Master of Computer Applications (MCA)

3 YEARS PROGRAMME

CREDIT BASED SYSTEM
wef JULY 2006

Department of Computer Sc. & Engineering
GJUS&T HISAR
## SCHEME OF EXAMINATION
### M C A (Credit System)
**w.e.f. July 2006**

### SEMESTER-I

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Nomenclature of Paper</th>
<th>Duration of Exam.</th>
<th>Total Credits</th>
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<tbody>
<tr>
<td>CSL-611</td>
<td>Computer Fundamentals and Problem Solving Through C</td>
<td>3 Hours</td>
<td>4</td>
</tr>
<tr>
<td>CSL-612</td>
<td>Computer Organisation</td>
<td>3 Hours</td>
<td>4</td>
</tr>
<tr>
<td>CSL-613</td>
<td>Discrete Mathematical Structure</td>
<td>3 Hours</td>
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</tr>
<tr>
<td>CSL-614</td>
<td>Structured System Analysis and Design</td>
<td>3 Hours</td>
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</tr>
<tr>
<td>CSL-615</td>
<td>Computer Oriented Numerical and Statistical Methods Using C</td>
<td>3 Hours</td>
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<tr>
<td>CSP-611</td>
<td>Software Laboratory-I (Based on CSL-611)</td>
<td>3 Hours</td>
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<td>CSP-612</td>
<td>Software Laboratory-II (Based on CSL-615)</td>
<td>3 Hours</td>
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<td>CSP-613</td>
<td>Seminar</td>
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**Total : 25**

### SEMESTER-II

<table>
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<th>Paper No.</th>
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<tbody>
<tr>
<td>CSL-621</td>
<td>Data Structures Using C</td>
<td>3 Hours</td>
<td>4</td>
</tr>
<tr>
<td>CSL-622</td>
<td>Software Engineering</td>
<td>3 Hours</td>
<td>4</td>
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<tr>
<td>CSL-623</td>
<td>System Simulation</td>
<td>3 Hours</td>
<td>4</td>
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<tr>
<td>CSL-624</td>
<td>Computer Oriented Optimization Techniques and C ++</td>
<td>3 Hours</td>
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<tr>
<td>CSL-625</td>
<td>Object Oriented Systems and C ++</td>
<td>3 Hours</td>
<td>4</td>
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<tr>
<td>CSP-621</td>
<td>Software Laboratory-III (Based on CSL-621)</td>
<td>3 Hours</td>
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<td>CSP-622</td>
<td>Software Lab-IV (Based on CSL-625)</td>
<td>3 Hours</td>
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<tbody>
<tr>
<td>CSL-631</td>
<td>Data Base Systems</td>
<td>3 Hours</td>
<td>4</td>
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<tr>
<td>CSL-632</td>
<td>Visual Programming using VB</td>
<td>3 Hours</td>
<td>4</td>
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<tr>
<td>CSL-633</td>
<td>Computer Networks</td>
<td>3 Hours</td>
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<tr>
<td>CSL-634</td>
<td>Operating System</td>
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<tr>
<td>CSL-635</td>
<td>Windows Programming &amp; Visual C++</td>
<td>3 Hours</td>
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<tr>
<td>CSP-631</td>
<td>Software Laboratory-V ORACLE (Based on CSL-631)</td>
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</table>
| CSP-632   | Software Laboratory-VI VISUAL PROGRAMMING  
(based on CSL-632 & CSL-635) | 3 Hours | 2 |
| CSP-633   | Seminar               |                  | 1             |

Total: 25

**SEMESTER-IV**

<table>
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<tr>
<th>Paper No.</th>
<th>Nomenclature of Paper</th>
<th>Duration of Exam</th>
<th>Total Credits</th>
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<tbody>
<tr>
<td>CSL-641</td>
<td>JAVA Programming and Internet Applications</td>
<td>3 Hours</td>
<td>4</td>
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<tr>
<td>CSL-642</td>
<td>Computer Architecture &amp; Parallel Processing</td>
<td>3 Hours</td>
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<tr>
<td>CSL-643</td>
<td>LiNIX and Shell Programming Programme Elective-I</td>
<td>3 Hours</td>
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<td>Programme Elective-II</td>
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</table>
| CSP-641   | Software Laboratory-VII JAVA Programming  
(Based on CSL-641) | 3 Hours | 2 |
| CSP-642   | Software Laboratory-VIII LINUX & Shell Programming  
(Based on CSL-643) and CASE Tools | 3 Hours | 2 |
| CSP-643   | Seminar               |                  | 1             |

Total: 25

**List of Elective Papers**

**Programme Elective - I**

i) CSL-644 System Programming

ii) CSL-645 Advanced Database Systems

iii) CSL-646 High Speed Networks

**Programme Elective - II**

i) CSL-647 Microprocessors and Interfaces

ii) CSL-648 Software Project Management

iii) CSL-649 Management Information System
### SEMESTER-V

<table>
<thead>
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<th>Paper No.</th>
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<tbody>
<tr>
<td>CSL-651</td>
<td>Computer Graphics and Multimedia</td>
<td>3 Hours</td>
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<tr>
<td>CSL-652</td>
<td>Artificial Intelligence</td>
<td>3 Hours</td>
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<tr>
<td>CSL-653</td>
<td>Web Engineering</td>
<td>3 Hours</td>
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<tr>
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<td>Programme Elective-III</td>
<td>3 Hours</td>
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<td>Open Elective-I</td>
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<tr>
<td>CSP-651</td>
<td>Software Laboratory-IX PROLOG Programming and Graphics (Based on CSL-651 &amp; CSL-652)</td>
<td>3 Hours</td>
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<tr>
<td>CSP-652</td>
<td>Software Laboratory-X HTML, CGI using PERL, JSP, XML (Based on CSL-653)</td>
<td>3 Hours</td>
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<tr>
<td>CSP-653</td>
<td>Seminar</td>
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<td><strong>Total:</strong></td>
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<td><strong>25</strong></td>
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</tbody>
</table>

#### List of Elective Papers

**Programme Elective-III**

i) CSL-654 Compiler Construction

ii) CSL-655 Neural Networks

iii) CSL-656 Security of Information Systems

**Open Elective-I**

To be offered by other PG departments of university

### SEMESTER-VI

<table>
<thead>
<tr>
<th>Paper No.</th>
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<th>Duration of Exam</th>
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<tbody>
<tr>
<td>CSD-601</td>
<td>Project</td>
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</table>

(To be carried out at industry/company under supervision of official at industry / company where he/she is doing project. Evaluation & Viva Voce to be done jointly by internal and external examiner)

**Grand Total for all Semesters** 135

**Note:** One credit in theory papers is equivalent to 1 hour classroom teaching per week and one credit in practical/lab course is equivalent to 2 hour practical/lab work per week. A teacher will conduct practical class in a group of 15 students.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4

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(Examination)

**SYLLABUS**

Computer Fundamentals: Computer components, characteristics & classification of computers, hardware & software, peripheral devices.


Elements of C: C character set, identifiers and keywords, Data types: declaration and definition.

Operators: Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators and their hierarchy & associatively.

Data input/output.

Control statements: Sequencing, Selection: if and switch statement; alternation, Repetition: for, while, and do-while loop; break, continue, goto.

Functions: Definition, prototype, passing parameters, recursion.

Data Structures: arrays, struct, union, string, data files.

Pointers: Declaration, operations on pointers, array of pointers, pointers to arrays.

**References:**

- Computer Programming and Problem Solving Through C by Dharminder Kumar, Varun Kumar, Excel books, 2005, New Delhi.
- Gottfried, Programming with C, Tata McGraw Hill.
CSL-612 Computer Organization

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS

Information Representation : Number systems, BCD codes, character codes, error detecting and correcting codes, fixed-point and floating point representation of information. Binary arithmetic operations, Booths multiplication.

Binary Logic : Boolean algebra, boolean functions, truth tables, canonical and standard forms, simplification of boolean functions, digital logic gates.

Combinational Logic : Design procedure, adders, subtractors, encoders, decoders, multiplexers, de-multiplexers and comparators.

Sequential Logic : Flip-flops, shift registers and counters.

Memory System : Memory parameters, semiconductor RAMs, ROMs, magnetic and optical storage devices.

CPU organization : Processor organization, Machine instructions, instruction cycles, instruction formats and addressing modes, microprogramming concepts, micro-program sequencer.

I/O Organization : I/O interface, interrupt structure, transfer of information between CPU/memory and I/O devices, and IOPs.

References :

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4                             Time: 3 Hours
L        T        P     (Examination)
4        -        -

SYLLABUS


Graphs: Directed and undirected graphs, chains, Circuits, paths, Cycles, connectivity, Adjacency and incidence matrices, Minima's path Application (Flow charts and state transition graphs, algorithms for determining cycle and minimal paths, polish notation and trees, flows in networks).

Lattices and Boolean Algebra: Relations to partial ordering, Lattices, Hasse diagram, Axiomatic definition of Boolean algebra as algebraic structures with two operations basic results truth values and truth tables. The algebra of propositional function. The Boolean algebra of truth values, Applications (Switching circuits, Gate circuits).

Finite Fields: Definition Representation, Structure, Integral domain Irreducible polynomial, Polynomial roots, Splitting field.

REFERENCES:

- Alan Doerr, Kenneth Levasseur, APPLIED DISCRETE STRUCTURES FOR COMPUTER SCIENCE, Galgotia Publications Pvt. Ltd.
- Scymour Lipschutz, Marc Lars Lipson, DISCRETE MATHEMATICS, McGRAW-HILL international editions, Schaum's Series.
- Bernard Kolman, Robert C. Busby, DISCRETE MATHEMATICAL STRUCTURES FOR COMPUTER SCIENCE, Prentice-Hall of India Pvt. Ltd.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS

System Analysis: Requirement determination and specification, feasibility study, Information gathering, structuring system requirements, process modelling, logic modelling and conceptual data modelling.

System Design: Designing forms and reports, interface and dialogues, databases, process, output/input, files.

Implementation: Preparing for implementation, planning, test plans, program development, implementation management, changeover and routine operations.

Maintenance and Review: Types of maintenance, Cost of maintenance, performance evaluation.

References:

- Practical SSADM 4 4/e, A Complete Tutorial Guide, Philip Weaver, Nicholas Lambrou & Matthew Walkley, Addison-Wesley.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4                      Time: 3 Hours
L    T    P  (Examination)
4    -    -

SYLLABUS

Computer Arithmetic: Floating point representation of numbers, arithmetic operations with normalized floating point numbers and their consequences. Error in number representation - pitfalls in computing.

Iterative Methods: Bisection, False position, Newton-Raphson methods, Discussion of convergences, Polynomial evaluation, Solving polynomial equations (Bairstow's Method).


Numerical Differentiation and Integration: Differentiation formulae based on polynomial fit, Pitfalls in differentiation, Trapezoidal, Simpson's rules and Gaussian Quadrature.

Interpolation and Approximation: Polynomial interpolation, Difference tables, Inverse interpolation, Polynomial fitting and other curve fitting. Approximation of functions by Taylor series and Chebyshev polynomials.

Statistical methods: Sample distributions, Test of Significance, $\chi^2$, $t$ and $F$ test.

Analysis of Variance: Definition, Assumptions, Cochran's Theorem, One-way classification, ANOVA Table, Two-way classification (with one observation per cell).


References:

- Rajaraman V., Computer Oriented Numerical Methods, Prentice Hall, India.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
4 - - (Examination)

SYLLABUS
Introduction to Data Structures, Primitive and Composite, Arrays, Matrices, Sparse Matrices, String representation and manipulation, Stack, Queue, Dequeue, Linked lists, Trees, Binary trees, Threaded Binary tree, Balanced tree, Different tree traversal algorithms, Representation of Graphs and Applications, various searching and sorting techniques, Hashing, Dynamic Memory Management.

References:

CSL-622 SOFTWARE ENGINEERING

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS
Software and software engineering - Software characteristics, software crisis, software engineering paradigms.

Planning a software project - Software cost estimation, project scheduling, personnel planning, team structure.

Software configuration management, quality assurance, project monitoring, risk management.

Software requirement analysis - structured analysis, object oriented analysis and data modeling, software requirement specification, validation.

Design and implementation of software - software design fundamentals, design methodology (structured design and object oriented design), design verification, monitoring and control, coding.

Software reliability - metric and specification, fault avoidance and tolerance, exception handling, defensive programming.

Testing - Testing fundamentals, white box and black box testing, software testing strategies: unit testing, integration testing, Validation testing, System testing, debugging.

Software maintenance - maintenance characteristics, maintainability, maintenance tasks, maintenance side effects. CASE tools.

References:

• Pressman S. Roger, Software Engineering, Tata McGraw-Hill.
• Jalote Pankaj, An integrated Approach to Software, Engineering, Narosa Publishing House
• Sommerville Ian, Software Engineering, 5th ed., Addison Wesley-2000
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours

L T P (Examination)
4 – –

SYLLABUS

INTRODUCTION: Concept of System, stochastic activities, continuous and discrete systems, system modeling, principals used in modeling.

SIMULATION OF SYSTEM: Concepts of simulation of continuous system with the help of examples; use of integration formulas; concepts of discrete system simulation with the help of examples. Generation of random numbers, Generation of non-uniformly distributed random numbers.

SIMULATION OF QUEUING SYSTEMS: Basic concepts of queuing theory, Simulation of single-server, two-server and general queuing systems.

SIMULATION IN INVENTORY CONTROL AND FORECASTING: Elements of inventory theory, inventory models, Generation of Poison and Erlang variates, forecasting and aggression analysis.

DESIGN AND EVALUATION OF SIMULATION EXPERIMENTS: Experiment layout and Validation.

SIMULATION LANGUAGES: Continuous and discrete simulation languages, Black-Structured continuous simulation languages, Expression based languages, Discrete system simulation languages: GPSS, SIMSCRIPT, SIMULA, Factors in selection of discrete system simulation languages.

References:

- Narsingh Deo : "System Simulation with Digital Computer", PHI, New Delhi, 1993
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P (Examination)
4  -  -

SYLLABUS

Linear Programming: Formulation, Graphical solution, standard and matrix forms of linear programming problems, Simplex method and its flow chart, Two phase Simplex method, Degeneracy.

Duality: Introduction, Definition, General Rule for converting any primal into its Dual, Dual Simplex method and its flow chart.

Integer Programming: Importance and Applications, Gomorg's all integer programming problem technique, Branch and Bound Method.

Queuing Models: Introduction, Applications, Characteristic Waiting and Ideal time costs, Transient and Steady states, Kendall's Notations, M/M/1, M/M/C, M/Ek/1 and Deterministic Models. (No Mathematical derivations included).

PERT and CPM: Basic steps in PERT and CPM, Forward and Backward computation, Representation in Tabular form, Slack and Critical path, Difference between CPM and PERT, Float.

References:
- Bazara, Operation Research & Networking, Wiley.
- Avieral, Optimization Techniques.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS
Object-Oriented Concepts: Data abstraction, encapsulation, Classes and objects, modularity, hierarchy, typing, concurrency, persistence.


Programming in C++: Data Types, struct vs classes, static data & member function, constant parameters & member functions, friend functions & friend classes, role of constructors & destructors, dynamic objects, operator overloading, function overloading, inheritance, virtual functions, abstract class, virtual class, template functions & template classes, exception handling, file stream classes, ASCII & Binary files, sequential & random access to a file.

References:

- Rumbaugh, J. et. al., Object-Oriented Modelling and Design, Prentice Hall of India, 1998
- Booch, Grady, Object Oriented Analysis & Design, Addison Wesley, 1994
- Stroustrup, B., The C++ Programming Language, Addison-Wesley, 1993
- Lippman, C++ Primer, 4/e, Addison-Wesley
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4  Time: 3 Hours
L  T  P  (Examination)
4  -  -

SYLLABUS

Data Base Systems Concepts and Architecture: Data Models, Schemas and Instances, DBMS architecture and Data Independence, Data base languages & Interfaces, DBMS functions and component modules.


Relational Data Model: Relational model concepts, Integrity constraints over Relations, Relational Algebra - Basic Operations.

SQL: Data Definition, Constraints, & Schema Changes in SQL, Insert, Delete & update statements in SQL, view in SQL, Specifying Constraints and Indexes in SQL, Queries in SQL.


Relational Data Base Design: Functional Dependencies, Decomposition, Desirable properties of decomposition, Normal forms based on primary keys (1 NF, 2 NF, 4 NF and BC NF).

Practical Data Base Design: Role of Information systems in Organizations, Database design process, physical database design in Relational Databases.


Concurrency Control Techniques: Locking Techniques, Time stamp ordering, Multi-version Techniques, Optimistic Techniques, Granularity of Data Items.

Recovery Techniques: Recovery concepts, Recovery Techniques in centralized DBMS.

References:

CSL-632 VISUAL PROGRAMMING USING VISUAL BASIC

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS


The VB Integrated Development Environment and its elements : Menu bar, tool bars, project explorer, tool box, properties window, form designer, form layout, etc.

The VB language and its elements : Variables, constants, arrays, collections, subroutines, functions, arguments, and control structures.

Designing a VB application : Working with VB forms, form properties, adding, deleting, and managing forms at run time, coding event procedures, implementing drag and drop operations, menu designing, adding menu interface to forms, attaching code to events, dynamic menu appearance.

Coding a VB application : Implementing user interface controls, common controls and their properties, dynamic controls, custom controls, control arrays, using variable, subroutines, function and control structures, accessing data through code and data controls, using DLLs in VB applications, building ActiveX clients, activeX servers, ActiveX controls, ActiveX documents, and web-enabled applications, Multiple Document Interface, Graphics Programming.

Database programming (DAO/ADO, ADODC) and Object Oriented programming with VB.

References :

- Visual Basic - 6 by Howard Hawee PHI
- Teach yourself Visual Basic by Warner TMH
- Mastering VB-6 by Evangelos Petroutsos TMH
- Programming in VB-6 by J C Bradley TMH
- VB-6 The Complete Reference by Jerke TMH
- Visual Basic by Gery Corner.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4                             Time: 3 Hours
L T P        (Examination)
4 - -

SYLLABUS

Network Concepts: Goals and applications of Computer Networks; Topologies; Categories of Networks - LAN, MAN, WAN, Internetworks; point-to-point and broadcast networks; Introduction to SMDS, X.25 Networks, ISDN, frame relay and ATM networks.

Network architecture: Concept of protocols & services; OSI model and functions of its layers; TCP/IP reference model.

Data communication concepts: Components of a data communication system; transmission modes; transmission media - guided and wireless media; introduction to switching (circuit, message and packet) and multiplexing (frequency division and time division); concept of Modems.

Framing and Error control: Framing techniques; Error control - error detection & correction.

Data Link Control: Acknowledgments; Elementary data-link protocols, Automatic Repeat Request; Sliding Window protocols.

Medium Access Control and LANs: Multiple Access protocols of MAC sublayer - ALOHA, l-persistent, p-persistent and non-persistent CSMA, CSMA/CD, Collision free protocols, Limited contention protocols, Wavelength Division Multiple Access, MACA, GSM, CDPD, CDMA; IEEE Standard 802 for LANs and MANs - Ethernet, token bus, token ring, DQDB, Logical Link Control.

Routing: Deterministic and Adaptive routing; Centralized and distributed routing; shortest-path; flooding; flow based; optimal; distance vector, link-state, hierarchical; routing for mobile hosts; broadcast and multicast routing;

Congestion control: Principles of congestion control; Traffic shaping; choke packets; load shedding; RSVP.

TCP/IP: Elements of Transport Protocols; transmission control protocol (TCP); user datagram protocol (UDP); Internet protocol (IP).

References:

- Computer Networks - Andrew s. Tanenbaum, PHI.
- Data Communications, Computer Networks and Open Systems, fourth edition-Fred Halsall, Addison Wesley.
- Introduction to Data communications and Networking- Behrouz, Forouzan, Tata Mc-Graw Hill.
- Data and Computer Communications, fifth edition-William Stallings, PHI.
CSL-634 OPERATING SYSTEMS

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
L T P (Examination)
4  -  -

SYLLABUS

Introductory Concepts: Operating system functions and characteristics, historical evolution of operating systems, Real time systems, Distributed systems, Methodologies for implementation of O/S service system calls, system programs, Interrupt mechanisms.


CPU Scheduling: Levels of Scheduling, Comparative study of scheduling algorithms, Multiple processor scheduling.

Storage Management: Storage allocation methods: Single contiguous allocation, Multiple contiguous allocation, Paging; Segmentation combination of Paging and Segmentation, Virtual memory concepts, Demand Paging, Page replacement Algorithms, Thrashing.

Hardware Management: Hardware Organisation, Device scheduling policies.

Deadlocks: Deadlock characterization, Deadlock prevention and avoidance, Deadlock detection and recovery, practical considerations.


Protection: Goals of protection, mechanism & policies implementation dynamic protection structures, revocation protection schemes in UNIX / MULTICS.

Case Studies: Comparative study of DOS, WINDOW, UNIX & LINUX system.

References:

- Peterson, J.L. & Silberschatz, A., Operating System Concept, Addison Wesley, reading.
- Brinch, Hansen, Operating System Principles, Prentice Hall of India
- Tanenbaum, A.S., Operating System
- Hansen P.B., Architecture Concurrent Programs, PHI
- Shaw, A.C., Logic design of Operating Systems, PHI
- Deitel, H.M., Operating System, John Wiley/Addison Wesley.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours (Examination)
L  T  P
4  -  -

SYLLABUS

Windows basic concepts, window API, DEF files, creating windows, message, x-windows, Mouse and keyboard.

Introduction to resources, designing and creating menus, pop-up menus, user defined resources.

Bitmaps and dialogues; windows animation; Font basics; window controls; Font display; static controls, edit controls, list boxes, psychic windows.

Overview and structure of windows programming, coding conventions; Displaying text, mouse, graphics device interfaces.

Programming using visual C++.

References:

- Windows Programming by Charles Petzol.
- Windows Programming by Jim Conger.
- Visual C++ by Yashwant Kanetkar.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS


JAVA and The Internet: The JAVA programming language and its characteristics; Java run-time environment; Java compiler; Java developers kit; running Java applications and Java applets.

JAVA programming: Elements of Java: Data types, scalar data types, operators & expressions, control structures. Class, objects & methods, constructors, finalizer, visibility controls, array, string & vectors, inheritance, interfaces, packages multithreading, applet programming.

Exception Handling- defining and throwing exceptions, creating your own exceptions.

Input/Output: streams, byte and character stream, the class Printstream, data streams, StringTokenizer class, stream tokenizers.

Delegation Event Model. AWT classes, AWT controls, Layout managers & menus.

References:

- Computer Networks and Internets, second edition - Douglas E. Comer, Addison-Wesley, 2000
- Programming the Internet with Java, revised edition- Darrel Ince & Adam Freeman, Addison-wesley, 2000
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P (Examination)
4 - -

SYLLABUS

Parallel Computer Models
The state of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI Models

Program and Network Properties
Conditions of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanism, System Interconnect Architecture,

Processors and Memory Hierarchy
Advanced Processor Technology, Superscalar and vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

Bus, Cache, and Shared Memory
Backplane Bus Systems, Cache Memory Organizations, Shared-Memory Organizations, Sequential and Weak Consistency Models

Pipelining and Superscalar Techniques
Linear Pipeline Processors, Nonlinear Pipeline Processors, Instruction Pipeline Design, Arithmetic Pipeline Design, Superscalar and Superpipeline Design

Multiprocessors and Multicomputers
Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Message-Passing Mechanisms

Multivector, Scalable, Multithreaded, Data Flow Architecture
Vector Processing principles, Multivector Multiprocessors, Compound Vector Processing, Principles of Multithreading, Dataflow and Hybrid Architectures.

References:
- Kain, Richard Y., Advanced Computer Architecture, PHI, 1999
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4

Time: 3 Hours (Examination)

SYLLABUS

Linux Startup
User accounts, accessing linux - starting and shutting processes, Logging in and Logging out, Command line, simple commands.

Shell Programming
Unix file system: Linux/Unix files, inodes and structure and file system related commands, Shell as command processor, shell variables, creating command substitution, scripts, functions, conditionals, loops, customizing environment.

Regular Expressions and Filters
Introducing regular expressions patterns, syntax, character classes, quantifiers, introduction to egrep, sed, programming with awk and perl.

The C Environment
The C compiler, vi editor, compiler options, managing projects, memory management, use of makefiles, dependency calculations, memory management - dynamic and static memory, building and using static and dynamic libraries, using ldd, soname, dynamic loader, debugging with gdb.

Processes in Linux
Processes, starting and stopping processes, initialization Processes, rc and init files, job control - at, batch, cron, time, network files, security, privileges, authentication, Password administration, archiving, Signals and signal handlers, Linux I/O system.

References:

CSL-644 SYSTEM PROGRAMMING

(Programme Elective-I 4th Semester)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4                                           Time: 3 Hours
L     T      P                          (Examination)
4     -      -

SYLLABUS

Introduction to System Software: Definition, Components of System Software, evolution of System Software.

Assemblers: Elements of Assembly language programming, overview of assembly process, design options— one pass assembler & multi pass assembler.

Macroprocessors: Basic functions, Design options—Recursive macro expansion, General purpose macro processors, Macro processing within language translators.


Loaders & Linkage Editors: Loading, Linking & Relocation, Program relocatability, Overview of Linkage editing, linking for program overlays.

Software Tools: Spectrum of Software tools, text editors, Program generators, debug monitors, Programming environments.

References:

• Donovan J. John, System Programming, (Tata McGraw Hill)
• Dhamdhere D.M, System programming and operating system, (Tata Mc-Graw-Hill)
Extended E-R Model: Subclasses, Superclasses, and Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization.

Object-Oriented Data Model: Object Identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods and Persistence, Type Hierarchies and Inheritance, Complex Objects, Polymorphism, Multiple Inheritance, Versions and Configurations.

Object Relational Databases: Basic Concepts of Object-Relational Systems, Object-Relational features of Oracle, An Overview of SQL3, Object-Relational support in SQL3, Nested Relational Data Model.

Further Normalization: Higher Normal Forms, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Forms, Domain-Key Normal Form.


Web Interfaces to Databases: Web Fundamentals, Databases and the Web, Web Servers and Sessions, Providing access to Database on WWW. The Oracle Webserver.

Performance Tuning, Performance Benchmarks.


References:

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4  Time: 3 Hours
L  T  P  (Examination)
4  -  -

SYLLABUS

HIGH SPEED LAN

- Gigabit Ethernet → Overview of fast Ethernet, Gigabit Ethernet — overview, specifications, layered protocol architecture, network design using Gigabit Ethernet, applications, 10GB Ethernet — overview, layered protocol architecture, applications.

- Wireless Networks → Existing and emerging standards, Wireless LAN(802.11), Broadband Wireless(802.16), Bluetooth(802.15) their layered protocol architecture and security. Mobile Networks - GSM, CDMA and GPRS

- Fibre Channel → Fibre channel physical characteristics — topologies & ports, layered protocol architecture, class of service, technology comparison, SAN overview and architecture.

HIGH SPEED WAN

Frame Relay: Protocol architecture, frame format, routing.

ISDN & B-ISDN: Channels, interfaces, addressing, protocol architecture, services.

ATM: Virtual circuits, cell switching, reference model, traffic management.

INTERNET SUITE OF PROTOCOLS

Internet Layer: IPV4 and IPV6, IP addressing, ARP, IP routing(OSPF & BGP), internet multicasting, mobile IP.

Transport Layer: UDP/TCP protocols & architecture, TCP connection management, wireless TCP.

Application Layer: DNS, FTP, Voice over IP, audio & video compression.

References:

- Computer Networks and Internets - Douglas E. Comer, Addison Wesley.
- High Speed Network - Tere Parnel, TMH Publications.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

**Total Credits: 4**

**SYLLABUS**

**Introduction to Microprocessor and Microcomputer**: Historical background, modern microprocessors and microcomputers, architecture of pentium processor, real and protected modes of operations, addressing modes and instruction set of pentium processor, concept of RISC and CISC microprocessors.

**Memory Interface**: Memory devices, address decoding, 8/16/32/64-bit memory interfaces.

**Input-Output Interfaces**: Introduction to I/O interfaces, I/O mapped I/O, basic input interface and basic output interface, I/O port address decoding, 8/16/32-bit wide I/O ports, 82C55 PPI.

**Interrupt Structure**: Basic interrupt processing, interrupt instructions of pentium, operations of real and protected mode interrupts, 8259 PIC and its programming, expanding interrupt structure by cascading 8259's.

**Direct Memory Access**: DMA data transfer and basic DMA operations, 8237 DMA controller, its programming.

**Bus Interface**: The 8/16-bit ISA bus and its interfacing with input & output ports, EISA 32-bit bus and its interfacing, VESA and VL busses, PCI and PCMCIA busses.

**REFERENCES**:

- Microprocessors By DV Hall.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4                             Time: 3 Hours
L     T     P     (Examination)
4     -     -

SYLLABUS


A software management process framework: Life cycle phases – inception, elaboration, construction and training phase. Artifacts of the process – the artifact sets, management artifacts, engineering artifacts, pragmatics artifacts. Model based software architectures. Workflows of the process. Checkpoints of the process.


References:

- Project management 2/e, Maylor.
- Managing the Software Process, Humphrey.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P (Examination)
4 - -

SYLLABUS

Background Meaning, Nature, Need, Role, Importance, Evolution of management through information system; Relatedness of MIS with management process. Management functions and decision making.

Concept of balance MIS effectiveness and efficiency criteria.

Development of Management Information System: Introduction, Information system planning, Motivational forces behind development of information system, Principles for information system development, SDLC for MIS development process.

Development of MIS: Methodology and Tools techniques for systematic identification, implementation, evaluation, and maintenance of MIS.


Case studies: To introduce business problems and to discuss various stages for understanding the systems development process.

References:

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P (Examination)
4 – –

SYLLABUS

Introduction: Survey of computer Graphics and its applications; Interactive and passive graphics; Introduction to GKS primitives; display processors;

Graphic Devices: Display systems-refresh CRTs, raster scan and random scan monitors, Grey shades, Interlacing, beam penetration shadow mask monitors, look up tables, plasma panel, LED and LCD monitors, VGA and SVGA resolutions; Hard copy Devices-printers, plotters; Interactive Input Devices-mouse, digitizing tablet, light pen, touch panels, image scanners, voice systems, joy stick, track ball.

Drawing Geometry: Coordinate system; resolution; use of homogeneous coordinate system; scan conversion: symmetrical DDA, simple DDA, Bresenham's line drawing algorithm, Circle drawing using DDA and polar coordinates, Bresenham's circle drawing algorithm, generation of ellipse.

2-D Transformations: Translation; rotation; scaling; mirror reflection; shearing; zooming; panning; input techniques-pointing, positioning, rubber band methods and dragging; tweening.

Graphic operations: Clipping-line clipping using Sutherland-Cohen and midpoint sub-division algorithm, polygon clipping; window and viewport; windowing transformation; Filling-stack based fill algorithm, scan-line seed fill algorithm;

4-D Graphics: 3D modelling of objects; 3D display techniques; coordinate system; 3D transformation matrices for translation, scaling and rotation; parallel projection; perspective projection; Hidden-surface removal - Z-buffer, back face, scan-line, depth-sorting, area subdivision; Shading - modelling light intensities, gouraud shading, phong shading.

Multimedia: Concepts of Hypertext/Hypermedia; multimedia applications; multimedia authoring; multimedia hardware; images; bitmaps; windows paint brush.

References:

- Computer Graphics - Donald Hearn, M.Pauline Baker, PHI
- Multimedia Systems - John F. Koegel Buford, Addison Wesley
- Computer Graphics Principles & Practice - Foley etc. Addison Wesley
- Fundamentals of Computer Graphics and Multimedia - D.P. Mukherjee, PHI
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS
Introduction: Background and history, Overview of AI applications areas.

The predicate calculus: Syntax and semantic for propositional logic and POPL, Clausal form, inference rules, resolution and unification.


Search strategies: Strategies for state space search-data driven and goal driven search; Search algorithms- uninformed search (depth first, breadth first, depth first with iterative deepening) and informed search (Hill climbing, best first, A* algorithm, mini-max etc.), computational complexity, Properties of search algorithms-Admissibility, Monotonicity, Optimality, Dominance, etc.

Production system: Types of production system, Control of search in production system.

Rule based expert systems: Architecture, development, managing uncertainty in expert systems(Bayesian probability theory, Stanford certainty factor algebra, Nonmonotonic logic and reasoning with beliefs, Fuzzy logic, Dempter/Shaffer and other approaches to uncertainty.

Knowledge acquisition: Types of learning, learning automata, genetic algorithms, intelligent editors, learning by induction.

Programming with Prolog.

References:

• Dan W. Patterson Introduction to Artificial Intelligence and Expert system PHI.
• Eugene Charniak, Drew McDermott Introduction to Artificial Intelligence Addison Wesley-2000.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4                             Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS


Java Server Pages Basics, Integrating Scripts in JSPs, JSP Objects and Components, configuring and troubleshooting, JSP: Request and response objects, Retrieving the Contents of a an HTML form, Retrieving a Query String, Working with Beans. Cookies, Creating and Reading Cookies. Using Application Objects and Events.

XML Relationship between HTML, SGML, and XML, Basic XML, Valid Documents. Ways to use XML, XML for Data Files, Embedding XML into HTML documents, Converting XML to HTML for DISPLAY, Displaying XML using CSS and XSL, Rewriting HTML as XML, The future of XML.

References:
- Scott Guelich, Shishir Gundavaram, Gunther Birzniek; CGI Programming with Perl 2/e. O'Reilly.
- Doug Tidwell, James Snell, Pavel Kulchenko; Programming Web Services with SOAP, O'Reilly.
- Pardi, XML in Action, Web Technology, PHI.
- Yong, XML Step by Step, PHI.
- Aaron Weiss, Rebecca Taply, Kim Daniels, Stuven Mulder, Jeff Kaneshki, Web Authoring Desk Reference, Techmedia Publications.
Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4

L T P (Examination)
4 - -

SYLLABUS

Introduction to Compilation: Compilers and phases of compilation, analysis-synthesis model of translation, compiler construction tools.

Lexical Analysis: Process of lexical analysis, finite state automata, DFA and NFA, recognition of regular expressions, LEX.

Syntax Analysis: Process of syntax analysis, types of grammar, top-down and bottom-up parsing techniques, parser generator.


Code Optimization: Introduction to code optimization, potential cases of code optimization, optimization of basic blocks, loops in flow graphs, code improving transformation.

Code Generation: Issues in the design of a code generator, the target machine, dynamic storage management, translating basic blocks, a simple code generator, peephole optimization, directed acyclic graphs and basic blocks, code generation from directed acyclic graphs.

Overview of syntax-directed translation scheme.

REFERENCES:

- Compilers: Principles, Techniques & Tools, By Aho, Ullman, & Sethi (Addison Wesley)
- Principles of Compiler Design, By Aho & Ullman (Narosa Publications)
- Practice & Principles of Compiler Building with C, By Henk Alblas et al. (PHI)
- Principles of Compiler Design, By Trembley & Sorenson (McGraw Hill)
CSL-655 NEURAL NETWORK

(Programme Elective III 5th Semester)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS

Fundamental of Neural Networks
Overview of Biological neurons, neuron concept, single layer neural network, notation and representation of neural networks, training of ANNs.

Single Layer Neural network
Representation of perceptron and issues, perceptron learning and training, classification, Linear separability, structure of Hopfield nets, training, application and stability.

Backpropagation
Backpropagation training algorithm, application of back propagation, advance algorithms.

Counter propagation networks
Kohonen network, Grossberg layer, application of counter propagation, Image classification.

Multilayer Neural Networks
BAM structure retrieving a stored association, encoding the association, memory capacity, ART architecture, ART classification operation, cognitron and neocognitron.

References:

- Jock. M. Juroda, "Artificial Neural Systems".
- Kevin Gurney, "Introduction to Neural Networks: (UCL Press).
- Philip D. Wasserman, Neural Computing and Practice, ANZA Research Inc.
CSL-656 SECURITY OF INFORMATION SYSTEMS

(Programme Elective III 5th Semester)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4 Time: 3 Hours
L T P (Examination)
4 - -

SYLLABUS

Symmetric Key Cryptography: DES, AES.

Asymmetric Key Cryptography: RSA algorithm, Key management protocols, Diffie Hellman Algorithm

Digital Signature: Digital Signatures, Public Key Infrastructure


LAN Security: Threats, Authentication & access control, Secured communication Mechanisms (IPSec, Kerberos, Biometric, PKI), Secured Design for LAN.


Wi-Fi & IEEE 802.11 Security: Protocol architecture, WEP, Access controls

References:

- "Digital Certificates Applied Internet Security", Jalal Feghhi, Jalli Feghhi and Peter Williams, Addison Wesley Longman,
At the other end, credit-based financial systems (e.g., France, Germany) 
*typically have weak and fairly illiquid or thin capital markets, which play only a minor role in mobilizing and.* 15. *pricing investment funds* (Whitely, 1999, p.49). In market-based financial systems with well-developed equity markets, corporations strive to secure the most favorable financing terms. Typically, financing decisions by the markets are based on short-term profitability and therefore, within such systems, that is what firms focus on maximizing (Teoh, Welch & Wong, 1998a; Teoh, Welch & Wong, 1998b).