construction techniques; interactive input/output devices, Three-Dimensional concepts; 3-D representations; and transformations; 3-D viewing; algorithms for 3-D volumes spline curves and surfaces; Fractals, Quadtree & Octree data structures.

Hidden lines, Hidden surfaces, Rendering.

BSC. - 303 Principles of Visual and Windows Programming

Max. Marks External : 75
(Theory) Internal : 25
Time allowed : 3 hrs.

Diagram understanding - Generalized icons. The environment of a window application. Basic concepts of windows Programming. The structure of a windows program. Using child Windows, programming with the graphics device interface Displaying playing Text, Receiving commands and data from user.
BSC. - 304 Microprocessor-II

Note: The examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 304 Microprocessor-II

Max. Marks External: 75

(Theory) Internal: 25

Time allowed: 3 hrs.

Advanced microprocessor architecture; Intel 80286/80386/80486/pentium/ro-pentium architecture; Mecintosh Power PC,DEC Alpha-chip; RISC and CISC architecture; pipeline; super-scaler architecture; real and protected modes; virtual 8086 mode.

Programming model: General purpose registers; pointers and index registers; program invisible registers; flags, segment registers; memory/addressing/ addressing de-coding of 32/64 bit microprocessor modes. Advanced memory interfacing; memory address memory paging mechanisms and memory management; Cache memory and Cache controller. Advanced I/O features: 8251 programmable communication interface; Interrupts - Interrupt vector and table, hardware and software interrupts; 8259 programmable interrupt controller; real time clock; TTL RGB graphics controller; Analog RGB graphics controller; shared bus operation.

The course should be taught in the contact of Intel 80286, 80386, 83486, Pentium and its assembly languages.

Note: Examiners are requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 308 Network & Internet Technologies and Applications

Max. Marks External: 75

(Theory) Internal: 25

Time allowed: 3 hrs.

Survey of contemporary Internet technologies. The role, use and implementation of current tools, basic TCP/IP, name space, correctness and protocols. Worldwide Web/ HTML techniques for text, images, links and forms. Indexing methods gopher, WAIS Server side programming, CGI scripts. Security issues, emphasis on understanding, exploring and extending internet technology using Java or Perl.

E.D.I.

Electronics Commerce.

BSC. - 309 Scientific & Statistical Computing

Max. Marks External: 75

(Theory) Internal: 25

Time allowed: 3 hrs.

Numericals Methods:
Floating point arithmatic: Basic concept of floating point number system implications of finite precision, illustrations of errors due to round off.

Interpolation Finite difference calculus, polynomial, interpolation Approximation Uniform, discrete least square, polinomial fourier Numerical Integration & Differentitations Interpolatory numerical integration, numerical differentiation.

Solution of non-linear: Bisection, fixed point iteration, Newton's Reforms Methods.

Random variables and their distributions: Random variables (discrete and continuous), probability density and distribution functions, special distributions (Binomial, Poisson, Uniform, Exponential).

Independent random variables, functions of random variables and theory distribution.

Limit Theorems: Poisson and normal approximations, control limit theorem, Law of large numbers.

Statistical inference: Estimate and sampling, point and interval estimate of hypothesis testing, power of a test, regression.

Note: Examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 310 Multimedia & Applications

Max. Marks External: 75
(Theory) Internal: 25
Time allowed: 3 hrs.

Introduction to multimedia technology - computers, communications and entertainment, framework for multimedia systems. M/M devices presentation devices and the user interface, M/M presentation and authoring.

Digital representation of sound and transmission, brief survey of speech recognition and generation, digital video and image compression, JPEG image compression standards, MPEG motion video compression, DVI technology, time-based media representation and deliver.

M/M software environments, limitations of workstation operating systems, M/M system services, OS support for continuous media applications, media stream protocol, M/M file systems and information representation, data models for M/M and Hypermedia information.

Application of M/M intelligent M/M system.

Desktop VR, Virtual reality OS, distributed virtual environment system, virtual environment displays and orientation tracking, visually coupled system requirements intelligent VR software systems.

Applications of environments in various fields, such as medical, entertainment, manufacturing, business, education etc.

Note: Examiner is requested to set eight questions in each paper covering the whole syllabus, out of which students will be required to attempt five questions only.

BSC. - 311 Entrepreneurship

Max. Marks External: 75
(Theory) Internal: 25
Time allowed: 3 hrs.


The Entrepreneurship - myths and misconception, qualities, characteristics and role demanded of an Entrepreneur, Entrepreneur v/s Professional Managers.


Suggested Readings:

1. Enterpreneurship Development by C.B. Gupta & N.P. Srinivasan, Publisher Sultan Chand & Sons.
4. Product Selection by Prof. H.N. Pathak, Pub. by (NIESBUD), NSIC-PTC Campus, Okhla.
5. Enterpreneurship Development by Dr. S.P. Misra pub by National Institute for Enterpreneurship and small Business Development (NIESBUD NSIC-PTCB Campus, Okhla).
6. DESAI A N : Enterpreneur and environment, Ashish, NEW DELHI.

Note: Examiner is requested to set eight questions covering the whole syllabus, out of which the candidates will be required to attempt five questions.