SYLLABUS AND ORDINANCES
Wef-2010-11
SYLLABUS
FOR
M.Sc. (Computer Science) Programme
Ordinance
for
M.Sc. (Computer Science) Programme
Uttrakhand Technical university, Dheradun

1. Admission

Admission to the M. Sc. (Computer science) 1st semester will be made as per rules prescribed by the Academic Council of the University.

2. Eligibility

B.Sc. with Mathematics/Statistics as a subject or BCA or B.Sc.(IT) or B.Sc.(CS).

3. Attendance

3.1 Every candidate is required to attend all the lectures, tutorials, practicals and other prescribed curricular and co-curricular activities. It can be condoned up to 25% on medical grounds or for other genuine reasons.

3.2 A further relaxation of attendance up to 15% can be given by Principal/Dean/ Director of the Institute for the students, who have been absent with prior permission, for reasons acceptable to Head of the Institution.

3.3 No candidate will be allowed to appear in the end semester examinations if he/she does not satisfy the overall average attendance requirements as per clause 3.1 and clause 3.2.

4. Duration

4.1 Total duration of the M.Sc. (Computer Science) Course shall be two years, each year comprising two semesters.

4.2 Each semester shall normally have teaching for the 90 working days.

4.3 A student failing 2 times in I and/or II semester (of first year) and ineligible for the carry over system (clause 7) shall not be permitted to continue studies further.

4.4 Maximum time allowed for completing the M.Sc. (Computer Science) course will be 4 (Four) years. Those who are unlikely to satisfy the condition shall not be allowed to continue the studies any further.

5. Curriculum
5.1 The 2 (Two) years curriculum will be divided into four semesters. Semester I to III include lectures, tutorials, practicals. Semester IV will be exclusively devoted by students for projects in Industries/Organizations.

5.2 It will also include co-curricular and extra curricular activities as prescribed from time to time by the college/university.

6. Examination

6.1 Student’s performance will be evaluated through continuous assessment in the form of Class Tests, Assignments, Quizzes, Viva voce/Practicals etc. There shall also be an examination at the end of each semester in theory subjects, practicals and project.

6.2 The maximum marks for the theory subjects shall consist of marks allotted for end semester examination and sessional work.

6.3 The maximum marks for the practical shall consist of marks allotted for practical examination and sessional work.

6.4 Pass/fail in a subject shall be declared on the basis of total marks obtained in theory/practical examination and the sessional award for theory/practical subjects.

6.5 The minimum pass marks in the theory subjects (including sessional marks) shall be 40%.

6.6 The minimum pass marks in the practical subjects (including sessional marks) shall be 50%.

6.7 The marks of the previous semester(s) shall not be added in declaring the result of any semester examination.

6.8 To pass a semester candidate must secure 50% of aggregate marks in that semester. No merit position shall be awarded to a candidate who has qualified for promotion to higher classes with back papers.

6.9 The student failing in the project only but satisfying all other requirements including obtaining 50% or more marks in aggregate will be allowed to submit a new project at any time after the result is declared and within the next academic year without repeating the whole session.

7. Promotion Rules

7.1 A candidate satisfying all the conditions under clause 5 shall be promoted to the next semester.

7.2 A candidate not satisfying the above conditions but failing in not more than 2 subjects (Theory and/or practical) of a semester examination shall be governed by the clause No. 8.

7.3 All other candidates will be required to repeat the semester either as regular candidate, after re-admission or opting for ex-studentship. This facility is however subject to the time limits stipulated in clause No. 4.

8. Promotion under carry-over system

8.1 A candidate who fails in the category of clause No. 7.2 shall become eligible for provisional promotion to next semester and the carry-over system as per the following table.
<table>
<thead>
<tr>
<th>For promotion to &amp; exam</th>
<th>Max. permitted no. of carry over subjects of semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>II</td>
<td>2</td>
</tr>
<tr>
<td>III</td>
<td>2</td>
</tr>
<tr>
<td>IV</td>
<td>2</td>
</tr>
</tbody>
</table>

8.2 No separate carry-over Examination will be held for any subject except for M.Sc. (Computer Science) Final year. Any candidate eligible for the carry-over system shall have to appear in the carry over subjects in the subsequent University Examination for the same semester.

9. **Ex-studentship**

Sessional marks in the subject of an ex-student shall remain the same as those secured by him/her earlier.

10. **Result**

Results at the end of final year will be declared with the following weightage:

- I year: 100%
- II year: 100%
- III year: 100%

11. **Award of Division**

11.1 If candidate passes all examinations in single attempt and secures 75% or more in aggregate marks he/she shall be placed in the First Division with Honours.

11.2 If candidate passes all examinations and secures aggregate marks of 60% or more but less than 75%, he/she shall be placed in First Division.

11.3 If candidate passes all examinations and secures aggregate marks of 50% or more but less than 60%, he/she shall be placed in Second Division.

12. **Seminar and Project**

12.1 Candidate must secure 50% marks to pass in seminar and project.

13. **Grace Marks**

A candidate shall be entitled to grace marks of a maximum of 5 in any one subject in a semester to enable him to pass, provided he is failing in only one subject and has secured the necessary minimum aggregate. The grace marks shall not be added to the marks of the subject or to the aggregate. The grace marks will not be awarded to enable a candidate to pass in a practical or project.

14. **Scrutiny shall be allowed as per the rules of the University.** Revaluation is not permitted.
M. Sc. (Computer Science)
UTTARAKHAND TECHNICAL UNIVERSITY
DEHRADUN

Programme Structure

SEMESTER - I
MSCS101 : Computer Fundamental & Programming in ‘C’
MSCS102 : Combinatorics & Graph Theory
MSCS103 : Relational Data Base Management System
MSCS104 : Digital Electronics & Computer System Architecture
MSCS105 : Operating System with Case Study of UNIX/LINUX
MSCSP11 : Programming & Problem Solving in ‘C’
MSCSP12 : Shell Programming

SEMESTER - II
MSCS201 : Advance Data Structures
MSCS202 : Data Warehousing and Data Mining
MSCS203 : Theory of Computation
MSCS204 : Software Engineering
MSCS205 : Data Communication and Computer Networks
MSCSP21 : Data Structures Using ‘C’
MSCSP22 : Data Communication and Computer Networks

SEMESTER - III
MSCS301 : Programming in C++
MSCS302 : Java Programming
MSCS303 : Design and Analysis of Algorithm
MSCS304 : Mobile and Wireless Computing
MSCS305 : Elective
  i) Fuzzy Logic & Neural Network
  ii) Artificial Intelligence
iii) Network Security and Cryptography

iv) Distributed and Parallel Computing

MSCSP31 : Programming in C++
MSCSP32 : Java Programming

**SEMESTER - IV**

MSCSPR 401 : Project work 6 months duration (In an organization)
MSCSSSM 402 : Seminar

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### FIRST SEMESTER:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Evaluation – Scheme</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>Period</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
</tr>
<tr>
<td>Theory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>MSCS101</td>
<td>Computer Fundamental &amp; Programming in ‘C’</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>MSCS102</td>
<td>Combinatorics &amp; Graph Theory</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>MSCS103</td>
<td>Relational Database Management System</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>MSCS104</td>
<td>Digital Electronics &amp; Computer System Architecture</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>MSCS105</td>
<td>Operating System with Case Study of UNIX/LINUX</td>
<td>3</td>
</tr>
</tbody>
</table>

**Practical**

|       |            |                                                       |         |     |    |     |     |     |     |             |
|       |            |                                                       | Period   | Sessional | Examination |
|       |            |                                                       | L  | T | P | TA | CT | TOT | ESE | Sub. Total |
| 1.    | MSCSP11    | Programming & Problem Solving in ‘C’                  | -  | -  | 4 | 50 | -  | 50  | 50  | 100         |
| 2.    | MSCSP12    | Shell Programming                                     | -  | -  | 4 | 50 | -  | 50  | 50  | 100         |
|       |            |                                                       | Total    |     |    |     |     |     |     |             |
|       |            |                                                       | 15 | 5 | 8 |   | -  | 250 | 450 | 700         |

Total Period = 28
Total Marks = 700

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### SECOND SEMESTER:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Evaluation – Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Period</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
</tr>
<tr>
<td>Theory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>MSCS201</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>MSCS202</td>
<td>Data Warehousing and Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>MSCS203</td>
<td>Theory of Computation</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>MSCS204</td>
<td>Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>MSCS205</td>
<td>Data Communication and Computer Networks</td>
<td>3</td>
</tr>
</tbody>
</table>

**Practical**

|       |            |                                                       |         |     |    |     |     |     |     |             |
|       |            |                                                       | Period   | Sessional | Examination |
|       |            |                                                       | L  | T | P | TA | CT | TOT | ESE | Sub. Total |
| 1.    | MSCSP21    | Data Structures Using ‘C’                             | -  | -  | 4 | 50 | -  | 50  | 50  | 100         |
| 2.    | MSCSP22    | Object Oriented Programming in C++                    | -  | -  | 4 | 50 | -  | 50  | 50  | 100         |
|       |            |                                                       | Total    |     |    |     |     |     |     |             |
|       |            |                                                       | 15 | 5 | 8 |   | -  | 250 | 450 | 700         |
TA : Teacher Assessment
CT : Class Test
ESE : End Semester Examination
SUB TOT. : Subject Total
TOT. : Total

Total Period = 28
Total Marks = 700
### THIRD SEMESTER:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Evaluation – Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>1.</td>
<td>MSCS301</td>
<td>3</td>
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<tr>
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<td>MSCS302</td>
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<td>3.</td>
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<td>3</td>
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<td>MSCS304</td>
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<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>MSCS305</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Elective
i) Fuzzy Logic & Neural Network
ii) Artificial Intelligence
iii) Network Security and Cryptography
iv) Distributed and Parallel Computing

| Practical |            |     |     |    |    |    |     |     |             |
| 1.        | MSCSP31    | -  | -  | 4  | 50 | -  | 50  | 50  | 100        |
| 2.        | MSCSP32    | -  | -  | 4  | 50 | -  | 50  | 50  | 100        |
| Total     |              | 15 | 5  | 8  | -  | -  | 250 | 450 | 700        |

Total Period = 28
Total Marks = 700

### FOURTH SEMESTER:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Evaluation – Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Period</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
</tr>
<tr>
<td>Theory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>MSCSPR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>MSCSSM</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

TA : Teacher Assessment
CT : Class Test
ESE : End Semester Examination
SUB TOT. : Subject Total
TOT. : Total

**Note:** The students with the help of the Institution may do summer training of 6-8 weeks duration, after II Semester in an organization (academic or industrial) which will be submitted in the organization.

Each theory paper will of 100 marks comprising of 70 marks for University examination and 30 Marks for sessional. Each practical will be of 100 marks (50 marks of University
examination and 50 Marks for sessional). The following in the distribution for marks (Semester wise):

<table>
<thead>
<tr>
<th></th>
<th>Theory</th>
<th>Practicals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Semester I</td>
<td>5x100</td>
<td>2x100</td>
<td>700</td>
</tr>
<tr>
<td>2. Semester II</td>
<td>5x100</td>
<td>2x100</td>
<td>700</td>
</tr>
<tr>
<td>3. Semester III</td>
<td>5x100</td>
<td>2x100</td>
<td>700</td>
</tr>
<tr>
<td>4. Semester IV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Project</td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>(b) Seminar</td>
<td></td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>2750</td>
</tr>
</tbody>
</table>
MSCS101 : Computer Fundamental & Programming in ‘C’

Introduction to Computers: Computer hardware Components, Disk Storage, memory, keyboard, mouse, printers, monitors, CD etc., and their functions, Comparison Based analysis of various hardware components.

Basic Operating System Concepts: MS-DOS, WINDOWS, Functional knowledge of these operating systems. Introduction to Basic Commands of DOS, Managing File and Directories in various operating Systems, Introduction to internet, Basic terms related with Internet, TCP/IP.

Programming in C: History, Introduction to C Programming Languages, Structure of C programs, compilation and execution of C programems. Debugging Techniques, Data Types and Sizes, Declaration of variables, Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor

Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the comma operator, go to statement.

Loops: for, while, do-while.

Functions: built-in and user-defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs.

Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Memory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

References:

1. V. Rajaraman, "Fundamentals of Computers", PHI
2. Pater Norton's "Introduction to Computer", TMH
3. Hahn, "The Internet complete reference", TMH
4. Peter Norton's, "DOS Guide", Prentice Hall of India
MSCS102 : Combinatorics & Graph Theory

Rules of sum and products, Permutation, Combination, Permutation groups and application, Probability, Remsey Theory, Discrete numeric function and generating function, combinatorial problems, Difference equation.

Recurrence Relation: Introduction, Linear recurrence relation with constant coefficient, Homogeneous solution, Particular solution, Total solution, Solution by the method of generating function.

Graphs, sub-graphs, some basic properties, Walks, Path & circuits, Connected graphs, Disconnected graphs and component, Eular and Hamiltonian graphs, Various operation on graphs, Tree and fundamental circuits, Distance diameters, Radius and pendent vertices, Rooted and binary trees, Counting trees, Spanning trees, Finding all spanning trees of a graph and a weighted graph.

Cut-sets and cut vertices, some basic properties, All cut sets in a graph, Fundamental circuit and cut sets, Connectivity and seperatability, Network flows, Planner graphs, Combinatorial and geometric dual, Kuratowski to graph detection of planarity, Geometric dual, Some more criterion of planarity, Thickness and Crossings, Vector space of a graph and vectors, basis vectors, cut set vector, circuit vector, circuit and cut set verses sub spaces, orthogonal vector and sub space. Indicidence matrix & adjacency matrix of graphs.

Coloring and covering partitioning of graph, Chromatic number, Chromatic partitioning, Chromatic polynomials, Matching, covering, Four color problem, Directed graph, Types of directed graphs, Directed paths and connectedness, Euler digraph, Tree and directed edges, Fundamental circuit in digraph, Matrices A,B,C of digraph adjacency matrix of digraph, Enumeration and its types, counting of labeled and unlabeled trees, Polya's theorem, Graph enumeration with polyas theorem, Graph theoretic algorithm.

References:

1. Deo Narsing, :Graph Theory with applications to engineering and computer science", PHI
2. Tremblay and Manohar, :Discrete mathematical structures with applications to computer Science:, TMH
3. Joshi K.D., "Fundamental of discrete mathematics:, New Age International
4. John Truss, "Discrete mathematics of computer scientist"
5. C.L. Liu, "Discrete mathematics"
Introduction to database systems-Operational Data, File Management Vs Data Management, characteristics of Database approach, An Architecture for a Database System, Advantages and Disadvantages of DBMS, Data associations - Entities, Attributes and Associations, Relationship among Entities, Representation of Associations and Relationship, Data Model Classification, Entity Relationship Model, Relational Data Model, Network Data Model, Hierarchical Data Model. Objects – Relational Model Objects, Relationship, Composite Objects, Procedures, Types and Inheritance.

Relational data structure-A Review of Set Theory, Relations, Domains and Attributes, Tuples, Keys. Integrity Rules Extensions And Intensions, Base Tables, Indexes Relational Algebra and Operations, Retrieval Operations, Relational Calculus and Domain Calculus.

Relational database design-Universal Relation, Anomalies in a Database, Normalization Theory, Functional Dependencies. Closure of a Set of F.D Covers, Non Redundant and Minimum Cover, Canonical Cover, First, Second and Third Normal Forms, Relations with more than one Candidate Key, Good and Bad Decompositions, Boyce Codd Normal Form, Multivalued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.


References:

1. Date C.J. "An Introduction to Database System". Addision Wesley
3. Database Management System: V. K. Jain, Wiley dreamtech
5. Paul Beynon Davis, "Database Systems" Palgrave Macmillan


Memory Organization: Memory hierarchy, Main memory (RAM/ROM) chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.


References:

1. Willam Stalling, "Computer Organization & Architecture" Pearson Education Asia
2. Mano Morris, "Computer System Architecture" PHI
4. B. Ram, "Computer Fundamental Architecture & Organization" New Age
5. Tannenbaum, "Structured Computer Organization" PHI.
MSCS105 : Operating System with Case Study of UNIX/LINUX

Introduction: Definition, Design Goals, Evolution; Concept of User, job and Resources; Batch processing, Multi-programming, Time sharing; Structure and Functions of Operating System.


Case Study of UNIX/LINUX

References:
3. Tanenbaum, Modern operating Systems, PHI.
5. Vijay Mukhi, The C Odyssey, BPB.
7. P. B. Hansen, Operating System Principles, PHI.
MSCS201 : Data Structures

Introduction to data structures, Abstract data types
Stacks - Introduction to stack & primitive operation on stack, Stack as an abstract data
type, Stack’s applications - Infix, post fix & Prefix expressions, Recursion, Multiple
stacks
Queues - Introduction to queues, Primitive Operations on the Queues, Queue as an
abstract data type, Circular queue, Dequeue, Priority queue.

Linked List - Introduction to the Linked List, Operation on Linked List, Linked List
representation of stack and Queue, Header nodes.
Types of Linked List - Doubly Linked List, Circular Linked List
Application of Linked List.

Trees - Basic Terminology of Trees, Binary Trees, Tree Representations as Array &
Linked List
Binary tree representation, Traversal of binary trees - In order, Preorder & post order,
Application of Binary tree, Threaded binary tree
Balanced tree, AVL tree, B-tree, B+ & B* trees, Conversion of General Tree to Binary
Tree, Counting Binary Trees, 2-3 Trees, algorithm for manipulating 2-3 Trees.

Searching - Sequential Searching, Binary search and their Comparison.
Sorting - External & Internal sorting, Insertion sort, Selection sort, Quick sort, Bubble
sort, Heap sort, Merge sort, Comparison of sorting methods Algorithms of sorting and
searching in Linked list and Arrays.

Tables - Hash table, Collision resolution Techniques.
Graphs - Introduction to graphs, Basic Terminology, Directed, Undirected & Weighted
graph, Representation of graphs, W arshall’s algorithm for path matrix and shortest path
Graph Traversals - Depth first & Breadth first search.

References:

1. Lipshutz, Data Structure, McGraw Hill.
2. Standish, Data Structure, Addison-Wesley.
5. A. M. Tennenbaum, Y. Langsam and M. J. Augenstein, Data Structures using C, PHI,
6. S. Lipschutz, Data Structure, Schaum Series.
MSCS202: Data Warehousing & Mining


Multimedia Data-Mining, Multimedia-Database, Mining Multimedia Data-Mining and the World Wide Web, Data-Mining, Mining and Meta-Data Data Visualization & Overall Perspective Data Visualization. Applications of Data-Mining.

References:

1. Berson, "Data Warehousing, Data-Mining & OLAP", TMH
2. Mallach, "Decision Support and Data Warehousing System" TMH
4. Navathe, "Fundamentals of Database System" Person Education
5. Margaret H. Dunham, "Data-Mining. Introductory & Advanced Topics" Person Education
MSCS203 : Theory of Computation


References:

5. T.C. Martin, Theory of Computation, Tata McGraw-Hill

SOFTWARE PROJECT MANAGEMENT: Project Management Concepts – People Problem and Process


S/W REUSE: Reuse Process, Building Reuse Components, Classified And Retrieving Components, Economics Of S/W Reuse

COMPUTER AIDED S/W ENGINEERING: Introducing of Case, Building Block For Case, Taxonomy Of Case Tools, Integrating Case Environment, Integrating Architecture, Case Repository

References:

1. Software Engineering By R.S.Pressman
2. An Integrated Approach To Software Engineering By Pankaj Jalote
MSCS205 : Data Communication and Computer Networks

Introduction to Computer Networking: Use, advantage, structure of the communications network topologies the telephone network, analog to digital communication.

Communication Between Analog Computers & Terminals Layered Protocols, Network & The OSI Models, Traffic control and accountability wide area and local area networks, connection oriented and connectionless networks, classification of communication protocols polling/selection systems, non-priority system priority system, rotation for layered protocols foals of layered protocols, network design problems, communication between layers, A parametric illustration, introduction to standards organizations and the ISO standard.

Polling/Selection, Satellite and Local area Networks: Binary synchronous control, other BSC system, conversion using satellite communication SPUS, and the Tele-port primary attribute of a LAN, IEEE LAN standards, LAN topology and protocols.


The X.25 & Digital Networks: Layers of x.25, features of x.25 flow control principles, other packet type, x.25 logical channel states time out and time limits, packet formats, flow control and windows x.25 facilities, other standards layer the pad, communication networks communication between layers, advantage of digital networks, Digital’s switching, voice transmission by packet.

Personal Computer Network: Personal computer communications, characteristics, using the personal computers as server linking the personal computer to mainframe computers, semaphores of vendor offerings. File transfer on personal computers, personal computer and local area networks. Personal computer networks and the OSI models.

TCP/IP: TCP/IP and internetworking, example of TCP/IP operations, related protocols ports and sockets. The IP address structure, major features of IP, IP datagram, Major IP services. IP source routing, value of the transport layer, TCP, Major features of TCP, passive and active operation, the transmission control block (TCB), route discovery protocols, examples of route discovery protocols, application layer protocols.

References:

5. Starlings, William : Local Networks; and Introduction Mack Publishing Co.
7. Crichlow : Introduction to Distributed and Parallel Comp.
MSCS301 : Programming in C++

OOAD and OOP, Object Oriented Programming paradigm and design; General Concepts: Object, Class, Data Abstraction and Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing; Benefits of OOP, Object-oriented Languages.

Object oriented Programming using C++: Data Types, Operators, Classes and Objects, Constructors and Destructors, Operator Overloading, Type Conversions, Inheritance, Pointers, Virtual Functions, Polymorphism, Stream I/O in C++, File Processing, Templates, Standard Template Library, Program defined exceptions, Events; Introduction to Class Wizard, Application Wizard and MFC.

Use of OOAD and OOP concepts in different areas: - Object-oriented Software Engineering, Object-oriented OS.

References:

2. E. Balagurusamy, Object oriented Programming with C++, 2/ed, TMH.
4. Rumbagh et. Al., Object Oriented Modeling, PHI.
**MSCS302: JAVA Programming**

Java Programming: Introduction, Operator, Data types, Variables, Methods and Classes, Multi threaded programming, I/O Java applet.


Software Development Using Java: Java Bean, Java Swing, Java Servlets, Migrating from C++ to Java, Application of JAVA, Dynamic Billboard Applet.

Image Menu: An image based menu, Lavatron Applets, Scrabblets JDBC, Brief functioning of Upper Layer E-mail and their applications.

**References:**

1. Naughton, Schidt, "The Complete Reference JAVA2", TMH
2. Balagurusamy E, "Programming in JAVA, TMH
3. Dustin R. Calway, "Inside Serviets" Addison Wesley
4. Mark Wutica, "Java Enterprise Edition" QUE
5. Steven Hoizner, "Java2 Black book" Dreamtech
MSCS303: Design and Analysis of Algorithm

Elementary Data Structures, Basic Computational Models.


Design Methods : General Consideration, Algorithm design paradigms and representative problems: Divide and Conquer (Binary search, Merge Sort, Quick Sort, Arithmetic with Large integers, etc.), Greedy Method (Minimal Spanning Tree, Shortest Paths, Knapsack, etc.), Dynamic Programming (Chained Matrix Multiplication, Optimal Storage on Tapes, Shortest Paths, Optimal Search Trees, etc.), Backtracking (8-queens problem, Graph Colouring, Hamiltonian Cycles, etc.), Branch and Bound (0/1 Knapsack problem, Travelling Salesperson, etc.), Approximation (Graph Colouring, Task Scheduling, Bin Packing, etc.), Probabilistic Algorithms (Numerical Integration, Primality Testing, etc.).

Graph Algorithms: BFS, DFS and its applications.

Polynomial Evaluation and Interpolation, Fast Fourier transforms.

Lower Bound Techniques: Comparison tree, Reduction, Adversary argument.

References:
4. G.Brassard and P.Bratley, Algorithmics, PHI.
MSCS304 : Mobile and Wireless Computing


WIRELESS AND MOBILE COMPUTING: Overview of the history, evolution, and compatibility of wireless standards; the special problems of wireless and mobile computing;

MOBILE COMMUNICATION SYSTEMS: Introduction, mobile Internet protocol; mobile aware adaptation; extending the client-server model to accommodate mobility; mobile data access; the software packages to support mobile and wireless computing; Mobile/Cellular System Infrastructure, Registration, Handoff Parameters and Underlying Support. Roaming support Using System Backbone. The role of middleware and support tools; performance issues; Multicasting, Security and Privacy.


RECENT ADVANCES: Introduction, Ultra-Wideband Technology, Multimedia Services Requirements, Mobility Management for Integrated Systems; Multicast in Wireless Networks; MANET Route Maintenance/Repair; Design Issues in Sensor Networks; Bluetooth Networks; Threats and Security Issues.

References:

MSCS305 (i) : Fuzzy Logic & Neural Network


Real Life Applications of Fuzzy Logic and Neural Networks.

References:

3. 3.Principal of Artificial Intelligence, Nelson, Springer-Verlag.
MSCS305 (ii) : Artificial Intelligence

Introduction: Definition and meaning of artificial intelligence, A.I. techniques, pattern recognition, Level of, speech recognition representation in A.I. properties of internal representation.

Production System: Different types of tracing, strategies, graph search strategies, Heuristic graph, search procedure, AND/OR graph, relationship between decompositional and compatible systems, searching Gate Tree, min-max search game playing, actual game playing.

Introduction to Predicate Calculus: Predicates and Arguments, connectives, Simplifications of strategies, extracting answers from Resolution Refutation. Control strategies.

Rule Based Deduction Systems: Forward and backward deduction system, resolving with AND/OR graph, computation, deduction and program synthesis, central knowledge for rules based deduct systems.

Managing Plans of Action: Plan interpreter, planning decisions, execution monitoring and re-planning domain of application robot motion planning and game playing.

Structural Object Representation: Semantic networks semantic market matching deductive operations on structured objects.

Architectural for A.I. Systems: Knowledge, acquisitions representation IMAGES PROCESSING, Natural language processing.

References:

1. Introduction to artificial Intelligence Eugene Charnik Drew MC mott
2. Artificial Intelligence Elaine Rice.
4. Artificial Intelligence Application Programming: Tim Jones, Wiley dreamtech
MSCS305 (iii) : Network Security and Cryptography


References:

2. Johannes A. Buchmann, "Introduction to Cryptography" Springer-Verlag
3. Atul Kahate, "Cryptography and Network Security" TMH
5. Practical Cryptography "Bruce Schneier" Wiley dreamtech India Pvt. Ltd.
MSCS305 (iv) : Distributed and Parallel Computing

Parallel and high-performance computers, Models and parallel computers, Basic communication operations, Performance and scalability, MPT and open MP programming.
Distributed processing potential, Forms of Distributed processing strategies, Hexagon Distributed computing, client server model.

References:

5. Stallings, William : Local Networks; An Introduction Macmillan publishing Co.