BACHELOR OF TECHNOLOGY
(INFORMATION TECHNOLOGY)
THIRD SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPERS						
ETMA 201		Applied Mathematics – III	3	1	4	
ETCS 203		Foundation of Computer Science	3	1	4	M
ETEC 205		Switching Theory and Logic Design	3	1	4	
ETEE 207		Circuits and Systems	3	1	4	
ETCS 209		Data Structure	3	1	4	M
ETCS 211		Computer Graphics and Multimedia	3	1	4	
PRACTICAL/ VIVA VOCE						
ETEC 253		Switching Theory and Logic Design Lab	0	2	1	
ETCS 255		Data Structure Lab	0	2	1	
ETEE 257		Circuits and Systems Lab	0	2	1	
ETCS 257		Computer Graphics and Multimedia Lab	0	2	1	
		NCC/NSS*#	-	-	-	
TOTAL			**18**	**14**	**28**	

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

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPERS						
ETMA 202		Applied Mathematics - IV	3	1	4	
ETCS 204		Computer Organization and Architecture	3	1	4	M
ETCS 206		Theory of Computation	3	1	4	M
ETCS 208		Database Management Systems	3	1	4	M
ETCS 210		Object Oriented Programming	3	0	3	
ETEE 212		Control Systems	3	1	4	
PRACTICAL/VIVA VOCE						
ETMA-252		Applied Mathematics Lab	0	2	1	
ETCS-254		Computer Organisation and Architecture Lab	0	2	1	
ETCS-256		Database Management Systems Lab	0	2	1	
ETCS-258		Object Oriented Programming Lab	0	2	1	
ETEE-260		Control Systems Lab	0	2	1	
ETSS-250		NCC/NSS*#	-	-	1	
TOTAL			**18**	**15**	**29**	

M: Mandatory for award of degree

**NCC/NSS can be completed in any semester from Semester 1 to Semester 4. It will be evaluated internally by the respective institute. The credit points will be awarded 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)

APPLIED MATHEMATICS-III

	L	T/P	C
Paper Code: ETMA-201			
Paper: Applied Mathematics-III	**3**	**1**	**4**

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.

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 transform, 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 [illegible] theorem, final value theorem, convolution theorem, convergence of Z- transform, inverse of Z- transform, application to difference equations.

[T2][No. of hrs 11]

UNIT-III

Numerical Method[illegible]braic and transcendental equations using bisection method, Regula-Falsi method and Newton – Raphson method. Solution of linear simultaneous equations using Gauss-Jacobi's iteration method and Gauss-Seidal's iteration methods.Finite differences: Forward differences, backward differences and Central differences. Interpolation: Newton's interpolation for equi-spaced values. Stirling's central difference interpolation formula, Divided differences and interpolation formula in terms of divided differences , Lagrange's interpolation[illegible]-spaced values.

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

UNIT-IV

Numerical Differentiation, maxima and minima of a tabulated function. Numerical Integration: Newton-Cote's quadrature formula, Trapezoidal rule, Simpson's one-third rule and Simpson's three-eighth rule .Numerical solution of ordinary differential equations: Picard's method, Taylor's method, Euler's method, modified Euler's method, Runge-Kutta method of fourth order.

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

Text Books:

[T1] R.K. Jain and S.R.K. Iyengar," Numerical methods for Scientific and Engineering Computation", New Age Publishing, Delhi-2014

[T2] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications, 2014 Edition.

Reference Books:

[R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications

[R2] P. B. Patil and U. P. Verma," Numerical Computational Methods", Narosa

[R3]. Partial Differential Equations, Schaum's Outline Series, McGraw Hill.

[R4] Michael Greenberg, " Advance Engineering mathematics" , Pearson.

[R5] Schaum's Outline on Fourier Analysis with Applications to Boundary Value Problem, Tata McGraw-Hill

FOUNDATION OF COMPUTER SCIENCE

Paper Code: ETCS-203	**L**	**T/P**	**C**
Paper: Foundation of Computer Science	**3**	**1**	**4**

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, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

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, Predicates, Quantifiers, Theory of inferences for predicate calculus, resolution. Techniques for theorem proving: Direct Proof, Proof by Contraposition, proof by contradiction.

[T1,T2][No. of hrs. 10]

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, POSET, Hasse Diagrams, extremal Elements, Lattices, composition of function, inverse, binary and n-ary operations.

[T1, T2][No. of hrs. 12]

UNIT- III

Principle of mathe[illegible]rinciple of complete induction, solution methods for linear and non-linear first-order recurre[illegible] 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.

[T1,T2][No of hrs 11]

UNIT-IV

Groups, Symmetry, subgroups, [illegible]ups, cyclic groups, permutation group and cayles's theorem(without proof), cosets lagrange's theorem(with proof), homomorphism, isomorphism, automorphism, rings, Boolean function, Boolean expression, representation & minimization of Boolean function.

[T1,T2][No of hrs 11]

Text Books:

[T1] Norman L. Biggs, "Disc[illegible]thematics", Oxford, second edition.

[T2] Keneth H. Rosen, "Discrete M[illegible]matics and Its Applications", TMH, seventh edition.

Reference Books:

[R1] Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI, 1996.

[R2] C.L. Liu, "Elements of Discrete Mathematics", TMH, 2000.

[R3] J. P. Trembly& P. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1997.

SWITCHING THEORY AND LOGIC DESIGN

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

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: 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 Look-ahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.

[T2,T3][No. of Hrs. 14]

UNIT- II

Integrated circuits: - TTL and MOS 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.

[T2,T3][No. of hrs. 10]

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 models, minimization of completely specified and incompletely specified sequential machines, partition techniques and merger chart methods-concept of minimal cover table.

[T1][No. of hrs. 10]

UNIT- IV

Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partitioning-based design.

Fault Detection and Location: Fault models for combinational and sequential circuits, Fault detection in combinational circuits; Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

[T1][No. of hrs. 10]

Text Book:

[T1] Zyi Kohavi, "Switching & Finite Automata Theory", TMH, 2nd Edition
[T2] Morris Mano, Digital Logic and Computer Design", Pearson
[T3] R.P. Jain, "Modern Digital Electronics", TMH, 2nd Ed,

Reference Books:

[R1] A Anand Kumar, "Fundamentals of Digital Logic Circuits", PHI
[R2] Taub ,Helbert and Schilling, "Digital Integrated Electronics", TMH

CIRCUITS & SYSTEMS

Paper Code: ETEE-207	**L**	**T/P**	**C**
Paper: Circuits & Systems	**3**	**1**	**4**

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 Q. 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.

Objective: The purpose of this 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 waveforms.

[T1,T2][No. of Hours: 10]

UNIT-II

System modeling in terms of differential equations and transient response of R, L, C, series and parallel circuits for impulse, step, ramp, sinusoidal and exponential signals by classical method and using Laplace transform.

[T1,T2] [No. of Hours: 12]

UNIT-III

Graph theory: concept of tree, incidence matrix, cut set matrix and application to solve electric networks.

Two port networks – Introduction of two port parameters and their interconversion, interconnection of two 2-port networks, open circuit and short circuit impedances and ABCD constants, relation between image impedances and short circuit and open circuit impedances. Network functions, their properties and concept of transform impedance, Hurwitz polynomial.

[T1,T2][No. of Hours: 10]

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 filter and their classification, frequency response, characteristic impedance of low pass, high pass, Band Pass and Band reject prototype section.

[T1,T2][No. of Hours: 10]

Text Books:

[T1] W H Hayt "Engineering Circuit Analysis" TMH Eighth Edition

[T2] D. R. Choudhary, "Networks and Systems" New Age International, 1999.

Reference Books:

[R1] S Salivahanan "Circuit Theory" Vikas Publishing House 1st Edition 2014

[R2] Valkenburg, " Network analysis" PHI, 2000.

[R3] Bhise, Chadda, Kulshreshtha, " Engineering network analysis and filter design" Umesh publication, 2000.

[R4] Kuo, "Network analysis and synthesis" John Wiley and Sons, 2nd Edition.

[R5] Allan H Robbins, W.C.Miller, "Circuit Analysis Theory and Practice"Cengage Learning Pub 5th Edition 2013

[R6] Bell "Electric Circuit" Oxford Publications 7th Edition

DATA STRUCTURES

	L	T/P	C
Paper Code: ETCS-209			
Paper: Data Structures	**3**	**1**	**4**

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, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

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.

[T1,T2][No. of hrs. 12]

UNIT – II:

Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expression trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.

[T1,T2][No. of hrs. 12]

UNIT – III:

Multiway trees, B trees, 2-4 trees, B* and B+ Trees, Graphs, Graph representation, Graph traversal.

[T1,T2][No. of hrs. 12]

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 – Linear search, sequential search, binary search, hashing concepts, hashing methods (Direct addressing, modulo division, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing, linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.

[T1,T2][No. of hrs. 12]

Text Books:

[T1] R. F. Gilberg, and B. A. Forouzan, "Data Structures: A Pseudocode approach with C", Thomson Learning.

[T2] A .V. Aho, J . E . Hopcroft, J . D . Ullman, "Data Structures and Algorithm", Pearson Education.

Reference Books:

[R1] S. Sahni and E. Horowitz, "Data Structures" Galgotia Publications.

[R2] Tanenbaum, "Data Structures using C" Pearson/PHI.

[R3] T .H . Cormen, C . E . Leiserson, R .L . Rivest "Introduction to Algorithms", PHI/Pearson.

[R4] A.K.Sharma, "Data Structures", Pearson.

[R5] Ellis Horowitz and Shriaz Sahani "Fundamentals of Computer Algorithms", Computer Science Press.

COMPUTER GRAPHICS & MULTIMEDIA

	L	T/P	C
Paper Code: ETCS-211			
Paper: Computer Graphics & Multimedia	**3**	**1**	**4**

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, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand various aspects of media and to learn the concept of sound, images and videos.

UNIT- I

Introduction, Application areas, Components of Interactive Computer Graphics System. Overview of Input devices, Output devices, raster scan CRT displays, random scan CRT displays. DDA and Bresenham's Line Drawing Algorithms, Bresenham's and Mid Point Circle Drawing Algorithms. Homogeneous Coordinate System for 2D and 3D, Various 2D & 3D Transformations (Translation, Scaling, Rotation, Shear).

[T1,T2][No. of hrs. 12]

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 Ve[illegible]

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

UNIT- III

Shading Models, [illegible]d Shading, Phong Model. Visible surface detection, Back Face Detection, Depth Buffer (Z[illegible] Method, Overview of multimedia: Classification, basic concepts of sound/audio MIDI: devices, messages, software. , Authoring tools, Video and Animation: controlling animation, display and transmission of animation

[T1,T2][No of hrs 10]

UNIT- IV

Data Compression: Storage space, [illegible]nts, Basic co[illegible]ression 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.

[T1,T2][No of hrs 11]

Text Books:

[T1] Donald Hearn and M.[illegible] Baker, "Computer Graphics C[illegible]sion", Second Edition, Pearson Education.

[T2] Ralf Steinmetz & Klara Nahrstedt, "Multimedia Computing Communication & Applications", Pearson Education.

Reference Books:

[R1] C, Foley, VanDam, Feiner and Hughes, "Computer Graphics Principles & practice", 2nd Edition

[R2] R. Plastock and G. Kalley, Schaum's Series, "Theory and Problems of Computer Graphics", McGraw Hill, 2nd edition.

[R3] Fred Halsall, "Multimedia Communications Applications, Networks, Protocols & Standards", Pearson Education.

[R4] David F. Rogers, "Procedural elements for computer graphics", McGraw- Hill.

SWITCHING THEORY AND LOGIC DESIGN LAB

Paper Code: ETEC-253	**L**	**T/P**	**C**
Paper: Switching Theory and Logic Design Lab	**0**	**2**	**1**

List of Experiments:

1. Realize all gates using NAND & NOR gates
2. Realize Half Adder, Full Adder, Half subtracter, Full subtracter
3. Realize a BCD adder
4. Realize a Serial Adder
5. Realize a four bit ALU
6. Realize Master-Slave J-K Flip-Flop, using NAND/NOR gates
7. Realize Universal Shift Register
8. Realize Self Starting, 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 Mealy and Moore State machines

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

CIRCUITS AND SYSTEMS LAB

	L	T	C
Paper Code: ETEE-257			
Paper: Circuits and Systems Lab	**0**	**2**	**1**

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 Hybrid 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.

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DATA STRUCTURES LAB

Paper Code: ETCS-255	**L**	**T/P**	**C**
Paper: Data Structures Lab	**0**	**2**	**1**

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 then 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 it 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 doubly linked list with nodes having information about an employee and perform Insertion at front of doubly linked list and Deletion at end of that doubly linked list.
5. Create circular linked list with nodes having information about an 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 as a Binary Tree traversals (Preorder, Postorder, Inorder) using the concept of recursion.
9. Implement insertion, deletion and display (inorder, preorder and postorder) in 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, Heap sort, Radix sort, Shell sort, Selection 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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COMPUTER GRAPHICS & MULTIMEDIA LAB

	L	T	C
Paper Code: ETCS-257			
Paper: Computer Graphics & Multimedia Lab	**0**	**2**	**1**

List of Experiments:

1. Study of Fundamental Graphics Functions.
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:- Atleast 8 Experiments out of the list must be done in the semester.

APPLIED MATHEMATICS-IV

Paper Code: ETMA-202	**L**	**T/P**	**C**
Paper: Applied Mathematics-IV	**3**	**1**	**4**

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.

[T1][No. of Hrs. 11]

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.

[T1,T2][No. of Hrs. 12]

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.

[T1,T2][No. of Hrs. 12]

UNIT IV

Linear Programming: Introduction, formulation of problem, Graphical method, Canonical and Standard form of LPP, Simplex method, Duality concept, Dual simplex method, Transportation and Assignment problem.

[T1][No. of Hrs. 10]

Text Books:

[T1] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications

[T2]. N.M. Kapoor, "Fundamental of Mathematical Statistics", Pramod Publications

References Books:

[R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications

[R2] Miller and Freund, "Probability and statistics for Engineers" , PHI

[R3] Gupta and Kapoor, " Fundamentals of Mathematical Statistics" Sultan Chand and Sons

[R4] G. Hadley, "Linear Programming", Narosa.

[R5] Schaum's Outline of Probability and Statistics' Tata McGraw-Hill

[R6] Gupta and Manmohan," Problems in Operations Research", Sultan Chand and Sons.

[R7] R.K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics,"Narosa Publications.

COMPUTER ORGANIZATION & ARCHITECTURE

Paper Code: ETCS-204	**L**	**T/P**	**C**
Paper: Computer Organization & Architecture	**3**	**1**	**4**

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.

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

UNIT- II
Instruction set architecture & computer organization:
Levels of programming languages, assembly language instructions, 8085 instruction set architecture, Instruction Codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupts

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

UNIT- III
Control Design:
Instruction sequencing & interpretation, Hardwired & Micro Programmed (Control Unit), Micrprogrammed 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

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

UNIT- IV
Memory & Input/Output organization: Memory Technology, Main Memory (RAM and ROM Chips), Virtual memory, High-speed memories
Asynchronous Data Transfer, Programmed I/O, interrupts, Direct memory access, Serial communication, UARTs, **RS-232-C & RS-422** standard

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

Text Books:
[T1] J. D. Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 2006.
[T2] J. P. Hayes, "Computer Architecture and Organization", McGraw Hill, 1988.

Reference Books:
[R1] J. L Hennessy and D. A. Patterson, "Computer Architecture: A quantitative approach", Morgon Kauffman, 1992.
[R2] W. Stallings, "Computer organization and Architecture", PHI, 7th ed, 2005.
[R3] B. Parhami, "Computer Architecture: From Microprocessors to Supercomputers", Oxford University press, 2006.

THEORY OF COMPUTATION

Paper Code: ETCS-206	**L**	**T/P**	**C**
Paper: Theory of Computation	**3**	**1**	**4**

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 fundamental requirements for building algorithms of any language.

UNIT- I

Overview: Alphabets, Strings & Languages, Chomsky Classification of Languages, Finite Automata, Deterministic finite Automata (DFA) & Nondeterministic finite Automata (NDFA), Equivalence of NDFA and DFA, Minimization 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).

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

UNIT- II

Context free grammar, Derivation trees, Ambiguity in grammar and its removal, Simplification of Context Free grammars, 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.

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

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.

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

UNIT- IV

Introduction to Complexity classes and Intractable problems, Time complexity, P, NP, Co-NP, Proof of Cook's Theorem, Space Complexity, NPSPACE, PSPACE, Proof of Savitch's Theorem, L, NL ,Co-NL complexity classes.

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

Text Books:

[T1] Hopcroft, John E.; Motwani, Rajeev; Ullman, Jeffrey D "Introduction to Automata Theory, Languages, and Computation", Third Edition, Pearson.

[T2] Sipser, Michael, "Introduction to the theory of Computation", Third Edition, Cengage.

References Books:

[R1] Martin J.C., "Introduction to Languages and Theory of Computations", Third Edition, TMH.

[R2] Papadimitriou, C. and Lewis, C.L., "Elements of the Theory of Computation", PHI.

[R3] Daniel I.A. Cohen, "Introduction to Computer Theory", Second Edition, John Wiley.

DATABASE MANAGEMENT SYSTEMS

Paper Code: ETCS-208	**L**	**T/P**	**C**
Paper: Database Management Systems	**3**	**1**	**4**

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: 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-I : Introductory Concepts of DBMS: Introduction and application of DBMS, Data Independence, Database System Architecture – levels, Mapping, Database users and DBA, Entity – Relationship model, constraints, keys, Design issues, E-R Diagram, Extended E-R features- Generalization, Specialization, Aggregation, Translating E-R model into Relational model.

[T1, T2][No. of Hrs. 10]

UNIT-II : Relational Model: The relational Model, The catalog, Types, Keys, Relational Algebra, Fundamental operations, Additional Operations-, SQL fundamentals, DDL,DML,DCL PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions, Database Integrity – Triggers.

[T2, R3][No. of Hrs. 10]

UNIT-III: Functional Dependencies, Non-loss Decomposition, First, Second, Third Normal Forms, Dependency Preservation, Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

[T2, R1, R3][No. of Hrs. 10]

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.

[T1, T2, R2][No. of Hrs. 12]

Text Books:

[T1] Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 5th Edition, Tata McGraw Hill, 2006

[T2] Elmsari and Navathe, "Fundamentals of Database Systems", 6th Ed., Pearson, 2013

References Books:

[R1] C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.

[R2] J. D. Ullman, "Principles of Database Systems", 2nd Edn, Galgotia Publications, 1999.

[R3] Vipin C. Desai, "An Introduction to Database Systems", West Publishing Co.,

OBJECT ORIENTED PROGRAMMING

Paper Code: ETCS-210	**L**	**T/P**	**C**
Paper: Object Oriented Programming	**3**	**0**	**3**

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 – 1:
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.

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

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

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

UNIT – III:
Inheritance, Class [illegible] – public, private & protected; aggregation, composition vs classification hierarchies, polym[illegible]ion of polymorphic techniques, method polymorphism, polymorphism by parameter, operator overloading, parametric polymorphism, generic function – template function, function name overloading, overriding inheritance methods, run time polymorphism.

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

UNIT – IV:
Standard C++ classes, using [illegible] consistent [illegible]ams and files, namespaces, exception handling, generic classes, standard template library. Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators, vectors, valarray, slice, generalized numeric algorithm.

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

Text Books:
[T1] Rumbaugh et. al. "Object [illegible]odeling & Design", Prentice Hall
[T2] A.R.Venugopal, Rajkumar, T. Ra[illegible]haracter "Mastering C++", TMH

Reference Books:
[R1] A.K. Sharma, "Object Oriented Programming using C++", Pearson.
[R2] G . Booch, "Object Oriented Design & Applications", Benjamin,Cummings.
[R3] E.Balaguruswamy, "Objected Oriented Programming with C++", TMH
[R4] S. B. Lippman & J. Lajoie, "C++ Primer", 3rd Edition, Addison Wesley, 2000.
[R4] R. Lafore, "Object Oriented Programming using C++", Gargotia.
[R5] D . Parasons, "Object Oriented Programming with C++", BPB Publication.
[R6] Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication.

CONTROL SYSTEMS

	L	T/P	C
Paper Code: ETEE- 212			
Paper: Control Systems	**3**	**1**	**4**

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 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

Introduction to basic terms, classifications & types of Control Systems, block diagrams & signal flow graphs. Transfer function, determination of transfer function using block diagram reduction techniques and Mason's Gain formula. Control system components: Electrical/ Mechanical/Electronic/A.C./D.C. Servo Motors, Stepper Motors, Tacho Generators, Synchros, Magnetic Amplifiers, Servo Amplifiers,

[T1,T2][No. of Hrs. : 11]

UNIT II : Time – Domain Analysis

Time domain performance specifications, transient response of first & second order systems, steady state errors and static error constants for feedback control systems, response with P, PI and PID controllers, limitations of time domain analysis.

[T1,T2][No. of Hrs. : 10]

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.

[T1,T2][No. of Hrs. : 10]

UNIT IV : Stability & Compensation Techniques

Concepts, absolute, asymptotic, conditional and marginal stability. Routh–Hurwitz and Nyquist stability criterion, Root locus technique and its application.

Concepts of compensation, series/ parallel/ series parallel/feedback compensation, Lag/Lead/Lag-Lead networks for compensation, compensation using PI, PID controllers.

[T1,T2][No. of Hrs. : 11]

Text Books:

[T1] B. C. Kuo, "Automatic control system", Prentice Hall of India, 7th edition 2001.
[T2] Nagraath Gopal "Control Systems Engineering -Principles and Design" New Age Publishers

Reference Books:

[R1] Norman S. Nise, "Control systems engineering" John Wiley & Sons (Asia) Singapore.
[R2] Raymond T. Stefani, Design of Feedback Control System, Oxford University Press.
[R3] K. Ogata, "Modern control engineering", Pearson 2002.
[R4] S. P.Eugene Xavier, "Modern control systems", S. Chand & Company.
[R5] M. Gopal "Control Systems Principles and Design" TMH 4th Edition 2012

APPLIED MATHEMATICS LAB

	L	T/P	C
Paper Code: ETMA-252			
Paper: Applied Mathematics Lab	**0**	**2**	**1**

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.
4. Numerical Integration.
5. Solution of ordinary differential equations using Runge-Kutta Method.
6. Solution of Initial value problem.
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 atleast 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:

1. B.S. Grewal., "Numerical Methods in Engg. And Science", Khanna Publications
2. P. Dechaumphai & N. Wansophark, "Numerical Methods in Engg.: Theories with Matlab, Fortran, C & Pascal Programs", Narosa Publications

Reference Books:

1. P.B. [illegible] "Numerical Computational Methods", Narosa Publications
2. John [illegible] Arnold, "Ordinary Differential Equations using MATLAB", Pearson Publ[illegible]
3. Rudra Pratap, "Getting Started With MatLab" Oxford University Press
4. Byron Gottfried, "Programming With C" Shaum's Outline
5. Santosh Kumar, "Computer based Numerical & Statistical Techniques", S. Chand Publications.

NOTE:- At least 8 Experiment[illegible] be [illegible] ster.

COMPUTER ORGANIZATION & ARCHITECTURE LAB

	L	T/P	C
Paper Code: ETCS-254			
Paper: Computer Organization & Architecture Lab	**0**	**2**	**1**

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.

DATABASE MANAGEMENT SYSTEMS LAB

	L	T/P	C
Paper Code: ETCS-256			
Paper: Database Management Systems Lab	**0**	**2**	**1**

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, NOT NULL to the tables.
3. Write a SQL statement for implementing ALTER, UPDATE and 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 referential integrity constraints

TEXT BOOK:

1. SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4th Edition BPB Publications

NOTE:- At least 8 [illegible] of the list must be done in the semester.

OBJECT ORIENTED PROGRAMMING LAB

	L	T/P	C
Paper Code: ETCS-258			
Paper: Object Oriented Programming Lab	**0**	**2**	**1**

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 initialized 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 [illegible] with two pure virtual function store() and retrieve() to store a value cal[illegible]eve call retrieve function. Derive two classes stack and queue from it and ov[illegible]rieve.
6. Write a [illegible] 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 [illegible] and store the contents of the file without the white spaces in 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 5 Experiments out of the list must be done in the semester.

CONTROL SYSTEMS LAB

	L	T/P	C
Paper Code: ETEE-260			
Paper: Control Systems Lab	**0**	**2**	**1**

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/receiver in terms of position v/s phase and voltage magnitude with respect to rotor voltage magnitude /phase.
4. To study remote position indicator systems using synchro transmitter/receiver.
5. To plot speed- torque curves 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 Controller.
9. Plot 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 circuit.
11. Plot root locus for an nth order system (with complex poles). For Mp=30%, find the value of K using MATLAB.
12. To design a controller for the given process using Bode plots in MATLAB.

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

ALGORITHMS DESIGN AND ANALYSIS

Paper Code: ETCS-301	**L**	**T/P**	**C**
Paper: Algorithms Design and Analysis	**3**	**1**	**4**

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**: 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-oh notation, the little-omega notation, Recurrence relations: iteration method, recursion tree method, substitution method, master 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 for Matrix Multiplications.

[T1][R1][R2][No. of Hrs. 10]

UNIT – II

Dynamic Programming: Elements of Dynamic Programming, emphasis on optimal substructure , overlapping subproblems, Memorization. Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems, 0-1 knapsack problem, Binomial coefficient computation through dynamic programming. Floyd Warshall algorithm.

[T1][T2][R1] [R3][No. of Hrs. 10]

UNIT – III

Greedy Algorithms: Elements of greedy strategy, overview, Activity selection problem, Fractional Knapsack problem, Huffman Codes, A task scheduling problem. Minimum **Spanning Trees:** Krushal's and Prim's Algorithm, Single source shortest path: Dijkstra's and Bellman Ford Algorithm(with proof of correctness of algorithms).

[T1][T2][R4] [No. of Hrs. 10]

UNIT – IV

String matching: The naïve String matching algorithm, The Rabin-Karp Algorithm, String Matching with finite automata, The Knuth-Morris Pratt algorithm.

NP-Complete Problem: Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP –hard ,Case study of NP-Complete problems (vertex cover problem, clique problem).

[T1][R1] [No. of Hrs.: 10]

Text Books:

[T1] T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, "Introduction to Algorithms", 3rd Ed., PHI, 2013.

[T2] Jon Klenberg,Eva Tardos," Algorithm Design", Pearson Publications, 2014.

Reference Books:

[R1] Sara Basse, "introduction to Design & analysis",Pearson

[R2] Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Computer Algorithms/C++ "Second Edition, Universities Press.

[R3] A. V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Publication, 2013.

[R4] Richard Neapolitan, "Foundations of Algorithms" , Fifth Edition, Jones & Bartlett Learning

SOFTWARE ENGINEERING

Paper Code: ETCS-303	**L**	**T/P**	**C**
Paper: Software Engineering	**3**	**1**	**4**

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 improvise the concept to 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.

[T1][R1][R2][No. of Hrs.: 10]

UNIT – II

Software Project Planning:

Cost estimation, static single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management.

Software Requirements Specifications:

Problem Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software Requirement and Specifications, Behavioural and non-behavioural requirements, Software Prototyping.

[T1][R1][R2][No. of Hrs.: 11]

UNIT – III

Software Design:

Cohesion & Coupling, Classification, Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design.

Software Reliability:

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

[T1][R1][R2] [No. of Hrs.: 12]

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, Documentation.

[T1][R1][R2] [No. of Hrs.: 11]

TEXT BOOKS:

[T1] R. S. Pressman, "Software Engineering – A practitioner's approach", 3rd ed., McGraw Hill Int. Ed. 1992.

[T2] K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2001

Reference:

[R1] R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.

[R2] P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.

[R3] Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, 1996.

[R4] James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons

[R5] I. Sommerville, "Software Engineering ", Addison Wesley, 1999.