# BACHELOR OF TECHNOLOGY
## (INFORMATION TECHNOLOGY)
### THIRD SEMESTER EXAMINATION

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<td><strong>THEORY PAPERS</strong></td>
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M: Mandatory for award of degree
*NCC/NSS can be completed in any semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.
#NUES(Non University Examination)
BACHELOR OF TECHNOLOGY
(INFORMATION TECHNOLOGY)
FOURTH SEMESTER EXAMINATION

<table>
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<th>Code No.</th>
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THEORY PAPERS

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PRACTICAL/VIVA VOCE

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M: Mandatory for award of degree
*NCC/NSS can be completed in any semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

NOTE: 4 weeks Industrial / In-house Workshop will be held after fourth semester. However, Viva-Voce will be conducted in the fifth semester.

#NUES(Non University Examination System)

GURU GOBIND SINGH
INDRAPRASTHA UNIVERSITY

Scheme and Syllabi for B. Tech-IT, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22th BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
### UNIT-I
Fourier series: Definition, Euler's formula, conditions for Fourier expansion, functions having points of discontinuity, change of intervals, even and odd functions, half range series, Harmonic analysis. Fourier Transforms: Definition, Fourier integral, Fourier transform, inverse Fourier transforms, Fourier sine and cosine transforms, properties of Fourier transforms (linearity, scaling, shifting, modulation). Application to partial differential equations.

**[T2]** [No. of hrs 11]

### UNIT-II
Difference equation: Definition, formation, solution of linear difference equation with constant coefficients, simultaneous difference equations with constant coefficients, applications of difference equations. Z-transform: Definition, Z-transform of basic functions, properties of Z-transform (linearity, damping, shifting, multiplication), initial value theorem, final value theorem, convolution theorem, convergence of Z-transform, inverse of Z-transform, applications to difference equations.

**[T2]** [No. of hrs 11]

### UNIT-III

**[T1,T2]** [No. of hrs 11]

### UNIT-IV

**[T1,T2]** [No. of hrs 11]

### Text Books:

### Reference Books:
5. Schaum's Outline on Fourier Analysis with Applications to Boundary Value Problem, Tata McGraw Hill.

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**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks : 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

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**Scheme and Syllabi for B. Tech-IT, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14**

approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
**FOUNDATION OF COMPUTER SCIENCE**

**Paper Code:** ETCS-203  
**Paper:** Foundation of Computer Science

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**Objective:** To give basic knowledge of combinatorial problems, algebraic structures and graph theory.

**UNIT- I**

Formal Logic: Proposition, Symbolic Representation and logical entailment theory of Inferences and tautologies, Prepositions, Quantifiers, Theory of Inferences for predicate calculus, resolution, Techniques for theorem proving: Direct Proof, Proof by Contraposition, proof by contradiction.

**UNIT- II**

Overview of Sets and set operations, permutation and combination, principle of inclusion, exclusion (with proof) and pigeonhole principle (with proof), Relation, operation and representation of a relation, equivalence relation, ReST, Hasse Diagrams, extremal Elements, Lattices, composition of function, inverse, binary and n-ary operations.

**UNIT- III**

Principle of mathematical induction, principle of complete induction, solution methods for linear and non-linear first-order recurrence relations with constant coefficients, Graph Theory: Terminology, Isomorphic graphs, Euler’s formula (proof), chromatic number of a graph, five color theorem (with proof), Euler & Hamiltonian paths.

**UNIT- IV**

Groups, Symmetry, subgroups, cyclic groups, permutation group and Cayley’s theorem (without proof), Cosets Lagrange’s theorem (with proof), Homomorphism, isomorphism, automorphism, rings, Boolean function, Boolean expression, representation & minimization of Boolean function.

**Text Books:**


**Reference Books:**


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Scheme and Syllabi for B. Tech-IT, 1st year (Common to all branches) **w.e.f batch 2014-15 and (2nd, 3rd & 4th years)** **w.e.f batch 2013-14** approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
SWITCHING THEORY AND LOGIC DESIGN

Paper Code: ETEC-205  L  T/P  C  3  1  4
Paper: Switching Theory and Logic Design

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<th>INSTRUCTIONS TO PAPER SETTERS:</th>
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Objective: The objective of the paper is to facilitate the student with the knowledge of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture.

UNIT-I
Number Systems and Codes - Decimal, Binary, Octal and Hexadecimal Number Systems, Codes - BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.
Switching Theory - Boolean Algebra: Postulates and Theorems, De Morgan’s Theorem, Switching Functions: Canonical Forms - Simplification of Switching Functions - Karnaugh Map and Quine Mc-Clusky Methods.
Combinational Logic Circuits - Review of basic gates, Universal gates, Adder, Subtractor, Serial Adder, Parallel Adder - Carry Propagate Adder, Carry Tuckeshahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoders - 4-to-16 line, Multiplexer and De-multiplexer, ALU, PLA and PAL.

UNIT-II
Integrated Circuits - TTL and CMOS logic families and their characteristics. Brief introduction to RAM and ROM.
Sequential Logic Circuits - Latches and Flip Flops - SR, D, T and MS-JK Flip Flops, Asynchronous Inputs.
Counters and Shift Registers - Design of Synchronous and Asynchronous Counters - Binary, BCD, Decade and Up/Down Counters; Shift Registers, Types of Shift Registers, Counters using Shift Registers - Ring Counter and Johnson Counter.

UNIT-III
Synchronous Sequential Circuits - State Tables, State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.
Finite state machine - capabilities and limitations, Mealy and Moore types, minimization of completely specified and incompletely specified sequential machines, minimization techniques and merger chart method - concept of minimal cover table.

UNIT-IV
Algorithmic State Machine - Representation of sequential circuits using ASM charts, synthesis of output and next state functions using flip-flops - control path ratio - derived design.
Fault Detection and Location - Fault models for combinational and sequential circuits, fault detection in combinational circuits - Horowitz and Peterson, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

Text Book:
T2 Morris Mano, Digital Logic and Computer Design”, Pearson
T3 R.P. Jain, “Modern Digital Electronics”, TMH, 2nd Ed,

Reference Books:

Scheme and Syllabi for B. Tech-IT, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
Objective: The purpose of the course is for each student to learn and further explore the techniques of advanced circuit analysis. The concepts and analytical techniques gained in this course (e.g., signals, Laplace transformation, frequency response) will enable students to build an essential foundation of many fields within electrical engineering, such as control theory, analog electronic circuits, signal processing.

UNIT-I
Introduction to signals, their classification and properties, different types of systems, LTI systems and their properties, periodic waveforms and signal synthesis, properties and applications of Laplace transform of complex waveform.

UNIT-II

UNIT-III

UNIT IV
Positive real function and synthesis of LC, RC, RL Networks in Foster’s I and II, Cauer’s I & II forms, Introduction of passive filters and their classification, frequency response, characteristic impedance of low pass, high pass, Band Pass and Band reject prototype section.

Text Books:
T1 W H Hayt “Engineering Circuit Analysis” TMH Eighth Edition

Reference Books
R2 Valkenburg, “Networks and Interconnections”, PHI, 2007

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**Objective:** To understand the programming and the various techniques for enhancing the programming skills for solving and getting efficient results.

**UNIT – 1:**
Introduction to programming methodologies and design of algorithms. Abstract Data type, array, array organization, sparse array. Stacks and Stack ADT. Stack Manipulation, Prefix, infix and postfix expressions, their interconversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT. List manipulations: Single, double and circular lists.

**UNIT – II:**
Trees, Properties of trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expression trees and their usage, binary trees, AVL Trees, Heaps and their implementation.

**UNIT – III:**
Multiway trees, B-trees, B*-trees and B+ Trees. Graphs, Graph representation, Graph traversal.

**UNIT – IV:**
Sorting concept, order, stability, Selection sorts (straight, heap), insertion sort (Straight Insertion, Shell sort), Exchange Sort (Bubble, quicksort), Merge sort (Only 2-way merge sort). Searching – List search, sequential search, binary search, hashing concepts, Hashing methods (Direct, rehashing, quadratic, padding, folding, pseudorandom hashing), collision resolution (by open addressing, linear probe, quadratic probe, pseudorandom collision resolution), bucket hashing.

**Text Books:**

**Reference Books:**
- R2: Tanenbaum, “Computer Networks using C”, Pearson/PHI.
Objective: To understand various aspects of media and to learn the concept of sound, images and videos.

UNIT- I

UNIT- II
Clipping Algorithms, Sutherland-Cohen line Clipping Algorithm, Bezier Curves, B-Spline Curves. Parallel Projection, Perspective Projection, Illumination Model for diffused Reflection, Ambient light, Specular Reflection Model, Reflection Vector.

UNIT- III

UNIT- IV
Data Compression: storage space, coding requirements, Basic compression techniques: run length code, Huffman code, Lempel-Ziv JPEG: image preparation, Lossy sequential DCT, expanded lossy DCT, Lossless mode, Hierarchical mode, MPEG, Media synchronization, Media Integration, Production Standards.

Text Books:


Reference Books:

R4 David F. Rogers, “Procedural Elements for computer graphics”, McGraw-Hill.
List of Experiments:

1. Realize all gates using NAND & NOR gates
2. Realize Half Adder, Full Adder, Half subtractor, Full subtractor
3. Realize a BCD adder
4. Realize a Serial Adder
5. Realize a four bit ALU
6. Realize Master-Slave Flip-Flop, using NAND/NOR gates
7. Realize Universal Shift Register
8. Realize Static Synchronous Self Correcting Ring Counter
9. Realize Multiplexer and De-Multiplexer
10. Realize Carry Look ahead Adder / Priority Encoder
11. Simulation of PAL and PLA
12. Simulation Moore and Moore State machines

NOTE: At least 8 experiments out of the list must be done in the semester.
List of Experiments

1. Study the transient response of series RLC circuit for different types of waveforms on CRO and verify using MATLAB.
2. Study the time response of a simulated linear system and verify the unit step and square wave response of first order and second order, type 0,1 system.
3. Using MATLAB determine current in various resistors connected in network using mesh current and node voltage analysis.
4. To determine Z and Y parameters of the given two port network.
5. To determine ABCD parameters of the given two port network.
6. To verify Reciprocity Theorem for the given two port network.
7. To determine h parameters of the given two port network.
8. To design Cascade connection and determine ABCD parameters of the given two port network.
9. To design Series-Series connection and determine Z parameters of the given two port network.
10. To design Parallel-Parallel connection and determine Y parameters of the given two port network.
11. To design Series-Parallel connection and determine h parameters of the given two port network.
12. Study the frequency response of different filter circuits.

NOTE: At least 8 Experiments out of the list must be done in the semester.
DATA STRUCTURES LAB

Paper Code: ETCS-255
Paper: Data Structures Lab

List of Experiments:

1. Perform Linear Search and Binary Search on an array.
   Description of programs:
   a. Read an array of type integer.
   b. Input element from user for searching.
   c. Search the element by passing the array to a function and returning the position of the element from the function else return -1 if the element is not found.
   d. Display the position where the element has been found.

2. Implement sparse matrix using array.
   Description of program:
   a. Read a 2D array from the user.
   b. Store in the sparse matrix form, use array of structures.
   c. Print the final array.

3. Create a linked list with nodes having information about a student and perform
   I. Insert a new node at specified position.
   II. Delete a node with the roll number of student specified.
   III. Reverse the linked list.

4. Create a doubly linked list with nodes having information about an employee and perform Insertion at front of
   doubly linked list and Insertion at end of that doubly linked list.

5. Create a circular linked list with nodes having information about a college and perform Insertion at front perform
   Deletion at end.

6. Create a stack and perform Pop, Push, Traverse operations on the stack using Linear Linked list.

7. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and
   Display the queue elements.

8. Create a Binary Tree (Display using Graphics) perform Tree traversals (Preorder, Postorder, Inorder) using
   the concept of recursion.

9. Implement insertion, deletion and display (inorder, preorder and postorder) on a binary search tree with the
   information in the tree about the details of a automobile (type, company, year of make).

10. To implement Insertion sort, Merge sort, Quick sort, Bubble sort, Selection sort, Radix sort, Shell sort,
    Insertion sort, Heap sort and Exchange sort using array and data structure.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

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List of Experiments:

2. Implementation of Line drawing algorithms: DDA Algorithm, Bresenham's Algorithm
3. Implementation of Circle drawing algorithms: Bresenham's Algorithm, Mid Point Algorithm.
4. Programs on 2D and 3D transformations
5. Write a program to implement cohen Sutherland line Clipping algorithm
6. Write a program to draw Bezier curve.
7. Using Flash/Maya perform different operations (rotation, scaling move etc.) on objects.
8. Create a Bouncing Ball using Key frame animation and Path animation.

NOTE: At least 8 Experiments out of the list must be done in the semester.
INSTRUCTIONS TO PAPER SETTERS:  
MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The objective of this course is to teach the students about the difference equation, probability, curve fitting etc. and other numerical methods to solve various engineering problems.

UNIT – I
Partial Differential Equation: linear partial differential equations with constant coefficient, homogeneous and non-homogeneous linear equations. Method of separation of variables. Laplace equation, wave equation and heat flow equation in Cartesian coordinates only with initial and boundary value.

UNIT II
Probability Theory: Definition, addition law of probability, multiplication law of probability, conditional probability, Baye’s theorem. Random variable: discrete probability distribution, continuous probability distribution, expectation, moment, moment generating function, skewness, kurtosis, binomial distribution, Poisson distribution, normal distribution.

UNIT-III
Curve Fitting: Principle of least square Method of least square and curve fitting for linear and parabolic curve, Correlation Coefficient, Rank correlation, line of regressions and properties of regression coefficients. Sampling distribution: Testing of hypothesis, level of significance, sampling distribution of mean and variance, Chi-square distribution, Student’s T-distribution, F-distribution, Fisher’s Z-distribution.

UNIT IV

Text Books:

References Books:


**COMPUTER ORGANIZATION & ARCHITECTURE**

**Paper Code:** ETCS-204

**Paper:** Computer Organization & Architecture

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<td>Paper: Computer Organization &amp; Architecture</td>
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**INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS:** 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** To understand the architecture and organization of computer in depth.

**UNIT-I**

Computer Arithmetic and Register transfer language:
- Unsigned notation, signed notation, binary coded decimal, floating point numbers, IEEE 754 floating point standard, Micro-operation, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro operation, Arithmetic Logic Shift Unit.

**UNIT-II**

Instruction set architecture & computer organization:
- Levels of programming languages, assembly language instructions, 8085 instruction set architecture, Instruction Codes, Computer Register, Control Signals, Instructions, Timing & Control, Instruction Cycle, Memory Access, Instruction Formats, Input/Output and Interrupts.

**UNIT-III**

Control Design:
- Instruction sequencing & interpretation, Hardwired & Micro Programmed (Control Unit), Microprogrammed computers, Microcoded CPU, Pentium processor, Specifying a CPU, Design & implementation of simple CPU, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Internal architecture of 8085 microprocessor.

**UNIT-IV**

Memory & Input/Output organization:
- Memory Technology, Main Memory (RAM and ROM Chips), Virtual memory, High-speed memories, Asynchronous Data Transfers, Programmed I/O, Interrupts, Direct memory access, Serial communication UARTs, RS-232-C & RS-422 standards.

**Text Books:**

**Reference Books:**
### THEORY OF COMPUTATION

**Paper Code:** ETCS-206  
**Paper:** Theory of Computation

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**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** To understand fundamental requirements for building algorithms of any language.

**UNIT-I**
Overview: Alphabet, Strings & Languages, Chomsky Classification of Languages, Finite Automata, Deterministic Finite Automata (DFA) & Non-deterministic finite Automata (N DFA), Equivalence of NDFA and DFA, Minimalization of Finite Automata, Moore and Mealy machine and their equivalence, Regular expression and Kleen’s Theorem (with proof), Closure properties of Regular Languages, Pumping Lemma for regular Languages (with proof).

**UNIT-II**
Context Free grammar, Derivation trees, Ambiguity in grammar and its removal, Simplification of Context Free grammar, Normal forms for CFG, Chomsky Normal Form & Greibach Normal Form, Pumping Lemma for Context Free languages, Closure properties of CFL (proof required), Push Down Automata (PDA), Deterministic PDA, Non Deterministic PDA, Equivalence of PDA and CFG, Overview of LEX and YACC.

**UNIT-III**
Turing machines, Turing Church’s Thesis, Variants and equivalence of Turing Machine, Recursive and recursively enumerable languages, Halting problem, Undecidability, Examples of Undecidable problem.

**UNIT-IV**
Introduction to Complexity classes, Computability and Intractability, time complexity, P, NP, Co-NP, Proof of Savitch’s Theorem, Space Complexity, PSPACE, L, NL ,Co-NL complexity classes.

**Text Books:**


**References Books:**


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Scheme and Syllabi for B. Tech-IT, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.
INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The concepts related to database, database techniques, SQL and database operations are introduced in this subject. This creates strong foundation for application data design.


UNIT-IV: Transaction Management: ACID properties, Serializability of Transaction, Testing for Serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, Database recovery management.

Implementation Techniques: Overview of Physical Storage Media, File Organization, Indexing and Hashing, B+ tree Index Files, Query Processing Overview, Catalog Information for Cost Estimation, Selection Operation, Sorting, Join Operation, Materialized views, Database Tuning.

Text Books:

References Books:
**OBJECT ORIENTED PROGRAMMING**

Paper Code: ETCS-210

**Paper: Object Oriented Programming**

**L T/P C**

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**INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** To learn object oriented concepts to enhance programming skills.

**UNIT – I:**
Objects, relating to other paradigms (functional, data decomposition), basic terms and ideas (abstraction, encapsulation, inheritance, polymorphism). Review of C, difference between C and C++, cin, cout, new, delete operators.

**UNIT – II:**
Encapsulation, information hiding, abstract data types, object & classes, attributes, methods. C++ class declaration. The identity and behavior of an object, constructors and destructors, instantiation of objects, default parameter value, object types, C++ garbage collection, dynamic memory allocation, meta classes/abstract classes.

**UNIT – III:**
Inheritance, Class hierarchy – public, private & protected; aggregation, composition vs classification hierarchies, polymorphism. Decision of polymorphic to methods, method polymorphism, polymorphism by parameter, operator overloading, parametric polymorphism, generic function – template function, function name overloading, overriding inheritance methods, run time polymorphism.

**UNIT – IV:**
Standard C++ classes, using namespaces, library organization and containers, standard containers, algorithm and Function objects, objects, iterators and allocators, streams, manipulators, user defined manipulators, vectors, valarray, slice, generalized numeric algorithms.

**Text Books:**


**Reference Books:**


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Objective: To teach the fundamental concepts of Control systems and mathematical modeling of the system. To study the concept of time response and frequency response of the system. To teach the basics of stability analysis of the system.

UNIT I: Control Systems – Basics & Components

UNIT II: Time – Domain Analysis
Time domain performance specifications, transient response of first & second order systems, steady state errors and static error coefficient, open loop & closed loop control systems, response with P, PI and PID controllers, limitations of time domain analysis.

UNIT III: Frequency Domain Analysis
Polar and inverse polar plots, frequency domain specifications and performance of LTI systems, Logarithmic plots (Bode plots), gain and phase margins, relative stability. Correlation with time domain performance. Closed loop frequency responses from open loop response. Limitations of frequency domain analysis, minimum/non-minimum phase systems.

UNIT IV: Stability & Compensation Techniques

Text Books:

Reference Books:
APPLIED MATHEMATICS LAB

Paper Code: ETMA-252
Paper: Applied Mathematics Lab

List of Experiments:

1. Solution of algebraic and transcendental equation.
2. Algebra of matrices: Addition, multiplication, transpose etc.
3. Inverse of a system of linear equations using Gauss-Jordan method.
7. Calculation of eigen values and eigen vectors of a matrix.
8. Plotting of Unit step function and square wave function.

It is expected that at least 12 experiments be performed, including the above specified 8 experiments which are compulsory. The remaining experiments may be developed by faculty and students based on applications of Mathematics in Real Life problem.

Text Books:

Reference Books:
3. Rudra Pratap, “Getting Started With MatLab” Oxford University Press
4. Byron Gottfried, “Programming With C” Shaum’s Outline

NOTE:- At least 8 experiments out of the list must be done in the semester.

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Experimental work based upon the course Computer Organization & Architecture (ETCS-204).

NOTE: - At least 8 Experiments from the syllabus must be done in the semester.
Lab Based on DBMS

Lab includes implementation of DDL, DCL, DML i.e SQL in Oracle.

List of Experiments:

1. Design a Database and create required tables. For e.g. Bank, College Database
2. Apply the constraints like Primary Key, Foreign Key IN DJ SQL in the tables.
3. Write a SQL statement for implementing ALTER, UPDATE & DELETE
4. Write the queries to implement the joins
5. Write the queries for implementing the following functions: MAX ( ), MIN ( ), AVG ( ), COUNT ( )
6. Write the queries to implement the concept of Integrity constraints
7. Write the queries to create the views
8. Perform the queries for triggers
9. Perform the following operation for demonstrating the insertion, updation and deletion using the
   role: referential integrity constraints

Text book:


Note:- At least 8 Experiments out of the list must be done in the semester.
List of Experiment:

1. Write a program for multiplication of two matrices using OOP.
2. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imag parts to equal values and third which takes two argument is used to initialize real and imag to two different values.
3. Write a program to find the greatest of two given numbers in two different classes using friend function.
4. Implement a class string containing the following functions:
   - Overload + operator to carry out the concatenation of strings.
   - Overload = operator to carry out string copy.
   - Overload <= operator to carry out the comparison of strings.
   - Function to display the length of a string.
   - Function tolower( ) to convert upper case letters to lower case.
   - Function toupper( ) to convert lower case letters to upper case.
5. Create a class called LIST with two pure virtual function store() and retrieve(). To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and overload store and retrieve.
6. Write a program to define the function template for calculating the square of given numbers with different data types.
7. Write a program to demonstrate the use of special functions, constructor and destructor in the class template. The program is used to find the bigger of two entered numbers.
8. Write a program to perform the deletion of white spaces such as horizontal tab, vertical tab, space ,line feed ,new line from the file and store the contents of the file without the white spaces on another file.
9. Write a program to read the class object of student info such as name , age , sex , height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.
10. Write a program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
CONTROL SYSTEMS LAB

Paper Code: ETEE-260
Paper: Control Systems Lab

List of Experiments:

1. Comparison of open loop & closed loop control in speed control of D.C. motor & to find the transfer function.
2. To study the characteristics of positional error detector by angular displacement of two servo potentiometers
   a. excited with dc
   b. excited with ac
3. To study synchro transmitter in terms of position v/s phase & voltage magnitude with respect to rotor voltage magnitude phase.
4. To study remote position indicators systems using synchro transmitter/receiver.
5. To plot speed-torque curve for ac servomotor for different voltages.
6. To study ac motor position control system & to plot the dynamic response & calculate peak time, settling time, peak overshoot, damping frequency, steady state error etc.
7. To study the time response of simulated linear systems.
8. To study the performance of PID Controllers.
9. Plot the impulse response, unit step response, unit ramp response of any 2nd order transfer function on same graph using MATLAB.
10. To draw the magnetization (Volt Amps) characteristics of the saturable core reactor used in the magnetic amplifier.
11. Plot root locus for any 2nd order system (with complex poles). For Mp=30%, find the value of K using MATLAB.
12. To design lead-lag compensator for the given process using Bode plots in MATLAB.

NOTE:- At least 8 Experiments out of the list must be done in the semester.
INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this paper is to teach the students various problem solving strategies like divide and conquer, Greedy method, Dynamic programming and also the mathematical background for various algorithms. After doing this course, students will be able to select an appropriate problem solving strategies for real world problems. This will also help them to calculate the time, complexity and space complexity of various algorithms.

UNIT – I
Asymptotic Notations for time and space complexity, Big-Oh notation, Θ notation, Ω notation, the little-o notation, the little-omega notation, Recurrence relations: iteration method, recursion tree method, substitution method, ma-method (with proof), subtract and conquer master method(with proof), Data Structures for Disjoint Sets, Medians and Order statistics. Complexity analysis, Insertion sort, Merge Sort, Quick sort, Strassen’s algorithm and Matrix Multiplications.

UNIT – II
Dynamic Programming: Ingredients of Dynamic Programming, emphasis on optimal substructure, overlapping substructure, Bellman’s equation, Matrix Chain Multiplication, Longest common subsequence problems, 0-1 Knapsack problem, Binomial coefficient computation through dynamic programming, Floyd Warshall algorithm.

UNIT – III

UNIT – IV


Text Books:

Reference Books:

Guru Gobind Singh Indraprastha University
INSTRUCTIONS TO PAPER SETTERS:

**MAXIMUM MARKS: 75**

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2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** To improve the concepts in building any software.

**UNIT – I**

**Introduction:**
Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM.

Software Metrics:
Size Metrics like LOC, Token count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics.

**UNIT – II**

Software Project Planning:
Cost estimation, static, dynamic, activity, time driven models, COCOMO model, Putnam Resource Allocation Model.

Software Requirement Analysis and Specifications:

**UNIT – III**

Software Design:
Cohesion & Coupling, Classification & Grouping, Module Design, Object Oriented Design, User Interface Design.

Software Reliability:
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calendar time Component, Reliability Allocation.

**UNIT – IV**

Software Testing:
Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools & Standards.

Software Maintenance:
Management of Maintenance, Maintenance Process, Maintenance Models, Reverse Engineering, Software Re-engineering, Configuration Management, etc.

**TEXT BOOKS:**


**Reference:**


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