Course
Bachelor of Technology
Computer Science and Information Technology

(Effective from the Session: 2014-2015)
Minutes

A meeting of Board of Studies (BOS) held on 29/05/2014 at 11:30 AM in the department of computer science & IT, MJPRohilkhand University, Bareilly. The following members were present in the meeting.

1. Dr. Ravendra Singh Member and Head
2. Dr. Ashutosh Gupta Internal Member
3. Dr. S.S. Bedi Convener
4. Dr. Vinay Rishiwal Internal Member
5. Mr. B.R. Ambedkar Internal Member
6. Mr. Ashwani Gupta Internal Member
7. Dr. A.K. Denial External Member
   MMM University of Technology, Gorakpur

Following points were discussed and resolved.

1. The recommended list of examiners for the B.Tech. Theory and Lab Exams for academic session 2014-2015 is enclosed (Annexure 1).
2. The recommended list of examiners for the MCA Theory and Lab Exams for academic session 2014-2015 is enclosed (Annexure 2).
3. The recommended list of examiners for the BCA Theory and Lab Exams for academic session 2014-2015 is enclosed (Annexure 3).
4. The new course structure and syllabus for the B.Tech has been recommended for its approval from the faculty Board and Higher authorities for its implementation from academic year 2014-2015
5. According to the availability of the faculty and necessity with respect to emerging trends, it is recommended that any elective may be included (in addition of existing elective list) by the recommendation of the Departmental Board.
6. As per AICTE approval of MCA course, it is mandatory to consider it is a part of departmental of CS&IT. Department of CS&IT, IET/FET deal with the admission procedure for MCA and fees obtain from this course are also being deposit in the account of FET. All the faculty members and the staff members of this department are devoted for conducting the classes and laboratories of MCA course. University also right the name of institute on their award list as well as degree certificate of the students. Hence, It is recommended that the MCA course shell be considered as an integrated part of department of CS&IT, Institute of Engineering and Technology along with B.Tech. Courses and the same should be sent to the Chancellor to change the act and status of the university.

The faculty members of Department of CS&IT were also presented in the meeting. The convener is very thankful to all the BOS members and all the faculty members for their valuable suggestions.

The meeting ended with thank to chair.
Course Structure for B.Tech

Features of the syllabus

The syllabus for B.Tech (CSE/CSIT) programs match to outcome based teaching learning process. The structure of the syllabus is formed for eight semesters and the subjects have been offered in a manner so that the prerequisite knowledge is obtained first in the preceding semester. The syllabus has been designed as per guidelines of All India Council for Technical Education, N. Delhi and each subject meets out one or more of the following:

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design and conduct experiments, as well as to analyze and interpret data
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
4. An ability to function on multidisciplinary teams
5. An ability to identify, formulates, and solves engineering problems
6. An understanding of professional and ethical responsibility
7. An ability to communicate effectively
8. The broad education necessary to understand the impact of engineering solutions in global, economic, environmental, and societal context
9. A recognition of the need for, and an ability to engage in life-long learning
10. A knowledge of contemporary issues
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

These outcomes explain what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program. Further each subject in the course spells out clear instructional objectives which are mapped to the student outcomes.
### Course Structure for B.Tech

#### B.Tech I year, I Semester

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course No.</th>
<th>Subject</th>
<th>Credits</th>
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**Laboratory Courses**

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Course Structure for B.Tech

B.Tech I year, II Semester

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Laboratory Courses

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## Course Structure for B.Tech

### B.Tech SECOND YEAR, SEMESTER-III

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### Laboratory Course

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Note: Practical CS-201P (Computer Programming Lab II) for EC and EI branches.
## Course Structure for B.Tech

### SECOND YEAR, SEMESTER-IV

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<td>Analysis &amp; Design of Algorithm</td>
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<td>CS-208N</td>
<td>Data Base Management System</td>
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**Semester Total**  

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**Note:**  
1. CS-204N is assigned for B. Tech (CSIT, EC, EI & EE) branches.  
2. For summer training after IV sem, see the guidelines (**Annexure 1**).
## Course Structure for B.Tech

### THIRD YEAR, SEMESTER-V

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### Course Structure for B.Tech

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<td>Data Mining Techniques</td>
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**Laboratory Course**

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**Semester Total**

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</tr>
</tbody>
</table>

Note: 1. For Minor Project and Industrial Training see the guidelines (*Annexure 1*)

2. Subject CS-302N, Computer Network assigned for the EC and EI branches only
# Course Structure for B.Tech

## Fourth Year Semester-VII

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Courses No.</th>
<th>Subject</th>
<th>Credits</th>
<th>Teaching schedule</th>
<th>Contact Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CS-401N</td>
<td>Soft computing</td>
<td>4</td>
<td>3 1 0</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>CS-403N</td>
<td>Dot NET framework with C#</td>
<td>4</td>
<td>3 1 0</td>
<td>4</td>
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<tr>
<td>3</td>
<td>CS-***</td>
<td>Departmental Elective-III</td>
<td>4</td>
<td>3 1 0</td>
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<tr>
<td>4</td>
<td><strong>.</strong>*</td>
<td>Pool Elective</td>
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<td>5</td>
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<td>Open Elective</td>
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<tr>
<td>6</td>
<td>TRN-401</td>
<td>Industrial Training</td>
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<td><strong>23</strong></td>
<td><strong>15 5 0</strong></td>
<td><strong>20</strong></td>
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**Laboratory Course**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Courses No.</th>
<th>Subject</th>
<th>Credits</th>
<th>Teaching schedule</th>
<th>Contact Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>CS-401 P</td>
<td>DotNET Lab</td>
<td>2</td>
<td>0 0 3</td>
<td>3</td>
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<tr>
<td>8</td>
<td>CS-403 P</td>
<td>Major Project</td>
<td>6</td>
<td>0 0 9</td>
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<tr>
<td><strong>Total</strong></td>
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<td></td>
<td><strong>8</strong></td>
<td><strong>0 0 12</strong></td>
<td><strong>12</strong></td>
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</table>

**Semester Total**

<table>
<thead>
<tr>
<th></th>
<th>Credits</th>
<th>Total Contact Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31</td>
<td>32</td>
</tr>
<tr>
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<tr>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>
# Course Structure for B.Tech

## FOURTH YEAR

### SEMESTER-VIII

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Courses No.</th>
<th>Subject</th>
<th>Credits</th>
<th>Teaching schedule</th>
<th>Contact Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CS-402N</td>
<td>Advanced Computer Architecture</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>CS-***</td>
<td>Departmental Electives-IV</td>
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<td>1</td>
</tr>
<tr>
<td>3</td>
<td>CS-***</td>
<td>Departmental Elective-V</td>
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<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>CS-404</td>
<td>Seminar</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>14</td>
<td>09</td>
<td>4</td>
</tr>
</tbody>
</table>

**Laboratory Course**

| 5      | CS-402 P    | Advanced Programming Lab-II    | 2       | 0                 | 0          | 3          | 3         |
| 6      | CS-404 P    | Dissertation                   | 12      | 0                 | 0          | 15         | 15        |
|        |             | **Total**                      | 14      | 0                 | 0          | 18         | 18        |

**Semester Total**

|             |             | **Total**                      | 28      | 09                | 4          | 18         | 32        |
Annexure 1

Guidelines for Practical’s/Industrial Training/Minor Project/Major Project/Dissertation

<table>
<thead>
<tr>
<th>Semester I</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-101P</td>
<td><strong>Computer Programming Lab.</strong></td>
</tr>
<tr>
<td></td>
<td>The Lab shall be based on Theory subject CS101T and list of practicals will be provided by the Department before commencement of the session.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester III</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS201P</td>
<td><strong>Computer Programming Lab - II</strong></td>
</tr>
<tr>
<td></td>
<td>The Lab is assigned only for EC and EI branches. The list of practical’s will be provided by the Department before commencement of the session.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester IV</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-203P</td>
<td><strong>Data Structure Lab in C/C++</strong></td>
</tr>
<tr>
<td></td>
<td>The Lab shall be based on Theory subject CS203T and list of practical’s will be provided by the Department before commencement of the session.</td>
</tr>
</tbody>
</table>

|                     | **Object Oriented Programming Lab**                             |
|                     | The Lab shall be based on Theory subject CS205T and list of practical’s will be provided by the Department before commencement of the session. |

|                     | **Analysis & Design of Algorithm Lab**                           |
|                     | The Lab shall be based on Theory subject CS202T and list of practical’s will be provided by the Department before commencement of the session. |

|                     | **DBMS Project Lab**                                             |
|                     | The Lab shall be based on Theory subject CS208T and list of practical’s will be provided by the Department before commencement of the session. |

|                     | **Java Programming Lab**                                         |
|                     | The Lab shall be based on Theory subject CS210T and list of practical’s will be provided by the Department before commencement of the session. |

1Note:

1. After IV sem, the students are required to learn Linux / Advance Java Programming during summer vacation as a training course. The student is required to collect the assignments from the department on Linux / Advance Java Programming before...
Course Structure for B.Tech

start of summer vacation. These assignments will be completed by the students during vacation.
2. The summer training / assignments will be evaluated in V semester.

<table>
<thead>
<tr>
<th>Semester V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CS-301</strong> P Linux Lab</td>
</tr>
<tr>
<td>The Lab shall be based on summer training and Theory subject CS-307T. The list of practicals will be provided by the Department before commencement of the session.</td>
</tr>
<tr>
<td><strong>CS-305</strong> P Advance Java Programming Lab</td>
</tr>
<tr>
<td>The Lab shall be based on summer training and Theory subject CS-301T. The list of practicals will be provided by the Department before commencement of the session.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester VI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CS-306P</strong> Computer Graphics Lab</td>
</tr>
<tr>
<td>The Lab shall be based on Theory subject CS-306T and list of practical’s will be provided by the Department before commencement of the session.</td>
</tr>
<tr>
<td><strong>CS-302P</strong> Minor Project</td>
</tr>
<tr>
<td>Students are required to prepare a synopsis on Minor Project. The synopsis should be prepared in consultation with guide allotted by department. The format of synopsis includes: feasibility study on the Minor Project, system design, appropriateness and its application to society. The synopsis so formed should be submitted to the department for review and necessary approval. At the end of semester, the student will present the Minor Project to the department for evaluation and implement the project in Fourth year.</td>
</tr>
</tbody>
</table>

3Note: After VI semester, students have to go for **Industrial Training** of at least 6 weeks and will prepare the project in any software platform. After joining the training, a weekly report on the training shall be submitted by the student duly signed by their supervisor or through email of the training company/training Institute to the Training coordinator. After successful completion of the training, the student will submit the project/Training report with Certificate (duly signed by supervisor during training) to the department for evaluation in VII semester.
## Course Structure for B.Tech

### Semester VII

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRN-401</td>
<td><strong>Industrial Training</strong></td>
<td>Refer 3(^{rd}) Note provided in VI semester</td>
</tr>
<tr>
<td>CS-401 P</td>
<td><strong>DotNET Lab</strong></td>
<td>The Lab shall be based on Theory subject CS-403T and list of practical’s will be provided by the Department before commencement of the session.</td>
</tr>
<tr>
<td>CS-403 P</td>
<td><strong>Major Project</strong></td>
<td></td>
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</table>

### Semester VIII

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-402 P</td>
<td><strong>Advance Programming Lab -II</strong></td>
<td>The Lab shall be based on Elective Theory subject and list of practical’s will be provided by the Department before commencement of the session.</td>
</tr>
<tr>
<td>CS-404 P</td>
<td><strong>Dissertation</strong></td>
<td></td>
</tr>
</tbody>
</table>
LIST OF ELECTIVES for III Year

CS331N Distributed System
CS332N Advanced Data Base Management System
CS333N Advanced Java Programming
CS334N Linux System Administration
CS335N Graph theory
CS336N Advance Data structure
CS337N Web Technology
CS338N Principles of Programming Languages
CS339N Software Project management

LIST OF ELECTIVES for IV Year

CS441N Neural network for Machine Learning
CS442N Data Compression
CS443N Network Security and Cryptography
CS444N Artificial Intelligence
CS445N Network Management Systems
CS446N Object Oriented Analysis and Design
CS447N Parallel Computing and Algorithms
CS448N Digital Image Processing
CS449N Business Environment
CS450N Fault Tolerance Computing
CS451N Wireless Network and Mobile computing
CS452N Real Time System
CS453N Environment Engineering
CS454N Computational Geometry
CS455N Natural Language Processing
CS456N Pattern Recognition and Classification
CS457N Embedded System
CS458N Wireless Network Security
CS459N Formal methods
CS460N XML based Applications
CS461N Information Retrieval
CS462N Bioinformatics
CS463N Modeling and Simulation
CS464N GIS and Remote Sensing
CS465N Operation Research
CS466N Cyber Security
CS467N GIS
CS468N
CS469N
CS470N

Note: Due to rapid change in Industrial needs and Technological advancements, there is a need to revise the syllabus and introduction of new electives. So, the Departmental board is authorized to revise the syllabus as well as introduction of new electives time to time.
B.Tech First Year

CS-101T  Computer Fundamental and Programming  Credits 4(3-1-0)

Section A: Computer Fundamentals

1. Introduction: Basic definition, Classification of Computers, Block diagram of computer and brief idea of its part (I/O, Memory, control unit) with their working and example.


3. Planning the computer program: Purpose of program planning, algorithms, flowcharts, Pseudo code.

4. Computer Software: Introduction to software, hardware, Firmware with example, Type of software, Translators and their types (compiler, interpreter, assembler etc.).

5. Basic operating system concepts: OS, Types of OS (MS-DOS, WINDOWS) Role of OS with its characteristics in brief (Multi-programming, Multitasking, Multiprocessing, Multi-threading, Time-sharing, online-processing, Real-time processing).

Section B: Programming in C

6. Introduction: Introduction to C Programming Language, structure of C programs, compilation and execution of C programs, debugging techniques, data types and sizes, declaration of variables, modifiers, identifiers and keywords, symbolic constants, storage classes (automatic, external, register and static) and their use—when and where, macros, the C pre-processor.

7. Operators: unary operators, Arithmetic and logical operators, bitwise operators, assignment operators, relational operators, shift operators, comma operators, conditional operators, size of operators, type conversion, type casting.

8. Control statements: IF-ELSE statement, nested if-else, Switch statement, break, exit(), return(), continue, go-to statement.

9. Iterative statements: While-loop, do-while loop, for loop, nested loops, difference between iteration and recursion.

10. Functions: Built in and User defined, function declaration, definition and function calls, parameter passing, actual and formal argument, call by value and call by reference, recursive functions, command line argument, multilfile program.

11. Arrays: Linear Arrays (declaration, accessing elements of an array, initialisation) multidimensional Arrays, array of strings, passing array to functions.
12. **Structure and unions**: Definition, Declaration, Accessing of element and use of structure, union, enumerated data types and difference between structure and union, arrays of structures, passing structure in to function and passing its element in to function.


**References:**
1. “Computer Fundamentals” by V. Rajaraman
2. “Computer Fundamentals” by B. Ram
3. “Programming in C” by E. Balagurusamy, TMH.
5. “Schaums outline series”, by Gottfried, TMH
6. Programming in C by Dennis and Ritchie
7. “Magic with C” AB Publication
B.Tech Second Year

CS-201N Discrete Mathematical Structures Credit 4(3-1-0)

1. SET THEORY:-
   Sets, Set Relations, Set operations, Infinite Collection of sets, Power sets, Venn Diagram, Algebras of sets, Cartesian Products, Inductively, defined sets, Proofs by Mathematical Induction.

2. FUNCTIONS:-
   Functions, Injective and Surjective, Composition of functions, Inverse, Function, Recursively defined functions, Functions and Set operations, Permutation Function.

3. RELATIONS:-
   Relations, Types of relation, Representation of relation, Compositions, of Relations, Equivalence Relations, Equivalence Classes

4. COUNTING AND COUNTABILITY :-
   Counting Principles, Functions and Counting, Permutations and Combinations, Principle of inclusion and exclusion, Pigeonhole principle, Extended Pigeonhole principle

5. LOGIC:-
   Propositions, Algebra of propositions, Conditional and Biconditional, Tautology & Contradiction, Disjunctive normal Form and Simplification, Predicates and Quantifiers, Valid Arguments and proofs using tautology concept & without tautology concept. Proofs of Arguments using reduction method.

6. GRAPH THEORY :-
   Basic Concepts, Paths and Connectivity, Planar Graphs, Regular graph, Complete graph, Bipartite graph, Distance & Diameter, Trees & its types, Rooted Trees, Shortest path algorithm.

7. INTRODUCTION TO ALGEBRA :-
   Binary operations, Semigroups, Groups, Rings, Subgroups, Cosets and Lagrange’s Theorem and its significance.

REFERENCES:-
1. Discrete Mathematics, Schaum’s Outline, TMH
5. Discrete mathematical Structure, G.Shankar Rao, New Age
CS203N  Data Structure  Credits 4(3-1-0)

UNIT 1:  **Basic Concepts & Notation:** Data structure concepts and its types, Linear and Non-Linear data structures. Basics of Complexity and their types; Array as an ADT: one dimensional array, two dimensional array and multidimensional array.

UNIT 2:  **Stacks:** Definition and examples, primitive operations, Array representation of stacks, Example: Infix, Postfix, and Prefix: Basic definitions and Examples, Evaluating a postfix expression, Converting an expression from infix to postfix, Recursion - tower of Hanoi.

UNIT 3:  **Queues and Linked Lists:** The Queue and its sequential Representation, Priority Queue; Linked Lists: Inserting and removing nodes from the list, Linked list as a data Structure, Other List structures: Circular Lists, Doubly Linked Lists.

UNIT 4:  **Trees:** Binary Trees, Operation on Binary Trees, Traversal: In order, Preorder, Post order; Application Binary Tree. Expression Tree; Binary Tree Representation: Array representation, Link List representation; Example: Huffman Algorithm.  **Binary search tree:** inserting into Binary Search Tree (BST), Deleting from a BST, Balanced (AVL) Tree, Search Tree and B-Tree.

UNIT 5:  **Search Methods:** Basic search Techniques: Sequential Searching, Indexed Sequential Search, B++ tree. **Sorting:** Selection sort, bubble sort, insertion sort, quick sort and Merge sort, Heap sort and their time complexity. **Hashing:** Hash function: Division Method, Mid-square Method, Folding Method, hash table, collision resolution: linear probing, chaining.

UNIT 6:  **Graphs and Their Applications:** Introduction, Representation of graphs- Adjacency matrix and adjacency list, Wars hall’s algorithm, Dijkstra’s algorithm, Graph traversal: Depth first search, Breadth First search.

Text

1. Data Structures using C/C++: Tennenbaum, PHI

Books

2. Introduction to Data Structures : Schaum Series. by Lipetu, Mac GrawHill

3. Data Structures by Augenstein &Tenenbaum.
UNIT 1: Basics Of Object Oriented Programming
Object oriented programming concepts, Procedure oriented programming, problems with structured approach, OO terminology, Characteristics of Object oriented languages (Objects, Classes, Data Abstraction, Data Encapsulation, Inheritance, Polymorphism, Dynamic binding, Message passing) Structure of C++ Program , Benefits of OOPs.

UNIT 2: Tokens, Expressions and Control Structure In C++
Tokens. Basic data types,User defined data types, reference variables. Different Operators in C++ (::, new, delete, ., , , , , , ) Loops (For, while and do), Decisions( if, if-else and switch), Control statements(break, continue and goto ), default argument.

UNIT 3: Building Objects with Classes
Specifying classes, defining member function- inside and outside, arrays with in a class, Inline function, call by reference, function overloading, friend function, static data member and static member function, Arrays of objects, passing the object and returning the object, local class ,Const argument and Const member function, Constructor and Destructors, Characteristics of Constructor , types of constructor, Dynamic initialization of constructor , constructor overloading, Type Compatibility, Return by Reference, Memory allocation of objects, Friend class.

UNIT 4: Defining Operations on Objects
Operator & function overloading concepts, overloading unary and binary operator by using member function and friend function, Type Conversion, rules of operator overloading and limitation of overloading.

UNIT 5: Using Inheritance in C++
Derived class, Public, Private and Protected Derivation, single inheritance, multilevel Inheritance, multiple inheritance, Hierarchical inheritance, hybrid inheritance, virtual base class, abstract class, Constructor in Derived class, containership.

UNIT 6: Pointer’s, Virtual Functions and Polymorphism
Basics of pointers, Manipulation and operations on pointers ,pointer to objects,, pointer to function, this pointer and pointer to derived class, Dynamic binding, static binding, virtual function, pure virtual function, dynamic binding through virtual function.

UNIT 7: Working with Files
Classes for file stream operation, opening and closing a file, detecting EOF, file modes, file pointers and their manipulations, error handling during file operation. Command line argument, sequential input– output operation, updating a file.

UNIT 8: Templates and Exception Handling
Templates, class templates, function templates, member function templates, Overloading of Template functions, Non–Type Template Arguments, exception handling and its terminology, mechanism of exception handling and catching, Re-throwing an exception, Specifying Exception, Catch –all exception, Uncaught exception .

References:
1) Programming in C++ by BjarneStroustrup,
2) Object Oriented Programming with C++ by Balagurusamy, TMH.
3) Turbo C++ by Robert Lafore,
4) Complete Reference C++ by Herbert Shield,
CS 202N ANALYSIS AND DESIGN OF ALGORITHMS Credit 4(3-1-0)

UNIT I: Overview: Introduction to basic techniques for designing and analyzing algorithms, including asymptotic analysis and recurrences; divide-and-conquer algorithms; lower bound for comparison based sorting methods, sorting in linear time, greedy algorithms; dynamic programming; backtracking and some graph algorithms for path problems.


UNIT II: Divide and Conquer: General method, applications-Binary search, Finding the maximum and minimum, Quick sort, Heapsort.

Sorting in Linear Time: Lower bounds for sorting, Counting sort, Radix sort, Bucket sort, Medians and Order Statistics, Minimum and maximum.


UNIT IV: Dynamic Programming: General method, applications, capital budgeting problem, Multistage graphs, Matrix chain multiplication, 0/1 knapsack problem, All Pair shortest path algorithm, Travelling salesman Problem.

Backtracking: General method, applications, 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT V: Graph Algorithms: Introduction, representation of graphs, Breadth first search, depth first search, topological sort, strongly connected component, flow networks, Ford-Fulkerson method.

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, satisfiability problem, reducibility.

TEXT BOOKS:


Code: CS-204N  Computer Organization  Credits: 4(3-1-0)
Branches: EE, EC, EI, CSIT

1. **Introduction:** - Review of digital logic gates, Design of adder and subtractor using gates & K-MAP.

2. **Arithmetic for Computer:** - Introduction to number system, negative numbers, Arithmetic Algorithms (addition, subtraction, Booth Multiplication), IEEE standard for Floating point numbers

3. **Processor Design:** - Von-Neumann Structure, Processor Organization: General register organization, Stack organization, Addressing modes, instruction types, RISC and CISC.

4. **Control Design:** - Control memory address sequencing, micro instruction interpretation, CPU control unit, Hardwired & Micro Programmed Control Unit, basic concepts of micro programmed control, micro program sequencer for a control memory, micro instruction formats.

5. **Memory Organization:** - Characteristics of memory systems, Memory Hierarchy, Virtual Memory, Dynamic Address Translation Scheme addressing scheme for main memory, TLB, characteristics and principles of cache memory, elements of cache design, Cache memory organization, Block replacement policies and mapping techniques.

6. **System Organization:** - Synchronous & asynchronous communication, standard communication interfaces, Bus arbitration (Serial and Parallel procedure), Modes of transfer, Programmed I/O (IO addressing, IO instruction), DMA (Cycle Stealing Concept, DMA Controller and DMA Transfer), interrupt driven I/O: Interrupt processing, interrupt hardware, types of interrupts and exceptions.

**REFERENCES**

1. Computer Architecture and Organization, By John P. Hayes, TMH.
3. Computer System Architecture, by M. Morris Mano, PHI
4. Computer Organization, Stallings(PHI)
5. Structured Computer Organization, Tannenbaum(PHI)
CS-206N  Data Communication  Credits 4(3-1-0)

UNIT 1: Introduction and Signals
Data and Information, Data communication, Characteristics of DC, Components, Data Representation, data Flow, Simplex, Half Duplex, Full Duplex, Categories of Networks, Analog and Digital Signals, Periodic and Aperiodic signals, Time and Frequency Domain, Composite Signals.

UNIT II: Encoding, Decoding and Modulation techniques

UNIT III: Multiplexing Techniques
Many to one/ One to Many Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing, Synchronous Time Division Multiplexing, Wave Division Multiplexing, Space Division Multiplexing, Code Division Multiplexing, DTE-DCE, Telephone System, Modems.

UNIT IV: Introduction to Mobile Communication

UNIT V: Global System for Mobile (GSM)
GSM System Overview, GSM architecture, Network and Switching Subsystem (NSS), VLR, HLR, EIR, AUC , Identifiers used in GSM system, Frame Structure for GSM, GSM call Procedures: Registration, Mobile-to-network call, Network-to-mobile call, GSM hand-off Procedures.

Text Books:
1. Behrouz Forouzan, “Data Communications and networking,” TMH.
5. Data Networks, D. Bertsekas and R Gallager, PHI.
SECOND YEAR (FOURTH SEMESTER)
CS-208N Data Base Management Systems Credits 4(3-1-0)

UNIT 1: Introduction:
Data Base System Concepts, database system architecture, Data models and their types, Data base scheme and Instances, Data Independence, Data Base Languages and Interfaces, DBA role.

UNIT 2: Data Modeling Using the Entity-Relationship Model:
ER model concepts, Notations for ER diagram, Extended E-R diagram, Extended E-R model, E-R model design issues, constraints, keys: Weak entity set strong entity set, Relationships of higher degree.

UNIT 3: Relational Data Model and Languages:
Relational model concepts, E.F. Code rules for RDBMS, constraints, Relational Algebra operations, Extended relational algebra operations, Relational Calculus, Tuple and Domain relational calculus

SQL (DDL, DML, DTCL, DCL): Basic Structure and queries; set operators, Aggregate function, Derived Relations, Modification of the Database, Joined relations and up-dates in SQL, Advance SQL (SQL data types, Embedded-SQL, Dynamic SQL)

UNIT 4: Database Design:

UNIT 5: Transaction Processing concepts:
Transaction and system concepts, transaction states, ACID properties of transactions, concurrent execution schedules and Recoverability, serializability of schedules.

UNIT 6: Concurrency Control Techniques:
Lock based protocols: Two phase and three phase Locking Techniques for Concurrency Control; Time-Based Protocols: Time stamping and concurrency control; Deadlock handling: Concepts and Necessary conditions, Deadlock prevention, Deadlock avoidance.

UNIT 7: Storage and Query Processing:
Overview of physical storage, Magnetic disks, RAID, File organization, Data dictionary, Indexing, B+ Tree Index, B Tree Index files, Static and Dynamic Hashing.

UNIT 8: Protecting the Database against Misuse:
Integrity constraints, Principle of security, security, Views, Encryption and Decryption Techniques, RSA Algorithm, Diffie Hellman Algorithm.

References:
4) Whittigton, R.P. Database system engineering, Claventor Press.
CS 210N       Java Programming       Credit 4 (3-1-0)

(1) Introduction
Introduction – what is java, importance of java, java implementation application of java, sample program & compilation, using block of code, lexical issues (White space, identifiers, literals, comments, separators, keyword), java class library

(2) Data type, operators, control structures
variables, constants, declaration, literals, scope of variable, type casting, arithmetic operators, relational operators, logical operators, assignment operators, increment –decrement operators, conditional operators, bit wise operators, interface of operators, dot operators, if-else, statement, loops (while, do-while, for break, goto, continue return ) switch statement, operator, array –declaration, creation, initialization, length, two-dimensional arrays, string-string arrays, string methods, stringbuffer class

(3) Introduction of classes, objects and methods
What is class, object & method, defining class, adding variables, adding methods, creating objects, constructors THIS key word, garbage collection, finalize() method, accessing class members, vectors and wrapper classes, inheritance, final variables and methods, final classes, finalizer methods, abstract methods and classes, visibility control – public access, friendly access, protected access, private protected access, String class, Command-Line arguments

(4) Inheritance
Inheritance, Member access, super class, creating multilevel Hierarchy, Method over loading & overriding, Abstract class, method, Using final to prevent overriding & overloading, the object class

(5) Packages and Interfaces
Defining packages, Access protection, importing packages, defining interfaces

(6) Exception handling
exception types, uncaught exceptions, multiple catch clauses, nested try statements, throw, throws, finally, java’s built-in exceptions, creating your own exception subclasses

(7) Multithreaded programming
creating threads, run() method, new thread, thread class, stopping & blocking threads, life cycle of thread-newborn, runnable, running, blocked, dead, waiting sleeping, suspended, blocked, using thread methods, thread exceptions, thread priority, synchronization, implementing the Runnable interface

(8) Applet
what is an applet, applet lifecycle, applet class, applet context class, passing parameters to applet, use of java.awt graphics class and its various methods in an applet

(9) Event Handling
Event delegation model or event class hierarchy, all classes and interfaces of event delegation model, programs related to event handling covering all types of events

(10) I/O files in java
Concept of streams, difference between character streams and byte streams

(11) Graphical user interface
Layout managers (flowlayout, borderlayout, cardlayout gridbaglayout, gridlayout), AWT controls (labels, buttons, canvases, checkboxes, checkboxgroup, choices, textfields, textareas, lists, scrollbars, panels, windows, frames, menus, menubar)

References:
4. The complete reference JAVA2, Hervert schildt. TMH.
6. Core Java, Dietel and Dietel.
7. Java – Balaguruswamy.
8. Java server programming, Ivan Bayross SPD.
B.Tech Third Year

CS 301N  Computer Network & Security  Credit 4 (3-1-0)

Unit 1: Introduction, Protocols, Layered Model: Network components, Uses of networks and Topologies, Categories of Network (LAN, MAN & WAN), Transmission Media, Trace-route and socket API, Protocols and layering, Reference models (Internet, OSI), LAN switching (switch, hubs, Repeater, Bridge, Gateway, Router)

Unit 2: Data Link Layer, Retransmissions, Multiple access: Simple link models PPP, HDLC, Framing and Data Link Control, Error detection schemes (VRC, LRC, checksum, CRC), Error correction schemes (Hamming), Retransmissions (Simplest, Stop & Wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ), IEEE standard (802.3, 802.4, 802.5, 802.11), Random access / Ethernet ALOHA, CSMA family, Contention-free access / Token Ring.

Unit 3: Network Layer and Internetworking: Datagram and virtual circuit models (IP, MPLS), IP addressing (classfull & Classless) and forwarding (prefixes, longest matching prefix), IP helpers: ARP, DHCP, Internetworking (fragmentation, path MTU discovery, ICMP), IPv4 and IPv6, Network Address Translation (NAT), VPN concepts


Unit 5: Transport Layer, Reliable Transport: Sockets, ports and service APIs, Reliable and unreliable delivery (TCP, UDP), Connection establishment and teardown, Flow control and sliding windows, Retransmission timeouts, General Principles of Congestion Control, Congestion Prevention Policies, Congestion control in datagram subnet, TCP congestion control (slow start, fast retransmission and recovery), Techniques for achieving good Quality of Service: Buffering, Traffic shaping, The leaky bucket algorithm, The Token bucket algorithm.

Unit 6: Application Layer Protocols: Naming (DNS), Telnet, ATM, SMTP, HTTP, ftp, pop3.

Unit 7: Network security: Issues in network security, Network security services : Message Confidentiality, Message Integrity, Message Authentication, Message Non-repudiation, Entity Authentication, Web security (SSL, DNSSEC),Firewalls

TEXT BOOKS:
2. Data Communications and Networking – Behrouz A. Forouzan.Third, Edition TMH.

REFERENCES:
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson
3. Data Networks, D. Bertsekas and R Gallager, PHI.
CS-303N  
Software Engineering  
Credit 4(3-1-0)

UNIT I: Introduction: Introduction to software engineering, software crisis, software characteristics & application, software development life cycle model, waterfall model, iterative waterfall model, prototyping model, evolutionary model, spiral model, Agile development.

Project Management: project management concept, software process and project metrics, project size estimation metrics, project estimation technique, empirical estimation technique, COCOMO – A heuristic estimation technique, Halstead’s software science-an analytical technique, staffing level estimation, scheduling.

UNIT II: Software Requirement Specification: requirement analysis, requirement elicitation techniques like FAST, QFD & use case approach, DFD, ER-diagram, nature of SRS, characteristic & organization of SRS, Alternative analysis techniques, data structure oriented methods, the DSSD Approach, Jackson system development.

UNIT III: System Design: Design concept or principal, design fundamental abstraction, refinement, modularity, software architecture, control hierarchy, design techniques and its implementation: structure approach, functional approach, object oriented approach.

UNIT IV: Testing And Maintenance: coding guidelines, code review, testing process, design of test case, functional testing, structural testing, software testing techniques: unit testing, integration testing (top down and bottom up), alpha and beta testing, system testing and debugging, maintenance process, maintenance model, reverse-engineering, and re-engineering, documentation, verification vs validation.

UNIT V: Software Reliability And Quality Assurance: quality concepts & characteristics, software quality assurance, software quality activity, cost impact of software, formal technical review, the review meeting, review reporting and record keeping, review guide line, SQA, CMM & ISO 9001 Standard.

References:


3. Software Engineering Concepts By Fairley (TMH)

4. Fundamental Of Software Engineering: Rajib Mall PHI
UNIT 1: Introduction
A general introduction to Strings, languages, graphs, trees and relations, Models of Computation: RAM and RASP Models of Computation, Finite State Machines, Regular expressions; Deterministic - Finite systems, Non deterministic Automata with and without e-moves, equivalence of DFA and NDFA without e-moves, Construction of DFA from NDFA with e-moves, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

UNIT 2: Properties of regular sets
Regular expression (RE), Definition, Operators of regular expression and there precedence, Algebraic laws for Regular expressions, Kleen’s Theorem, Construction of Regular expression from FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages.

UNIT 3: Context Free Grammars (CFG)
Chomsky Hierarchy of Grammars: Type0, 1, 2 and 3 Grammars. Context free grammar(CFG) and Context Free Languages (CFL): Definition, Examples, Derivation, Derivation trees, Ambiguity in Grammar, Ambiguous to Unambiguous CFG, Simplification of CFGs, Normal forms for CFGs: CNF(Chomsky normal form) and GNF (Griebach normal form), Conversion of a given grammar into Chomsky normal form, Griebach normal form (examples only). Closure properties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.

UNIT 4: Push Down Automata
Definition of instantaneous descriptions, definition of Deterministic PDA, Construction of PDA for a given language, Two Stack PDA and its construction, construction of CFL’s given the transition function of PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG.

UNIT 5: Turing machine (TM)
Definition, Types of TM, Different representations of TM, Construction of Turing machines for simple languages, Definition of Computable languages and functions, Definition of total recursive, partial recursive functions, Church Thesis, Post correspondence Problem, Halting problem.

Text Books:
1. John E Hopcroft, Rajeev Motwani, Jeffrey D Ullman, “Introduction to Automata Theory, Languages and Computation”, Pearson Education

References:
2. Martin J. C., “Introduction to Languages and Theory of Computations”, TMH.
Syllabus for B.Tech Course w.e.f. 2014-15

CS-307N  Operating System  credit 4(3-1-0)

Unit – I

Unit – II

Unit – III

Unit – IV
Memory Management: Basic bare machine, Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.

Unit – V
I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security.

References:
2. Sibbsankar Halder and Alex A Aravind, “Operating Systems”, Pearson Education
3. Harvey M Dietel, “An Introduction to Operating System”, Pearson Education
CS-304N

COMPILER DESIGN

Credit:4(3-1-0)

UNIT 1: Introduction to Compiling: Compiler, Translator and its Need, The phases of a compiler, phases of ‘C’ compiler, Cousins of the Compiler, grouping of Phases, Bootstrapping.

UNIT 2: Lexical Analysis: Role of lexical analyzer, Input buffering, specification & Recognition of tokens, Finite automata, Regular sets and expression, Conversion of Regular expression to FNA, Obtaining Regular expression from Finite Automata, Optimization of DFA states.


UNIT 4: Syntax Directed Translation: Syntax directed definition, L- attribute and S- attribute definition, 3-address code, Intermediate Code, Postfix notation, Quadruples, Triples, implementation of syntax directed translator, parse tree and syntax tree.

UNIT 5: Symbol Tables: The contents of symbol table, Entering information in to symbol Table, Information about run time storage location, Data structure for symbol tables, representing scope information in Symbol Table, Storage allocation, Activation Record, Static Allocation, (call and return sequence, access to nonlocal names, setting up the access link.)

UNIT 6: Error detection and recovery: Errors, Error recovery, Errors and Recovery in Lexical phase, Syntactic-phase, Semantic phase, LR Parsing, Predictive Parsing.

UNIT 7: Code optimization: Principles sources of optimization, loop optimization, DAG representation of basic blocks, values numbers and algebraic laws, Global data-flow analysis.

UNIT 8: Code Generation: Issues in the design of code generator, a simple code generator, register allocation and assignment, code generation from DAG.

References:
CS306N  Interactive computer graphics  Credits-4(3-1-0)

UNIT-1: Introduction:
Origin of computer graphics, display devices, General purpose Graphics software display of solid objects.

UNIT-2: Display Techniques and Devices:
Point plotting techniques, coordinate, system and intcremental methods, line drawing algorithms, circle generators, display devices, CRT, inherited memory devices, the storage tube display, refresh line-drawing display.

UNIT-3: Graphics Package and Display Files:
A simple graphics, segment functions for segmenting the display files, posting and unposting, segment naming schemes. Appending to segment refresh concurrent with reconstruction free storage allocation, display file structure, geometric models, defining symbols procedures, display procedure, structured display files.

UNIT-4: Two Dimensional Transformations:
Principle concatenation matrix representation, a line dipping algorithm, midpoint division, dipping other graphics entities, polygon dipping viewing transformation, tiny windowing transformation.

UNIT-5: Input Devices:
Pointing and positioning devices, three dimensional input devices. Graph input techniques.

UNIT 6: Event Handling & Input Fractions:
Introduction, polling, interrupts, the event queue, functions for handling eveifits, polling task design, light pen interrupts, dragging and fix, htt detection, on-line character recognizers.

UNIT 7: Raster Graphics:
Introduction, generating a raster image, interactive faster graphics raster display hardware.

UNIT 8: 3-D Graphics :

UNIT 9: Introduction To Virtual Reality

References:
3)Computer Graphics by Donald Heam & Baker, PHI.
4) Computetr Graphics, harington, TMH
5) Mathematical Approach To Computer Graphics, Rodger,
6) Computer graphics, Folay Addison Wessley
CS 308N  

Advance Computer Network  

Credits 4(3-1-0)

UNIT 1: Introduction

UNIT II: Routing architecture and IP switching
Cores, peers and algorithms, Routing Architecture, Routing between peers (BGP), Routing with an autonomous system: RIP and OSPF, IP switching and MPLS, Switching technology, using switching with IP, MPLS encapsulation, MPLS and fragmentation.

UNIT III: Mobile IP
Introduction, Mobile IP characteristics, Mobile IP operations, Foreign agent Discovery, Agent registration, Message Format, Communication with home network, VPN addressing and routing, Interaction between NAT and ICMP, Voice and Video over IP (RTP, RSVP and QoS) IPv6: why IPv6, Header Format IPv6, fragmentation and reassembly, hexadecimal notation, Address types, unspecified and loopback addresses, IPv4 Vs IPv6, Mobile TCP.

UNIT IV: Emerging Wireless Technologies
WLAN: Advantage and disadvantage, WLAN architecture, WLAN applications, HiperLAN technology, WPAN technology, WMAN Technology, Wi-Max, Wi-Max and 3Gpp, Wi-Fi, Bluetooth, Security in Wireless Networks (WLAN, WPAN and WMAN), interoperability of Wireless Networks.

UNIT V: Adhoc Networks

Text Books:

References
1. Murthy and Manoj, Ad Hoc Wireless Networks, Pearson Education publication.
2. Jochen Schiller,“Mobile Communications”,Addison-Wesley.
7. Mobile computing, A. K. talukder and R R Yavagal
CS-310N  

**Data Mining Techniques**  

**Credits 4(3-1-0)**

**UNIT 1: What is learning:** Introduction, What is learning, Self learning computer systems, Machine learning & Methodology of science, Ex:- A kangaroo in mist. Data Mining: Definitions, Challenges, The knowledge discovery process in detail (Data selection, Cleaning, Enrichment, Coding process) KDD (Knowledge Discovery in Database) v/s Data Mining, DBMS v/s Data Mining, Golden rules to setup KDD environment

**UNIT 2: DSS:** Characteristics, Definitions for DSS, Why Decision DSS, Benefits, DSS Architecture. Dss-Uses, definition, Operational Database. Introduction to DATA Warehousing. why do we need it & Integration with Data Mining, Data-Mart, Concept of Data-Warehousing, Multi-Dimensional Database Structures, Client/Server Computing Model & Data Warehousing.

**UNIT 3: DATA Warehousing:** DATA Warehousing, Data Warehousing Components, Building a Data Warehouse. Warehouse Database, Technical considerations & Implementation considerations of data warehouses, 3-level architecture of data warehousing.


**UNIT 5: Association Rules:** What is an Association rule, Methods to discover Association Rules, A Priori algorithm, Partition algorithms, Pincer search algorithms, Discussion on different algorithms, Incremental algorithms, Border algorithm, Generalized association rule.


**UNIT 7: Web Mining:** Web mining, Web content mining, Web structure mining, Web users mining, Text mining, Unstructured text, Episode Rule Discovery for Text, Hierarchy of Categories, Text-Clustering.

**References:**  
1) Data Mining techniques by Arun Pujari, Universities Press.  
2) Digital signal processing by Alan V. Oppenheim and Ronald Schafer  
4) Data warehousing, Data mining, OLAP, by Alex Berson & Stephen J. Smith, TMH Edition  
5) Mallach, “Decision Support and Data Warehousing System”, TMH  
7) Navathe, “Fundamental of Database System”, Pearson Education  
8) Margaret H. Dunham, “Data-Mining. Introductory & Advanced Topics”, Pearson Education
B.Tech Fourth Year

CS-401N

Soft Computing

UNIT I: FUZZY SET THEORY

UNIT II: ARTIFICIAL NEURAL NETWORK
Neural Network: Structure and Function of a single neuron: Biological neuron, artificial neuron, definition of ANN, Taxonomy of neural net, Difference between ANN and human brain, characteristics and applications of ANN, single layer network, Perceptron training algorithm, Linear separability, Widrow & Hebb’s learning rule/Delta rule, ADALINE, MADALINE, Introduction of MLP, different activation functions, Error back propagation algorithm, derivation of BBPA, momentum, limitation, characteristics and application of EBPA.

UNIT III: GENETIC ALGORITHM

UNIT IV: HYBRID SYSTEMS
Integration of neural networks, fuzzy logic and genetic algorithms, applications of computational intelligence:

Text Books:

REFERENCES
CS-403N  DO T NET FRAMEWORK WITH C#       Credit:-4(3-1-0)

UNIT I –
INTRODUCTION TO C#
Introducing C#, Overview of C#, Literals, Variables & Constant, Data Types, Operators, Expressions, Branching, Looping, Methods, C# statements Arrays, Strings, Structures, Enumerations.

UNIT II-
INTRODUCTION TO .NET

UNIT III-
OBJECT ORIENTED ASPECTS OF C#
Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, System Collections, Delegates, Events, Errors and Exceptions.

UNIT IV –
WEB BASED APPLICATION DEVELOPMENT ON .NET
Namespace System, Window Forms, C# in Web Application, Programming Web Applications with Web Form, Programming Web Services, Validation and Rich Controls, Master Pages and Themes, Building Windows Applications, Accessing Data with ADO.NET.

UNIT V –
WORKING WITH ADO.NET
ADO.NET Fundamentals, Reflection, State Management, Website Navigation, Forms Connectivity with Database.

UNIT VI-
THE CLR AND THE .NET FRAMEWORK
Versioning, Attributes, Viewing Metadata, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using Single Call, Threads.

Note: Each unit shall be discussed with suitable examples through C# programming.

TEXT BOOKS
2) ‘Beginning ASP.NET 2.0 in C# 2005’ by Apress
3) 'C# with .NET Framework ’ by Shibi Pannikar & Kumar Sanjeev
CS-402N  Advance Computer Architecture  Credit:4(3-1-0)

UNIT -1 COMPUTATIONAL MODEL

UNIT -2 PRINCIPLES OF SCALABLE PERFORMANCE
Performance Metrics and measures, Speedup Performance Laws, Scalability Analysis and Approaches.

UNIT-3 INTRODUCTION TO PARALLEL PROCESSING
Parallel processing Concepts, Architectural classification schemes, Applications, Types and levels of parallelism, ILP, Dependencies, Instruction scheduling.

UNIT-4 PIPELINED PROCESSORS AND SUPER SCALER TECHNIQUES
Linear pipeline processors, Non-linear pipeline, Instruction level pipeline designs, Arithmetic pipeline design, Early Vector processors, Scientific Attached Processors, Recent Vector Processors.

UNIT-5 ARRAY PROCESSORS

UNIT-6 MULTI PROCESSOR ARCHITECTURE, CONTROL AND ALGORITHMS
Functional Structures, Interconnection Networks, Multi processing Operating Systems, Exploiting Concurrency for multi processing, multiprocessor scheduling strategies, Parallel algorithms for multiprocessors, Example-Multiprocessor systems.

REFERENCE BOOKS:-
3. Advance Computer Architectures – A Design Space Approach, Dezso Sima, Terence Fountain and Peter Karsuk, Pearson
ELECTIVES

CS-331N  Distributed System  Credits 4(3-1-0)

UNIT 1: Introduction to distributed system: What is distributed system, Advantages of distributed systems over centralized systems and PCs, Disadvantages of distributed system. Hardware concepts: Bus based multiprocessors, switched Multiprocessors, Bus based multi computer, Switched multi computers. Software Concepts: Network OS, true distributed systems, Multiprocessor time sharing system.


UNIT 3: Theoretical Foundations of Distributed Operating System: Inherent limitation of distributed system, absence of global clock, Absence of shared memory, Lamport’s Logical clock, Global State Chandy-Lamport’s global state recording algorithm, termination detection.


UNIT 5: Distributed data storage and distributed Query Processing: Data Replication, Data Fragmentation (horizontal, vertical and mixed), Data replication and fragmentation, Query Transformation, Simple join Processing. Semijoin strategy. Join strategy that exploits parallelism, Distributed transaction model.

UNIT 6: Commit protocol, Concurrency control and deadlock handling: Commit protocols-two phase commit and three phase commit, Concurrency control-locking protocol and time stamping, Deadlock handling - centralized and distributed approaches.

References:
1) Advanced Concepts in operating system by Mukesh Singhal and Niranjan G. Shivaratri.
2) Distributed operating system by Andrew S. Tanenbaum.
CS-332 N  Advance DBMS  Credit 4(3-1-0)

Unit 1  Introduction to distributed data base systems, transaction processing Concurrency control techniques, security, Distributed Data Base architecture.

Unit 2  Introduction to object oriented database system, Definition of Objects, Review of Key Object-oriented programming concepts, Object Orientation for Database Systems, Relational Extensions to Object-oriented Database Systems, Object Orientation in Relational Databases, Uses for Object-oriented Database.

Unit 3  Introduction to data mining, Self-learning, What is data warehouse and why do we need, Designing decision support systems, Integration with data mining.

Unit 4  Introduction to knowledge discovery process, Data selection, cleaning. Enrichment coding data mining, Preliminary analysis of the data set using traditional query tools, Decompose trees, Association rules, Neural networks, Genetic algorithms Introduction to setting up a KDD environment.

Unit 5  Advanced Transaction processing: Remote Backup systems, Transaction Processing Monitors, TP-Monitor Architectures, High-Performance Transaction systems. Long Duration Transactions, Transactional Workflows, Query Optimization security and production, Encryption, Statistical Database. Data base triggers, functions, procedures, packages and forms with respect to existing database.

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<th>S. No</th>
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<th>Author</th>
<th>Publisher</th>
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<tbody>
<tr>
<td>1</td>
<td>Distributed Data base system,</td>
<td>Stegano Ceri and</td>
<td>Mc-Graw Hill</td>
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<td></td>
<td></td>
<td>giuseppe Pelagati</td>
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<td>2</td>
<td>Distributed Object Oriented Data-</td>
<td>Prabhat K. Andleigh,</td>
<td>PTR Prentic Hall Inc</td>
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<tr>
<td></td>
<td>Systems Design</td>
<td>Michael R. Gretzinger</td>
<td></td>
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<td>3</td>
<td>Data Mining, Addison, Wesley</td>
<td>Pieter Adriaans Dolf</td>
<td>Longman Ltd</td>
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CS-333N                                Advance JAVA Programming                                Credit:4(3-1-0)

1. **Collections**: Basic, Collection Interfaces, Concrete Collections, The Collections Framework

2. **Multithreading**: Creating thread and running it, Multiple Thread acting on single object, Synchronization, Thread communication, Thread group, Thread priorities, Daemon Thread, Life Cycle of Thread

3. **Networking**: Internet Addressing, InetAddress, Factory Methods, Instance Methods, TCP/IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagrams

4. **Enterprise Java Bean**: Preparing a Class to be a JavaBean, Creating a JavaBean, JavaBean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean

5. **Java Database Connectivity (JDBC)**: Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures

6. **Servlets**: Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with HttpSession

7. **Java Swing**
   Working with JFrame, JApplet, Jpanel, JTextField, JPasswordField, JButton, JCheckbox, JRadioButton, JList, JScrollPane, JComboBox, JMenu, JMenuBar, JMenuItem, JPopupMenu, JTree, JTable


9. **Remote Method Invocation**: Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client

10. **Common Object Request Broker Architecture (CORBA)**: Technical/Architectural Overview, CORBA Basics, CORBA services

11. **Introduction Smart Phone Application Development**: Introduction to android platform, Creating application template, adding activity, intent, services to application, using Google map API

Reference Book:

1. “Advanced Java 2 Platform HOW TO PROGRAM” by H. M. Deitel, P. J. Deitel, S. E. Santry – Prentice Hall
2. “Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional” by Antonio Goncalves - Apress publication

References:

4. The complete reference JAVA2, Hervert schildt. TMH.
6. Core Java, Dietel and Dietel.
7. Java – Balaguruswamy.

8. Java server programming, Ivan Bayross SPD.
CS-334 N  Linux System Administration  Credit 4(3-1-0)


Unit 2  Managing Unix File Systems: Partitions, Swap space, Device files, Raw and Block files, Formatting disks, Making file systems, Superblock, I-nodes, File system checker, Mounting file systems, Logical Volumes, Network File systems, Boot disks. Configuring the TCP/IP Networking: Kernel Configuration; Mounting the /proc File system, Installing the Binaries, Setting the Hostname, Assigning IP Addresses, Creating Subnets, Writing hosts and networks Files, Interface Configuration for IP, ifconfig, netstat command, Checking the ARP Tables; Name service and resolver configuration.

Unit 3  TCP/IP Firewall: Methods of Attack, What Is a Firewall? What Is IP Filtering? Setting Up Linux for Firewalling Testing a Firewall Configuration; A Sample Firewall Configuration: IPAccounting, Configuring the Kernel for IP Accounting, Configuring IP Accounting, Using IPAccounting Results. IP Masquerade and Network Address Translation: Side Effects and Fringe Benefits, Configuring the Kernel for IP Masquerade, Configuring IP Masquerade.


Unit 5  Active Directory, LDAP

S. No  Title  Authors  Publisher
1  System Software  L.L. Beck  Pearson Education
2  PC System Programming  Michel Ticher  Abacus
3  Linux network Administrator  Kirch  O’Rielly
4  Unix system administration  Maxwell  TMH
5  The Practice of System & Network Administration  Limoncelli  Pearson
CS-335 N

Graph theory

Credit 4(3-1-0)

Unit 1
Graphs Introduction Isomorphism Sub graphs Walks, Paths, Circuits Connectedness Components - Euler Graphs Hamiltonian Paths and Circuits Trees Properties of trees Distance and Centers in Tree Rooted and Binary Trees.

Unit 2
Spanning trees - Fundamental Circuits -Spanning Trees in a Weighted Graph Cut Sets Properties of Cut Set - All Cut Sets - Fundamental Circuits and Cut Sets Connectivity and Separability Network flows 1-Isomorphism 2-Isomorphism Combinational and Geometric Graphs Planer Graphs Different Representation of a Planer Graph.

Unit 3

Unit 4

Unit 5
Algorithms: Shortest Path Algorithm - DFS - Planarity Testing - Isomorphism

S. No | Title | Author | Publisher
--- | --- | --- | ---
1 | Graph Theory: With Application to Engineering and Computer Science | Narsingh Deo | PHI
2 | Introduction to Graph Theory | R.J. Wilson | Pearson Education
3 | A text book of Graph Theory | R. Balakrishan, K. Rangnathan | Springer
Unit 1: Introduction - Basic concepts, Computational Models, Fixed Universe successor problem and other data structure problems.

Unit 2: Binary Search trees - Introduction, Height of Binary search tree, Basic Operations in Binary Search Tree: Search, Successor, predecessor, insert, deletion, minimum, maximum, Balancing trees, random binary search tree- treaps, optimal binary search tree, Cartesian tree and its applications.


Unit 4: Multiway Search Trees - m-way search tree, B-tree-insertion, deletion, B+ tree- Searching, insertion, deletion, analysis, Finger Search Tree and level Linking, finger searching, finger search tree, search in finger tree, Randomized Finger Search Trees- Finger searching in Treaps, Finger searching in Skip Lists, Applications, (2,3) trees- height, insertion, deletion, application in range query, x-fast tree, y-fast tree.

Unit 5: String Data Structures - Introduction, Digital Search trees- searching, insertion, deletion, Binary tries, patricia trie, Suffix Trees, Suffix Array, Correspondence between suffix array and suffix tree.


Unit 7: Hashing Techniques - Introduction, Static Hashing, Hash functions, Cuckoo hashing, Bloom filters- design and applications.
CS-337N  Web Technology  Credit:4(3-1-0)

UNIT 1: INTRODUCTION

UNIT 2: HTML:

UNIT 3: CSS

UNIT 4: XML

UNIT 5: PHP & MYSQL
PHP Introduction, Creating PHP Script, Running PHP Script, Variables & Constants, data types, Operators, PHP Conditional Statements, Control Statements, Arrays, Functions, Working with forms and database using MySQL.

UNIT 6: JSP
Introduction to JSP, JSP processing, JSP Application Design, Tomcat Server, Implicit JSP objects, Conditional Processing, Declaring variables and methods, Error Handling and Debugging, Sharing data between JSP pages, Sharing Session and Application Data.

UNIT 7 - AJAX & CGI-PERL
AJAX Introduction, AJAX with XML, AJAX with PHP, Common Gateway Interface and Perl Programming.

Text books:
1) Burdman, “collaborative web development” addition Wesley
2) ASP.NET 21 days, TMH
3) “magic with HTML, DHTML, Javascript”, laxmi publication.
4) “web technology”, laxmi publication
CS-338N Principles of Programming Languages Credit:4(3-1-0)

UNIT 1: Introduction:

UNIT 2: Virtual computer and actual computer:
Structure and operations of a compiler, Translator and software related components, syntax and semantics, Software simulation, Virtual computer and actual computer, Binding and Binding time.

UNIT 3: Data objects, variables and constant:
Data types, specification of elementary data types, types checking (Static and dynamics).

UNIT 4: Vectors and arrays:
Implementation of one and multi dimension arrays, records and structures, their implementation, Record and arrays with structured component, pointer.

UNIT 5: Parallel programming:
Principle of Parallel programming language co routines, synchronization of tasks using interrupts, semaphores and messages, mutual exclusion, critical section.

UNIT 6: Abstract data types:
Data Abstraction, information, hiding, encapsulation by subprograms-subprograms as Abstract operation, subprogram definition & invocation, generic subprogram.

UNIT 7: Subprogram control:
Simple subprogram call-return with its implementation Recursive program with its implementation Referencing environment.

References:
1) Programming Languages (2nd ed.) by Ravi Sethi
2) Programming Languages (2nd ed.) by Ravi Sethi & Terrence W. Pratt.
CS-339 N  Software Project Management  Credit 4(3-1-0)

**Unit 1**

**Unit 2**

**Unit 3**

**Unit 4**

**Unit 5**

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<tbody>
<tr>
<td>1</td>
<td>Software Project Management</td>
<td>M. Cotterell, Bob Hughes</td>
<td>McGrew Hill</td>
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<td>2</td>
<td>Software Project Management</td>
<td>S. A. Kelkar</td>
<td>PHI</td>
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</table>
CS-441N  Neural Network for Machine learning  Credit: 4(3-1-0)

UNIT 1: Introduction, well posed learning problems, Machine learning approach, perspective and issues in machine learning, elements of Machine learning, types of machine learning: supervised learning, unsupervised learning, reinforcement learning, recommender system, linear regression with one variable (cost function, example), regression with multi variable and applications, gradient descent, overview of soft computing and applications.

UNIT 2: Introduction to Artificial Neural Systems, Neural Computation: Some Examples and Applications, biological Neurons, dendrite, synapses and their weights, pre- and post-synaptic signals, activation potential and activation function. Excitatory and inhibitory synapses. The biasing input. Types of activating functions, Models of Artificial Neural Networks, Neural Processing,


UNIT 5: Multilayer Feed Forward Neural Network, Supervised Learning, Linearly Nonseparable Pattern Classification, Error Back-Propagation algorithm, Fast training algorithms.


Text Books:

3. Artificial neural Networks, Zurada, Jacek M.
6. Artificial neural Networks, B. Yegnanarayana, PHI
CS-442N DATA COMPRESSION Credit:4(3-1-0)

Unit - I: Introduction

Unit – II: Huffman coding

Unit-III: Arithmetic Coding

Unit – IV: Mathematical Preliminaries for Lossy Coding
Distortion criteria, Models, Scalar Quantization: The Quantization problem, Uniform Quantizer, Adaptive Quantization, Non uniform Quantization.

Unit-V: Vector Quantization
Advantages of Vector Quantization over Scalar Quantization, The Linde-Buzo- Gray Algorithm, Tree structured Vector Quantizers. Structured Vector Quantizers.

Books:
1. Khalid Sayood, Introduction to Data Compression, Morgan Kaufmann Publishers
CS-443 N  Network security and Cryptography    Credit 4(3-1-0)

Unit 1  Introduction: Terminology, Substitution ciphers and Transposition ciphers, Simple XOR, One-Time Pads, Computer Algorithms. Cryptographic Protocols


Unit 4  Key Management: Generating Keys, Nonlinear Keyspaces, Transferring Keys, Verifying Keys, Using Keys.

Unit 5  Using Algorithms: Choosing an Algorithm, Public-Key cryptography versus Symmetric cryptography, Encrypting Communication Channels, Encrypting data for Storage. Cryptographic Algorithms: RSA, DES

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<tr>
<th>S. No</th>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Applied Cryptography</td>
<td>Bruce Schneier, John</td>
<td>Wiley &amp; Sons.</td>
</tr>
<tr>
<td>2</td>
<td>Network Security and Cryptography</td>
<td>William Stalling</td>
<td></td>
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<tr>
<td>3</td>
<td>Concept of Network Security and</td>
<td>Frozen</td>
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<td></td>
<td>Cryptography</td>
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</tbody>
</table>
CS-444N  Artificial Intelligence  Credit:4(3-1-0)

Unit-I

Unit-II

Unit-III
*Knowledge Representation & Reasoning*: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

Unit-IV

Unit-V

References:
3. E Charniak and D McDermott, “Introduction to Artificial Intelligence”, Pearson Education
4. Dan W. Patterson, “Artificial Intelligence and Expert Systems”, Prentice Hall of India,
CS-445 N  Network Management System  Credit 4(3-1-0)


S. No  Title  Author  Publisher
1  Network Management, Principles and Practice  Mani Subrahmanian  Pearson Education
2  Network Management  Morris  Pearson Education
3  Principles of Network System Administration  Mark Burges, Wiley  Dreamtech
4  Distributed Network Management  Paul, John Wiley
CS-446 N  Object Oriented Analysis and Design  Credit 4 (3-1-0)

Unit-I  Introduction to OOAD  What is OOAD?  What is UML?  What are the United process(UP) phases  Case study  the NextGen POS system, Inception  Use case Modeling  Relating Use cases include, extend and generalization.

Unit-II  Elaboration  Domain Models  Finding conceptual classes and description classes  Associations  Attributes  Domain model refinement  Finding conceptual class hierarchies  Aggregation and Composition  UML activity diagrams and modeling

Unit-III  System sequence diagrams  Relationship between sequence diagrams and use cases  Logical architecture and UML package diagram  Logical architecture refinement  UML class diagrams - UML interaction diagrams

Unit-IV  GRASP: Designing objects with responsibilities  Creator  Information expert  Low Coupling Controller  High Cohesion  Designing for visibility  Applying GoF design patterns  adapter, singleton, factory and observer patterns.

Unit-V  UML state diagrams and modeling  Operation contracts  Mapping design to code  UML deployment and component diagrams

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<tr>
<th>S. No</th>
<th>Title</th>
<th>Author</th>
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<tbody>
<tr>
<td>1</td>
<td>Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development</td>
<td>Craig Larman</td>
<td>Third Edition, Pearson Education</td>
</tr>
<tr>
<td>2</td>
<td>Object-Oriented Analysis &amp; Design: Understanding System Development with UML 2.0</td>
<td>Mike O’Docherty</td>
<td>John Wiley &amp; Sons</td>
</tr>
<tr>
<td>3</td>
<td>Java Design Patterns – A Tutorial</td>
<td>James W.-Cooper</td>
<td>Wesley</td>
</tr>
</tbody>
</table>
CS-447N  Parallel Computing and Algorithms  Credits 4(3-1-0)

UNIT 1: Introduction: Sequential model, need of alternative model, Parallel processing terminology, contrasting pipelining and data parallelism, control parallelism, scalability, sieve of Eratosthenes.

UNIT 2: PRAM algorithms: model of serial computation, PRAM model of parallel computation, PRAM algorithms: Parallel reduction, prefix sums, List ranking, preorder tree traversal, merging two sorted lists.

UNIT 3: Processor Arrays and Multiprocessors: Processor organizations: Mesh networks, Binary tree network, Hypertree network, Pyramid network, Butterfly network, hypercube network, Cube Connected Cycle, Shuffle Exchange network, de Bruijn network, Mapping data to processors on processor arrays and multicomputers. Multiprocessors: UMA and NUMA.

UNIT 4: Matrix Multiplication: sequential multiplication, Matrix Multiplication on 2D mesh, Hypercube and shuffle exchange SIMD model, Algorithm for Multiprocessors.

UNIT 5: Parallel Sorting Algorithm: Enumeration sort, lower bound on parallel sorting, odd-even transposition sort, Bitonic merge.

UNIT 6: Graph Algorithms – searching a graph, Connected components.

References:


2) S.G. Akl, “Design and Analysis of Parallel Algorithms”

CS-448 N  Digital Image Processing  Credit 4 (3-1-0)


**Image Enhancement in Spatial Domain** Introduction; Basic Gray Level Functions – Piecewise- Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.

Unit 2:  **Image Enhancement in Frequency Domain** Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

**Image Restoration** A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

Unit 3:  **Color Image Processing** Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation.

**Morphological Image Processing** Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

Unit 4:  **Registration** Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth

**Segmentation** Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

Unit 5:  **Feature Extraction** Representation, Topological Attributes, Geometric Attributes Description Boundary-based Description, Region-based Description, Relationship.

**Object Recognition** Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching

### Referenced Text Books

<table>
<thead>
<tr>
<th>S.no</th>
<th>Title of Book</th>
<th>Author Name</th>
<th>Publisher of Book</th>
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<tbody>
<tr>
<td>1</td>
<td>Digital Image Processing</td>
<td>Rafael C. Gonzalvez and Richard E. Woods</td>
<td>Pearson Education</td>
</tr>
<tr>
<td>2</td>
<td>Digital Image Processing and Computer Vision</td>
<td>R.J. Schalkoff.</td>
<td>John Wiley and Sons</td>
</tr>
</tbody>
</table>
CS-449 N  Business Environment  Credit 4 (3-1-0)


Unit-II  Indian Financial System : Monetary And Fiscal Policy,Economic Trends , Price Policy,Stock Exchange Of India , Role of regulatory institutions in Indian financial system – RBI and SEBI, National Income,Role of Industry in Economic Development, Foreign Trade and Balance of Payment, Poverty in India, Unemployment in India, Inflation, Human Development, Rural Development, Problems of Growth

Unit-III  Direct & Indirect Taxes (MODVAT),(CENVAT),Competition Act 2002 & FEMA Acts ,Business Ethics, Corporate Governance, Philosophy and strategy of planning in India.

Unit-IV  Liberalisation, Privatization and Disinvestmentts, Special Economic Zone (SEZ) and their role and impact in International Business Environment, World Trade Organisation (WTO), Redefining Value Preposition to MSMEs

Unit-V  Social Responsibility of business enterprises, New Economic Policy, Globalization, EXIM policy and role of EXIM bank, FDI policy, Multinational Corporation (MNCs) and Transnational Corporations (TNCs), Global Competitiveness, technology and competitive advantage, technology transfer - importance and types, Appropriate technology and technology adaptation.

S. No  Title  Author  Publisher
1  Business Environment  Shaikh & Saleem  Pearson
2  Business Environment, Text and Cases  Francis Cherunilam  Himalaya Publishing House
3  Business Environment  Mittal  Excel Books
4  Business Environment  Fernando  Prentice hall
**CS-450 N Fault Tolerance computing Credit 4(3-1-0)**

**Unit 1**
**INTRODUCTION:** Fundamental terminology, Objective of Fault Tolerance, Applications of Fault-Tolerant computing, Reliability, Safety, Availability and Maintainability Modeling using Markov chain, Dependability Evaluation technologies, Failure rate, reliability function. Mean time to Failure (MTTF), Mean Time between failures (MTBF) Mean time to Repair (MTTR)

**Unit 2**

**Unit 3**
**Reliable Design and Fault Diagnosis:** Hazard, Fault Detection in Combinational circuits, fault location Experiments, Boolean Differences, Fault Detection by Path Sensitizing.

**Unit 4**
**Coding Theory For Fault-Tolerant System:** Error models, Basic structural properties of parity check codes, Matrix description of parity check codes, vectorspace properties of parity check codes Error checking the syndrome, Group properties of Parity check codes, Distance properties of parity check codes Polynomial algebra and cyclic codes, Hamming single error correcting codes, Unidirectional error correcting and Detecting codes, Asymmetric Error correcting codes, single-Asymmetric error correcting code.

**Unit 5**

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<th>S. No</th>
<th>Title</th>
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<tr>
<td>2</td>
<td>Design and analysis of reliable and fault tolerance Computed Systems</td>
<td>Mustafa Abd-El-Barr</td>
<td>Imperial College Press</td>
</tr>
<tr>
<td>3</td>
<td>Fault tolerance Computing</td>
<td>Dhiraj K. Pradhan, Jacob A. Abraham</td>
<td>Prentic Hall</td>
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</table>

UNIT-2 WLAN: Technical issue (uses, design goal, types, components and services offered by a typical IEEE 802.11 network), IEEE 802.11 standard (physical layer, MAC layer mechanism & functionalities, CSMA/CA mechanism). HIPERLAN: HIPERLAN standard, HyperLAN/1 (physical layer, DLC & RLC layer, MAC sub-layer), HyperLAN/2 (Physical layer, MAC sub-layer, power conservation issues) BLUETOOTH: Specifications, transport protocol group, middleware protocol group, profile.

UNIT 3: Medium access control (wireless): Motivation for a specialized MAC (hidden and exposed terminals, near and far terminals), SDMA, FDMA, TDMA and CDMA.


UNIT-5 Introduction & issues in Ad Hoc wireless networks: introduction (cellular vs ad hoc wireless networks and applications), Medium Access Scheme, Routing, Multicasting, transport layer protocols, Pricing Scheme, QoS provisioning, Self organization, security, addressing and service discovery, energy management, Scalability, deployment considerations, Issues in designing a routing protocol for ad hoc wireless Networks (Mobility, Bandwidth constraint, Error prone shared broadcast radio channel, Hidden & exposed Terminal Problems, Resource Constraints, characteristics of idle routing protocol), Classification of routing protocols: Table-driven routing protocols (DSDV, WRP), On-demand routing protocols (DSR, AODV, LAR).

Text Books:
1. Murthy and Manoj, Ad Hoc Wireless Networks, Pearson Education publication.
2. Jochen Schiller, “Mobile Communications”, Addison-Wesley.

REFERENCES:
4. Mobile computing, A. K. talukder and R R Yavagal
CS-452 N Real Time System Credit 4(3-1-0)

Unit 1 Introduction to real-time computing- Structure of a real-time system - Characterization of real-time systems and tasks - Performance measures.

Unit 2 Task Assignment and Scheduling - Uniprocessor scheduling algorithms - Task assignment - Mode changes - Fault tolerant scheduling.

Unit 3 Real-time Communication- Network topologies and architecture issues - Protocols - Contention-based, token-based, polled bus - Fault tolerant routing.

Unit 4 Real-time Databases - Transaction priorities and aborts - Concurrency control issues - Scheduling algorithms - Two-phase approach to improve predictability.

Unit 5 Programming Languages and Tools - Hierarchical decomposition - Run-time error handling - Overloading - Timing specification - Recent trends and developments.

S. No Title Author Publisher
2 Real-Time Systems Jane W.S. Liu Prentice Hall.
3 Real-Time Systems “Theory and Practice ” Ragib Mall Preason

[45]
CS-454 N  Computational Geometry  Credit 4(3-1-0)

Unit 1  INTRODUCTION: Application Domains – Line Segment Intersection – Intersection of Convex Polygons Polygon Triangulation


Unit 5  VORONOI DIAGRAM: Voronoi Diagram – Proximity Problems Solved by the Voronoi Diagram – Planar Applications

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<th>Title</th>
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<tbody>
<tr>
<td>3</td>
<td>Computational Geometry,</td>
<td>Satyan L. Devadoss and Joseph O'Rourke,</td>
<td>Princeton University Press, 2011.</td>
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<tr>
<td></td>
<td></td>
<td>Discrete and</td>
<td></td>
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<tr>
<td>4</td>
<td>Algorithms in Combinatorial Geometry, EATCS Monographs in Computer</td>
<td>Herbert Edelsbrunner</td>
<td>Springer Verlag, 1987</td>
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<tr>
<td></td>
<td>Science</td>
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</table>
CS-456 N  Natural Language Processing  Credit 4(3-1-0)

Unit 1  Introduction to Natural Language Understanding: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax.

Unit 2  Introduction to semantics and knowledge representation, Some applications like machine translation, database interface.


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<tbody>
<tr>
<td>1</td>
<td>NLP: A Paninian Perspective</td>
<td>Akshar Bharti, Vineet Chaitanya and Rajeev Sangal</td>
<td>Prentice Hall, New Delhi</td>
</tr>
<tr>
<td>2</td>
<td>Natural Language Understanding</td>
<td>James Allen</td>
<td>Pearson Education</td>
</tr>
<tr>
<td>3</td>
<td>Speech and Language Processing</td>
<td>D. Jurafsky, J. H. Martin</td>
<td>Pearson Education</td>
</tr>
<tr>
<td>4</td>
<td>Language as a Cognitive Process</td>
<td>T. Winograd</td>
<td>Wesley</td>
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</table>
CS-457 N  Pattern Recognition and Classification  Credit 4(3-1-0)

Unit 1  **Introduction:** Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

Unit 2  **Statistical Pattern Recognition:** Bayesian Decision Theory, Classifiers, Normal density and discriminate functions,

Unit 3  **Parameter estimation methods:** Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods - Principal Component Analysis (PCA), Fisher Linear discriminate analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.


Unit 5  **Unsupervised Learning & Clustering:** Criterion functions for clustering, Clustering Techniques: Iterative square - error partitional clustering – K-means, agglomerative hierarchical clustering, Cluster validation.

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<th>Publisher</th>
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<tbody>
<tr>
<td>1</td>
<td>Pattern Recognition</td>
<td>Richard O. Duda, Peter E. Hart and David G. Stork</td>
<td>John Wiley</td>
</tr>
<tr>
<td>2</td>
<td>Pattern Recognition and Machine Learning</td>
<td>C. M. Bishop</td>
<td>Springer</td>
</tr>
<tr>
<td>3</td>
<td>Pattern Recognition</td>
<td>S. Theodoridis and K. Koutroumbas</td>
<td>Academic Press</td>
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</tbody>
</table>
CS-458 N  

Embedded System  

Credit 4(3-1-0)

Unit 1  Introduction to embedded systems: Classification, Characteristics and requirements

Unit 2  Timing and clocks in Embedded systems, Task Modeling and management, Real time operating system issues.

Unit 3  Signals, frequency spectrum and sampling, digitization (ADC, DAC), Signal Conditioning and Processing. Modeling and Characterization of Embedded Computation System.

Unit 4  Embedded Control and Control Hierarchy, Communication strategies for embedded systems: Encoding and Flow control.

Unit 5  Fault-Tolerance Formal Verification.

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<th>Title</th>
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<tbody>
<tr>
<td>1</td>
<td>Embedded System</td>
<td>Raj Kamal</td>
<td>TMH</td>
</tr>
<tr>
<td>2</td>
<td>Embedded System</td>
<td>A.P Godse, A.O Mulani</td>
<td>Technical Publication</td>
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<td>3</td>
<td>Intro To Embedded System</td>
<td>Shibu</td>
<td>TMH</td>
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</table>
CS-460 N  Formal Methods  Credit 4(3-1-0)


Unit 2  FORMAL SPECIFICATION STYLE: Model Oriented Specifications Concurrency Based Specifications Example Specification Languages.

Unit 3  VDM: Introduction to VDM Basic Types Quote Types Compound Types Optional Types Functions Operations Additional Constructs Modules.

Unit 4  THE Z NOTATION The Interchange Language User-Defined Identifiers Data Types Basic Types Compound Types Schemas Additional Constructs.


S. No  Title  Author  Publisher
1  Formal Methods: Fact File VDM and Z  Andrew Harry  John Wiley and Sons
CS-462 N  Information retrieval System  Credit 4(3-1-0)

Unit 1  **Introduction**: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

Unit 2  **Data Structures**: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

Unit 3  **Automatic Indexing**: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

Unit 4  **User Search Techniques**: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext. Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

Unit 5  **Text Search Algorithms**: Introduction, Software text search algorithms, Hardware text search systems.
**Information System Evaluation**: Introduction, Measures used in system evaluation, Measurement example TREC results.

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<th>Author</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Information Retrieval Systems: Theory and Implementation</td>
<td>Kowalski, Gerald, Mark T Maybury</td>
<td>Kluwer Academic Press,</td>
</tr>
<tr>
<td>2</td>
<td>Information Retrieval Data Structures and Algorithms,</td>
<td>Frakes, W.B., Ricardo Baeza-Yates</td>
<td>Prentice Hall,</td>
</tr>
<tr>
<td>3</td>
<td>Modern Information Retrieval</td>
<td>Yates</td>
<td>Pearson Education.</td>
</tr>
</tbody>
</table>
CS-463 N  Bioinformatics  Credit 4(3-1-0)

Unit 1  Introduction Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis, Major Bioinformatics databases and tools. Metadata: Summary & reference systems, finding new type of data online. Molecular Biology and Bioinformatics: Systems approach in biology, Central dogma of molecular biology, problems in molecular approach and the bioinformatics approach, Overview of the bioinformatics applications.

Unit 2  The Information Molecules and Information Flow Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, -Transcription, -Translation, Genes- the functional elements in DNA, Analyzing DNA,DNA sequencing. Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction.

Unit 3  Perl Basics, Perl applications for bioinformatics- Bioperl, Linux Operating System, Understanding and Using Biological Databases, Java clients, CORBA, Introduction to biostatics.

Unit 4  Nucleotide sequence data Genome, Genomic sequencing, expressed sequence tags, gene expression, transcription factor binding sites and single nucleotide polymorphism. Computational representations of molecular biological data storage techniques: databases (flat, relational and object oriented), and controlled vocabularies, general data retrieval techniques: indices, Boolean search, fuzzy search and neighboring, application to biological data warehouses.

Unit 5  Biological data types and their special requirements: sequences, macromolecular structures, chemical compounds, generic variability and its connection to clinical data. Representation of patterns and relationships: alignments, regular expressions, hierarchies and graphical models.

S. No  Title  Author  Publisher
1  Developing Bioinformatics computer skills  O’Reilly  Indian Edition’s publication
2  Bioinformatics concepts, skills &Applications  Rastogi, Mendiratta, Rastogi.  CBS Publishers
3  Bioinformatics Basic Applications  Rashidi, Hooman and Lukas K. Buehler  CRC Press
4  Bioinformatics  Addison Wesley
CS-464 N  

Modeling and Simulation  
Credit 4(3-1-0)

Unit 1  
System definition and components, stochastic activities, continuous and discrete systems, System modeling, Types of models, static and dynamic physical models, static and dynamic mathematical models, full corporate model, types of system study.

Unit 2  
System simulation, Need of simulation, Basic nature of simulation, techniques of simulation, comparison of simulation and analytical methods, types of system single-server queuing system and an inventory problem, Monte-Carlo simulation, Distributed Lag model, Cobweb model.

Unit 3  
Simulation of continuous Systems, analog vs digital simulation, simulation of water reservoir system, simulation of a servo system, simulation of an auto-pilot. Discrete system simulation, fixed time-step vs event to event model, generation of random numbers, test of randomness, Monte-Carlo computation vs stochastic simulation.

Unit 4  
System dynamics, exponential growth models, exponential decay models, logistic curves, system dynamics diagrams, world model.

Unit 5  
Simulation of PERT networks, critical path computation, uncertainties in activity duration, resource allocation and consideration, Simulation languages, object oriented simulation.

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<th>Author</th>
<th>Publisher</th>
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<tbody>
<tr>
<td>1</td>
<td>System Simulation</td>
<td>Geoffrey Gordon</td>
<td>PHI</td>
</tr>
<tr>
<td>2</td>
<td>System Simulation with digital computer</td>
<td>Narsingh Deo</td>
<td>PHI</td>
</tr>
<tr>
<td>3</td>
<td>Simulation Modelling and Analysis</td>
<td>Averill M. Law, W. David Kelton</td>
<td>TMH</td>
</tr>
</tbody>
</table>
CS-465 N GIS and Remote Sensing Credit 4 (3-1-0)


Unit 3 SATELLITES & SENSORS: Satellite and Sensor characteristics of LANDSAT series, SPOT, IRS, IKONOS & QUICKBIRD. Visual Interpretation Keys – Converging Evidence.


Unit 5 WATER RESOURCES APPLICATIONS: Land use/Land cover, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring. Watershed management for sustainable development and Watershed characteristics Reservoir sedimentation, Identification of suitable sites for Ground water & identification of sites for artificial recharge structures, Drainage morphometry, water depth estimation and bathymetry.

S. No Title Author Publisher
1 Remote Sensing and Image Interpretation Lillesand and Kiefer John Wiley and Sons
2 Remote Sensing and Geographical Information systems M.Anji Reddy B.S.Publications
4 Fundamental of GIS Micheal N Demers JohnWiley & Sons
CS-466 N  **Operational Research**  Credit 4(3-1-0)

Unit 1  **Introduction:** Definition and scope of operations research (OR), OR model, solving the OR model, art of modeling, phases of OR study.

**Linear Programming:** Two variable Linear Programming model and Graphical method of solution, Simplex method, Dual Simplex method, special cases of Linear Programming, duality, sensitivity analysis.

Unit 2  **Transportation Problems:** Types of transportation problems, mathematical models, transportation algorithms.

**Assignment:** Allocation and assignment problems and models, processing of job through machines.

Unit 3  **Network Techniques:** Shortest path model, minimum spanning Tree Problem, Max-Flow problem and Min-cost problem.

**Project Management:** Phases of project management, guidelines for network construction, CPM and PERT.

Unit 4  **Theory of Games:** Rectangular games, Minimax theorem, graphical solution of 2 x n or m x 2 games, game with mixed strategies, reduction to linear programming model.

**Quality Systems:** Elements of Queuing model, generalized poisson queing model, single server models.

Unit 5  **Inventory Control:** Models of inventory, operation of inventory system, quantity discount.

Replacement: Replacement models: Equipments that deteriorate with time, equipment that fail with time.

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<tr>
<td>1</td>
<td>Operations Research</td>
<td>Wayne L. Winston</td>
<td>Thomson Learning</td>
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<tr>
<td>2</td>
<td>Operations Research -An Introduction</td>
<td>Hamdy H. Taha</td>
<td>Pearson Education,</td>
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<td>Operations Research</td>
<td>R. Panneer Seevam</td>
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<td>Total Quality Management</td>
<td>V.K.Khanna</td>
<td>New Age International</td>
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<td>1</td>
<td>Applied Cryptography</td>
<td>Bruce Schneier, john biley &amp; Sons</td>
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<td>Hand book of information security management</td>
<td>Micki Krause, Harold F tipton</td>
<td>CRC Press LLC</td>
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<td>3</td>
<td>Network Security and Cryptography</td>
<td>William Stalling</td>
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