

SCHEME OF EXAMINATION

and

SYLLABI

for

**Bachelor of Technology
Information Technology**

Offered by

University School of Engineering and Technology

1st SEMESTER TO 8th SEMESTER



**Guru Gobind Singh Indraprastha University
Dwarka, Delhi – 110078 [INDIA]**

www.ipu.ac.in

**BACHELOR OF TECHNOLOGY
(COMMON TO ALL BRANCHES)
FIRST SEMESTER EXAMINATION**

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPERS						
ETMA-101		Applied Mathematics-I	3	1	4	M
ETPH-103		Applied Physics-I	2	1	3	M
ETME-105		Manufacturing Processes	3	0	3	M
ETEE-107		Electrical Technology	3	0	3	M
ETHS-109		Human Values and Professional Ethics-I#	1	1	1	--
ETCS-111		Fundamentals of Computing	2	0	2	--
ETCH-113		Applied Chemistry	2	1	3	M
PRACTICAL/VIVA VOCE						
ETPH-151		Applied Physics Lab-I	-----	2	1	
ETEE-153		Electrical Technology Lab	-----	2	1	M
ETME-155		Workshop Practice	-----	3	2	M
ETME-157		Engineering Graphics Lab	-----	3	2	
ETCS-157		Fundamentals of Computing Lab	-----	2	1	--
ETCH-161		Applied Chemistry Lab	-----	2	1	--
		NCC/NSS*#	-----	-----	-----	--
TOTAL			16	18	27	

M: Mandatory for award of degree

#NUES (Non University Examination System)

*#NCC/NSS can be completed in any one 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. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

**BACHELOR OF TECHNOLOGY
(COMMON TO ALL BRANCHES)
SECOND SEMESTER EXAMINATION**

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPERS						
ETMA-102		Applied Mathematics-II	3	1	4	M
ETPH-104		Applied Physics-II	2	1	3	
ETEC-106		Electronic Devices	3	0	3	M
ETCS-108		Introduction to Programming	3	0	3	M
ETME-110		Engineering Mechanics	2	1	3	--
ETHS-112		Communication Skills	2	1	3	--
ETEN-114		Environmental Studies	2	1	3	--
PRACTICAL/VIVA VOCE						
ETPH-152		Applied Physics Lab-II	-----	2	1	
ETCS-154		Programming Lab	-----	2	1	M
ETEC-156		Electronic Devices Lab	-----	2	1	M
ETME-158		Engineering Mechanics Lab	-----	2	1	--
ETEN-160		Environmental Studies Lab	-----	2	1	--
		NCC/NSS*#	-----	-----	-----	--
TOTAL			17	15	27	

M: Mandatory for award of degree

#NUES (Non University Examination System)

*#NCC/NSS can be completed in any one 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. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

**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 System)

**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-260		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 – 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)

**BACHELOR OF TECHNOLOGY
(INFORMATION TECHNOLOGY)
FIFTH SEMESTER EXAMINATION**

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPERS						
ETCS 301		Algorithms Design and Analysis	3	1	4	M
ETCS 303		Software Engineering	3	1	4	M
ETCS-307		Java Programming	3	1	4	
ETMS 311		Industrial Management	3	0	3	
ETIT-309		Communication Systems	3	1	4	
ETHS 301		Communication Skills for Professionals	2	0	1	
PRACTICAL/VIVA VOCE						
ETCS 351		Algorithms Design and Analysis Lab	0	2	1	
ETCS 353		Software Engineering Lab^	0	2	1	
ETCS 357		Java Programming Lab	0	2	1	
ETIT 359		Viva Industrial Training / In-house Workshop *	0	0	1	
ETIT 357		Communication Systems Lab	0	2	1	
ETHS 351		Communication Skills for Professionals Lab	0	2	1	
TOTAL			17	14	26	

M: Mandatory for award of degree

*Viva-Voce for evaluation of Industrial Training / In-house Workshop will be conducted in this semester.

^Using UML 2.0

**BACHELOR OF TECHNOLOGY
(INFORMATION TECHNOLOGY)
SIXTH SEMESTER EXAMINATION**

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPERS						
ETCS 302		Compiler Design	3	1	4	M
ETCS 304		Operating Systems	3	1	4	M
ETEC 310		Data Communication and Networks	3	1	4	M
ETCS 308		Web Engineering	3	0	3	
ETCS 310		Artificial Intelligence	3	1	4	
ETEE-310		Microprocessor and Microcontroller	3	1	4	
PRACTICAL/VIVA VOCE						
ETCS 352		Operating Systems (Linux Programming and Administration) Lab	0	2	1	
ETEC 358		Data Communication and Networks Lab	0	2	1	
ETCS 356		Web Engineering Lab	0	2	1	
ETEE 358		Microprocessor and Microcontroller Lab	0	2	1	
TOTAL			18	13	27	

M: Mandatory for award of degree

Note: Minimum of 4-6 weeks of industrial training related to CSE will be held after 6th semester; however, viva-voce will be conducted in 7th Semester (ETIT 461).

Imp:- Elective Paper will be floated in 7th Semester, if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 7th Semester is done before 15th April every year before end of 6th semester.

**BACHELOR OF TECHNOLOGY
(INFORMATION TECHNOLOGY)
SEVENTH SEMESTER EXAMINATION**

Code No.	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS					
ETIT-401		Advanced Computer Networks	3	1	4
ETIT-403		Cryptography and Network Security	3	0	3
ETEC-405		Wireless Communication	3	0	3
ELECTIVE (SELECT ANY TWO, ONE FROM EACH GROUP)					
GROUP-A					
ETEC-401		Embedded Systems	3	0	3
ETEC-403		Optoelectronics and Optical Communication	3	0	3
ETIT-407		Cloud Computing	3	0	3
ETIT-409		Distributed Databases	3	0	3
ETIT-411		Semantic Web Technologies	3	0	3
ETIT-413		Software Testing	3	0	3
ETIT-415		Digital Signal Processing	3	0	3
GROUP-B					
ETIT-419		.NET and C# Programming	3	0	3
ETIT-421		Enterprise Computing in Java	3	0	3
ETIT-423		System and Network Administration	3	0	3
ETIT-425		Grid Computing	3	0	3
ETIT-427		Advanced Database Administration	3	0	3
ETIT-429		Probabilistic Graphical Models	3	0	3
ETHS-419		Sociology and Elements of Indian History for Engineers	3	0	3
PRACTICAL/VIVA VOCE					
ETIT-453		Advanced Computer Networks Lab	0	2	1
ETIT-455		Cryptography and Network Security Lab	0	2	1
ETEC-463		Wireless Communication Lab	0	2	1
ETIT-459		Lab based on Elective Group– A or B	0	2	1
ETIT-461		Summer Training / Industrial workshop / Certification	0	0	1
ETIT-463		Minor Project+	0	6	3
TOTAL			15	15	24

Imp:- Elective Paper will be floated if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 8th Semester is done before 15th November every year before end of seventh semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.

+ The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.

**BACHELOR OF TECHNOLOGY
(INFORMATION TECHNOLOGY)
EIGHTH SEMESTER EXAMINATION**

Code No.	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS					
ETIT 402		Mobile Computing	3	1	4
ETEC 406		Ad hoc and Sensor Networks	3	0	3
ETHS 402		Human Values and Professional Ethics-II	1	0	1
ELECTIVE (SELECT ANY TWO, ONE FROM EACH GROUP)					
GROUP A					
ETIT-406		Big Data Analytics	3	0	3
ETIT-408		Social Network Analysis	3	0	3
ETIT-410		Soft Computing	3	0	3
ETIT-412		Bio Informatics	3	0	3
ETIT-414		Web Application development using .NET	3	0	3
ETIC-414		VLSI Design	3	0	3
ETIT-416		Information Theory and Coding	3	0	3
ETCS-404		Human Computer Interaction	3	0	3
GROUP B					
ETIT418		Digital Image Processing	3	0	3
ETIT420		Next Generation Networks	3	0	3
ETIT422		GPS and GIS	3	0	3
ETEC404		Satellite Communication	3	0	3
ETIT428		E-Commerce and M-Commerce	3	0	3
ETIT430		Distributed Systems	3	0	3
ETIT 432		Selected Topics of Recent Trends in Information Technology **	3	0	3
PRACTICAL/VIVA VOCE					
ETIT 452		Mobile Computing Lab	0	2	1
ETEC-458		Ad hoc and Sensor Networks Lab	0	2	1
ETIT 456		Lab based on Elective - I	0	2	1
ETIT 458		Lab based on Elective - II	0	2	1
ETIT-460		*Major Project	0	12	8
TOTAL			13	21	26

*The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports. Seminar related to major project should be delivered one month after starting of Semester. The progress will be monitored through seminars and progress reports.

**Syllabus may be revised after 2 years.

NOTE:

1. The total number of the credits of the B.Tech. (IT) Programme = 215.
2. Student shall be required to appear in examinations of all courses. However, to award the degree a student shall be required to earn a minimum of 200 credits including mandatory papers (M).

FOR LATERAL ENTRY STUDENTS:

1. The total number of the credits of the B.Tech. (IT) Programme = 161.
2. Each student shall be required to appear for examinations in all courses Third Semester onwards. However, for the award of the degree a student shall be required to earn a minimum of 150 credits, including mandatory papers (M).

NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF**B.TECH AND M.TECH**

1. **ET** stands for Engineering and Technology.
2. **PE** stands for Power Engineering.
3. **ME** stands for Mechanical Engineering.
4. **MT** stands for Mechatronics.
5. **AT** stands for Mechanical and Automation Engineering.
6. **EE** stands for Electrical and Electronics Engineering.
7. **EL** stands for Electrical Engineering.
8. **IT** stands for Information Technology
9. **CS** stands for Computer Science and Engineering
10. **CE** stands for Civil Engineering
11. **EC** stands for Electronics and Communications Engineering.
12. **EN** stands for Environmental Engineering
13. **TE** stands for Tool Engineering
14. **MA** stands for Mathematics
15. **HS** stands for Humanities and Social Sciences
16. **SS** stands for Social Services

APPLIED MATHEMATICS-III**Paper Code: ETMA-201****Paper: Applied Mathematics-III**

L	T/P	C
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 value 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 Methods: Solution of algebraic 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 formula for unequi-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

Paper: Foundation of Computer Science

L	T/P	C
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 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.

[T1,T2][No of hrs 11]

UNIT-IV

Groups, Symmetry, subgroups, normal subgroups, cyclic group, 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.

[T1,T2][No of hrs 11]

Text Books:

[T1] Norman L. Biggs, "Discrete Mathematics", Oxford, second edition.

[T2] Kenneth H. Rosen, "Discrete Mathematics 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

Paper: Switching Theory and Logic Design

L	T/P	C
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 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.

[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 partition-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

Paper: Circuits & Systems

L	T/P	C
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 waveform.

[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, tie set 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**Paper Code: ETCS-209****Paper: Data Structures**

L	T/P	C
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 – I:

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, 2-3 trees, 2-3-4 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 – List search, sequential search, binary search, hashing concepts, hashing methods (Direct, subtraction, modulo-division, mid-square, 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 . Ulman “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 Sartaz Sahani “Fundamentals of Computer Algorithms”, Computer Science Press.

COMPUTER GRAPHICS & MULTIMEDIA**Paper Code: ETCS-211****Paper: Computer Graphics & Multimedia**

L	T/P	C
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, Applications 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 Vector.

[T1,T2][No. of hrs. 11]**UNIT- III**

Shading Models, Flat shading, Gourard Shading, Phong Model. Visible surface detection, Back Face Detection, Depth Buffer (Z-Buffer, A-Buffer) 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, 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.

[T1,T2][No of hrs 11]**Text Books:**

- [T1] Donald Hearn and M.Pauline Baker, "Computer Graphics C version", 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**Paper Code: ETEE-257****Paper: Circuits and Systems Lab**

L	T	C
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.

DATA STRUCTURES LAB**Paper Code: ETCS-255****Paper: Data Structures Lab**

L	T/P	C
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 of a node with the roll number of student specified.
 - III. Reversal of that linked list.
4. Create doubly linked list with nodes having information about an employee and perform Insertion at front of doubly linked list and perform deletion at end of that doubly linked list.
5. Create circular linked list 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 using Graphics) perform Tree traversals (Preorder, Postorder, Inorder) using the concept of recursion.
9. Implement insertion, deletion and display (inorder, preorder and postorder) on 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, Bucket sort, Radix sort, Shell sort, Selection sort, Heap sort and Exchange sort using array as a data structure.

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

COMPUTER GRAPHICS & MULTIMEDIA LAB**Paper Code: ETCS-257****Paper: Computer Graphics & Multimedia Lab**

L	T	C
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:- At least 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, moments, 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, "Fundamentals of Mathematical Statistics", Pitambar 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 on "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 equip the students with the internal architecture, organization and design of computer systems.

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), 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.

[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 Transfers, 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", Morgan Kaufman, 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

Paper: Theory of Computation

L	T/P	C
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 (NFA), Equivalence of NFA 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 grammar, Normal forms for CFGs: 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, Computability and Intractability, time complexity, P, NP, Co-NP, Proof of Cook's Theorem, Space Complexity, SPACE, 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] Papadimitrou, 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

Paper: Database Management Systems

L	T/P	C
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 Ed., 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 – 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.

[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 hierarchy, derivation – public, private & protected; aggregation, composition vs classification hierarchies, polymorphism, categorization 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 multiple inheritance, persistent objects, streams 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 Oriented Modelling & Design”, Prentice Hall

[T2] A.R.Venugopal, Rajkumar, T. Ravishanker “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++”, Galgotia.

[R5] D . Parsons, “Object Oriented Programming with C++”,BPB Publication.

[R6] Steven C. Lawlor, “The Art of Programming Computer Science with C++”, Vikas Publication.

CONTROL SYSTEMS

Paper Code: ETEE- 212

Paper: Control Systems

L	T/P	C
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 in unity 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 closes 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 P, 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

Paper Code: ETMA-252
Paper: Applied Mathematics Lab

L	T/P	C
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. Patil & U.P. Verma, "Numerical Computational Methods", Narosa Publications
2. John C. Polking & David Arnold, "Ordinary Differential Equations using MATLAB", Pearson Publications
3. Rudra Pratap, "Getting Started With MatLab" Oxford University Press
4. Byrom Gottfried, "Programming With C" Shaum's Outline
5. Santosh Kumar, "Computer based Numerical & Statistical Techniques", S. Chand Publications.

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

COMPUTER ORGANIZATION & ARCHITECTURE LAB

Paper Code: ETCS-260	L	T/P	C
Paper: Computer Organization & Architecture Lab	0	2	1

List of Experiments:

Based on 8085 simulator

1. To draw and explain
 - i. Block diagram and pin diagram of 8085.
 - ii. Instruction set of 8085.
2. Write a program to perform :
 - i. Addition of two 8 bit numbers without carry.
 - ii. Addition of two 8 bit numbers with carry
3. Write a program to perform:
 - i. Subtraction of two 8 bit numbers without borrows.
 - ii. Subtraction of two 8 bit numbers with borrows.
4. Write a program to find 1's complement of an 8 bit number.
5. Write a program to find 2's complement of an 8 bit number.
6. Write a program to perform Multiplication of two 8 bit numbers.
7. Write a program to find to find the smallest and largest number from the given series.
8. Write a program to find sum of series of n consecutive numbers.
9. Write a program to find factorial of a number.
10. Write a program to reverse an 8 bit number.
11. Write a program to sort array in ascending/ descending order.
12. Write a program to perform division of two 8 bit numbers.

The instructor is advised to develop lab programs based on the learning concepts of architecture and insight into operating systems.

NOTE: - At least 8 Experiments from the syllabus must be done in the semester

DATABASE MANAGEMENT SYSTEMS LAB**Paper Code: ETCS-256****Paper: Database Management Systems Lab**

L	T/P	C
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 constrains
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 Experiments out of the list must be done in the semester.

OBJECT ORIENTED PROGRAMMING LAB**Paper Code: ETCS-258****Paper: Object Oriented Programming Lab**

L	T/P	C
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 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 override 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 and carriage return from a text 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**

L	T/P	C
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 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 circuits.
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.

ALGORITHMS DESIGN AND ANALYSIS**Paper Code: ETCS-301****Paper: Algorithms Design and Analysis**

L	T/P	C
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: Ingredients of Dynamic Programming, emphasis on optimal substructure , overlapping substructures, 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 of local and global optima, matroid, Activity selection problem, Fractional Knapsack problem, Huffman Codes, A task scheduling problem. Minimum **Spanning Trees:** Kruskal’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
Paper: Software Engineering

L	T/P	C
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 build 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 Requirement Analysis and 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 of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design.

Software Reliability:

Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calendar 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.

JAVA PROGRAMMING**Paper Code: ETCS-307****Paper: Java Programming**

L	T/P	C
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 learn object oriented concepts and enhancing programming skills.

UNIT I

Overview and characteristics of Java, Java program Compilation and Execution Process. Organization of the Java Virtual Machine, JVM as an interpreter and emulator, Instruction Set, class File Format, Verification, Class Area, Java Stack, Heap, Garbage Collection. Security Promises of the JVM, Security Architecture and Security Policy. Class loaders and security aspects, sandbox model

[T1,R2][No. of Hrs.: 11]**UNIT II**

Java Fundamentals, Data Types & Literals Variables, Wrapper Classes, Arrays, Arithmetic Operators, Logical Operators, Control of Flow, Classes and Instances, Class Member Modifiers Anonymous Inner Class Interfaces and Abstract Classes, inheritance, throw and throws clauses, user defined Exceptions, The String Buffer Class, tokenizer, applets, Life cycle of applet and Security concerns.

[T1,T2][No. of Hrs.: 12]**UNIT III**

Threads: Creating Threads, Thread Priority, Blocked States, Extending Thread Class, Runnable Interface, Starting Threads, Thread Synchronization, Synchronize Threads, Sync Code Block, Overriding Synced Methods, Thread Communication, wait, notify and notify all.

AWT Components, Component Class, Container Class, Layout Manager Interface Default Layouts, Insets and Dimensions, Border Layout, Flow Layout, Grid Layout, Card Layout Grid Bag Layout AWT Events, Event Models, Listeners, Class Listener, Adapters, Action Event Methods Focus Event Key Event, Mouse Events, Window Event

[T2][No. of Hrs.: 11]**UNIT IV**

Input/Output Stream, Stream Filters, Buffered Streams, Data input and Output Stream, Print Stream Random Access File, JDBC (Database connectivity with MS-Access, Oracle, MS-SQL Server), Object serialization, Sockets, development of client Server applications, design of multithreaded server. Remote Method invocation, Java Native interfaces, Development of a JNI based application.

Collection API Interfaces, Vector, stack, Hashtable classes, enumerations, set, List, Map, Iterators.

[T1][R1][No. of Hrs.: 10]**Text Books:**

[T1] Patrick Naughton and Herbertz Schidt, "Java-2 the complete Reference", TMH

[T2] Sierra & bates, "Head First Java", O'reilly

Reference Books:

[R1] E. Balaguruswamy, "Programming with Java", TMH

[R2] Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley.

[R3] Decker & Hirshfield, "Programming.Java", Vikas Publication.

INDUSTRIAL MANAGEMENT

Paper Code: ETMS-311
Paper: Industrial Management

L	T/P	C
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: The course provides a broad introduction to some aspects of business management and running of business organization.

UNIT I

Industrial relations- Definition and main aspects. Industrial disputes and strikes. Collective bargaining.

Labour Legislation- Labour management cooperation/worker's participation in management. Factory legislation. International Labour Organization.

[T1,T2][No. of Hrs. 10]**UNIT II**

Trade Unionism- Definition, Origin, Objectives of Trade Unions. Methods of Trade unions. Size and finance of Indian Trade unions-size, frequency distribution, factors responsible for the small size. Finance-sources of income, ways of improving finance.

[T1,T2][No. of Hrs. 10]**UNIT III**

Work Study-Method study and time study. Foundations of work study. Main components of method study. Time study standards. Involvement of worker's unions. Work Sampling. Application of work study to office work.

[T1,T2][No. of Hrs. 10]**UNIT IV**

Quality Management- What is Quality? Control Charts. Quality is everybody's job. Taguchi Philosophy. Service Quality. What is Total Quality Management (TQM)? Roadmap for TQM. Criticism of TQM. Six Sigma.

[T1,T2][No. of Hrs. 10]**Text Books:**

- [T1] Sinha, P.R.N., Sinha I.B. and Shekhar S.M.(2013), Industrial Relations, Trade Unions and Labour Legislation. Pearson Education
- [T2] Chary, S.N. (2012), Production and Operations Management. Tata McGraw Hill Education.

Reference Books:

- [R1] Srivastava, S.C. (2012), Industrial Relations and Labour Laws, Vikas Publishing
- [R2] Shankar R (2012), Industrial Engineering and Management. Galgotia Publications
- [R3] Telsang, M. (2006), Industrial Engineering and Production Management. S.Chand
- [R4] Thukaram, Rao (2004), M.E. Industrial Management. Himalaya Publishing House.

COMMUNICATION SYSTEMS

Paper Code: ETIT-309

Paper: Communication Systems

L	T/P	C
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 students with the knowledge of electronic communication there by enabling the student to obtain the platform for studying in communication system.

UNIT I

Introduction: Overview of Communication system, Communication channels, Mathematical Models for Communication Channels

Introduction of random Variables: Definition of random variables, PDF, CDF and its properties, joint PDF, CDF, Marginalized PDF, CDF, WSS wide stationery, strict sense stationery, non stationery signals, UDF, GDF, RDF, Binomial distribution, White process, Poisson process, Wiener process.

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

UNIT II

Analog Modulation: Modulation- Need for Modulation, Amplitude Modulation theory: DSB-SC, SSB, VSB. Modulators and Demodulators. Angle Modulation, Relation between FM and PM Wave. Generation of FM wave- Direct and Indirect Methods. Bandwidth of FM (NBFM, WBFM)

Pulse Analog Modulation: Sampling-Natural and Flat top. reconstruction, TDM-Pulse Amplitude Modulation (TDM-PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), Generation and Recovery.

Pulse Digital Modulation: Pulse Code Modulation (PCM), Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), ADPCM.

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

UNIT III

Digital Modulation and Transmission: Advantages of digital communication. Modulation schemes: ASK, PSK, FSK. Spectral Analysis. Comparison. Digital Signaling Formats-Line coding.

Information and Coding Theory: Entropy, Information, Channel Capacity. Source Coding Theorem: Shannon Fano Coding, Huffman Coding.

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

UNIT IV

Fiber Optical System: Basic Optical Communication System. Optical fibers versus metallic cables, Light propagation through optical fibers. Acceptance angle and acceptance cone, Fiber configurations. Losses in optical fibers. Introduction to Lasers and light detectors. Applications: Military, Civil and Industrial applications.

Advanced Communication Systems: Introduction to cellular radio telephones. Introduction to satellite Communication.

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

Text Books:

[T1] George Kennedy, "Electronics Communication System", TMH 1993

[T2] B.P. Lathi, "Analog & Digital Communication", Oxford University Press 1999.

Reference Books:

[R1] Simon Haykin, "Introduction to Analog & Digital Communication", Wiley, 2000

[R2] Tannenbaum, "Computer networks", PHI, 2003

[R3] K. Sam Shanmugam, "Digital & Analog Communication system", John Wiley & Sons 1998.

COMMUNICATION SKILLS FOR PROFESSIONALS

Paper Code: ETHS-301

L T/P C

Paper: Communication Skills for Professionals

2 0 1

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 develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. This course will also equip them with the basic skills required for a variety of practical applications of communication such as applying for a job, writing reports and proposals. Further, it will make them aware of the new developments in communication that have become part of business organisations today.

UNIT I

Organizational Communication: Meaning, importance and function of communication, Process of communication, Communication Cycle - message, sender, encoding, channel, receiver, decoding, feedback, Characteristics, Media and Types of communication, Formal and informal channels of communication, 7 C's of communication, Barriers to communication, Ethics of communication (plagiarism, language sensitivity)

Soft Skills: Personality Development, Self Analysis through SWOT, Johari Window, Interpersonal skills -Time management, Team building, Leadership skills. Emotional Intelligence. Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, Career planning, Self esteem.

[T1,T2][No. of Hrs. 08]

UNIT II

Introduction to Phonetics: IPA system (as in Oxford Advanced Learner's Dictionary), Speech Mechanism, The Description of Speech Sounds, Phoneme, Diphthong, Syllable, Stress, Intonation, Prosodic Features; Pronunciation; Phonetic Transcription - Conversion of words to phonetic symbols and from phonetic symbols to words. British & American English (basic difference in vocabulary, spelling, pronunciation, structure)

Non-Verbal Language: Importance, characteristics, types – Paralanguage (voice, tone, volume, speed, pitch, effective pause), Body Language (posture, gesture, eye contact, facial expressions), Proxemics, Chronemics, Appearance, Symbols.

[T1,T2][No. of Hrs. 08]

UNIT III

Letters at the Workplace – letter writing (hard copy and soft copy): request, sales, enquiry, order, complaint.

Job Application -- resume and cover letter

Meeting Documentation-- notice, memo, circular, agenda and minutes of meeting.

Report Writing - Significance, purpose, characteristics, types of reports, planning, organizing and writing a report, structure of formal report. Writing an abstract, summary, Basics of formatting and style sheet (*IEEE Editorial Style Manual*), development of thesis argument, data collection, inside citations, bibliography; Preparing a written report for presentation and submission. Writing a paper for conference presentation/journal submission.

[T1,T2][No. of Hrs. 08]

UNIT IV

Listening and Speaking Skills: Importance, purpose and types of listening, process of listening, difference between hearing and listening, Barriers to effective listening, Traits of a good listener, Tips for effective listening. Analytical thinking; Speech, Rhetoric, Polemics; Audience analysis. Telephone Skills - making and receiving calls, leaving a message, asking and giving information, etiquettes.

Presentations: Mode, mean and purpose of presentation, organizing the contents, nuances of delivery, voice and body language in effective presentation, time dimension.

Group Discussion: Purpose, types of GDs, strategies for GDs, body language and guidelines for group discussion.

Interview Skills: Purpose, types of interviews, preparing for the interview, attending the interview, interview process, employers expectations, general etiquettes.

[T1,T2][No. of Hrs. 07]

Text Books:

- [T1] Anna Dept. Of English. Mindscapes: English for Technologists & Engineers PB. New Delhi: Orient Blackswan.
- [T2] Farhathullah, T. M. Communication Skills for Technical Students. Orient Blackswan, 2002.

References Books:

- [R1] Masters, Ann and Harold R. Wallace. Personal Development for Life and Work, 10th Edition. Cengage Learning India, 2012.
- [R2] Institute of Electrical and Electronics Engineers. IEEE Editorial Style Manual. IEEE, n.d. Web. 9 Sept. 2009.
- [R3] Sethi and Dhamija. A Course in Phonetics and Spoken English. PHI Learning, 1999.
- [R4] Khera, Shiv. You Can Win. New York: Macmillan, 2003.

ALGORITHMS DESIGN AND ANALYSIS LAB**Paper Code: ETCS 351****Paper: Algorithms Design and Analysis Lab**

L	T/P	C
0	2	1

List of Experiments:

1. To implement following algorithm using array as a data structure and analyse its time complexity.
 - a. Merge sort
 - b. Quick sort
 - c. Bubble sort
 - d. Bucket sort
 - e. Radix sort
 - f. Shell sort
 - g. Selection sort
 - h. Heap sort
2. To implement Linear search and Binary search and analyse its time complexity.
3. To implement Matrix Multiplication and analyse its time complexity.
4. To implement Longest Common Subsequence problem and analyse its time complexity.
5. To implement Optimal Binary Search Tree problem and analyse its time complexity.
6. To implement Huffman Coding and analyse its time complexity.
7. To implement Dijkstra's algorithm and analyse its time complexity.
8. To implement Bellman Ford algorithm and analyse its time complexity.
9. To implement naïve String Matching algorithm, Rabin Karp algorithm and Knuth Morris Pratt algorithm and analyse its time complexity.

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

SOFTWARE ENGINEERING LAB**Paper Code: ETCS-353****Paper: Software Engineering Lab**

L	T/P	C
0	2	1

Tool Required: Rational Rose Enterprise Edition**List of Experiments:**

1. Write down the problem statement for a suggested system of relevance.
2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4. To perform the user's view analysis for the suggested system: Use case diagram.
5. To draw the structural view diagram for the system: Class diagram, object diagram.
6. To draw the behavioral view diagram : State-chart diagram, Activity diagram
7. To perform the behavioral view diagram for the suggested system : Sequence diagram, Collaboration diagram
8. To perform the implementation view diagram: Component diagram for the system.
9. To perform the environmental view diagram: Deployment diagram for the system.
10. To perform various testing using the testing tool unit testing, integration testing for a sample code of the suggested system.
11. 10 Perform Estimation of effort using FP Estimation for chosen system.
12. 11 To Prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Text Books:

1. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2005
2. Pankaj Jalote, "An Integrated Approach to Software Engineering", Second Edition, Springer.

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

JAVA PROGRAMMING LAB**Paper Code: ETCS-357****Paper: Java Programming Lab**

L	T/P	C
0	2	1

List of Experiments:

1. Create a java program to implement stack and queue concept.
2. Write a java package to show dynamic polymorphism and interfaces.
3. Write a java program to show multithreaded producer and consumer application.
4. Create a customized exception and also make use of all the 5 exception keywords.
5. Convert the content of a given file into the uppercase content of the same file.
6. Develop an analog clock using applet.
7. Develop a scientific calculator using swings.
8. Create an editor like MS-word using swings.
9. Create a servlet that uses Cookies to store the number of times a user has visited your servlet.
10. Create a simple java bean having bound and constrained properties.

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

COMMUNICATION SYSTEMS LAB**Paper Code: ETIT-357****Paper: Communication Systems Lab**

L	T/P	C
0	2	1

List of Experiments:

1. Generation of DSB-SC AM signal using balanced modulator.
2. Practical study of amplitude demodulation by linear diode detector
3. Generation of SSB AM signal.
4. Practical study of envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
5. To generate FM signal using voltage controlled oscillator.
6. To generate a FM Signal using Varactor & reactance modulation.
7. Detection of FM Signal using PLL & foster seelay method.
8. Practical study of Super heterodyne AM receiver and measurement of receiver parameters viz.sensitivity, selectivity & fidelity.
9. Practical study of Pre-emphasis and De-emphasis in FM.
10. Generation of Phase modulated and demodulated signal.

Simulations study of some of the above experiments using P-spice or Multisim softwares**NOTE: - At least 8 Experiments out of the list must be done in the semester**

COMMUNICATION SKILLS FOR PROFESSIONALS LAB

Paper Code: ETHS-351	L	T/P	C
Paper: Communication Skills for Professionals Lab	0	2	1

Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. These activities will enhance students' communication skills with a focus on improving their oral communication both in formal and informal situations. They will develop confidence in facing interviews and participating in group discussions which have become an integral part of placement procedures of most business organisations today.

Lab Activities to be conducted:

1. **Listening and Comprehension Activities** – Listening to selected lectures, seminars, news (BBC, CNN, etc.). Writing a brief summary or answering questions on the material listened to.
2. **Reading Activities** -- Reading different types of texts for different purposes with focus on the sound structure and intonation patterns of English. Emphasis on correct pronunciation.
3. **Conversation Activities**-- Effective Conversation Skills; Formal/Informal Conversation; Addressing higher officials, colleagues, subordinates, a public gathering; Participating in a video conference.
4. **Making an Oral Presentation**–Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Connecting with the audience during presentation; Projecting a positive image while speaking; Emphasis on effective body language.
5. **Making a Power Point Presentation** -- Structure and format; Covering elements of an effective presentation; Body language dynamics.
6. **Making a Speech** -- Basics of public speaking; Preparing for a speech; Features of a good speech; Speaking with a microphone. Famous speeches may be played as model speeches for learning the art of public speaking. Some suggested speeches: Barack Obama, John F Kennedy, Nelson Mandela, Mahatma Gandhi, Jawahar Lal Nehru, Atal Bihari Vajpayee, Subhash Chandra Bose, Winston Churchill, Martin Luther King Jr.
7. **Participating in a Group Discussion** -- Structure and dynamics of a GD; Techniques of effective participation in group discussion; Preparing for group discussion; Accepting others' views / ideas; Arguing against others' views or ideas, etc.
8. **Participating in Mock Interviews** -- Job Interviews: purpose and process; How to prepare for an interview; Language and style to be used in an interview; Types of interview questions and how to answer them.

Suggested Lab Activities:

1. Interview through telephone/video-conferencing
2. Extempore, Story Telling, Poetry Recitation
3. Mock Situations and Role Play; Enacting a short skit
4. Debate (Developing an Argument), News Reading and Anchoring.

Reference Books:

1. Patnaik, Priyadarshi. *Group Discussion and Interview Skills: With VCD*. Cambridge University Press India (Foundation Books), 2012 edition.
2. Kaul, Asha. *Business Communication*. PHI Learning: 2009.
3. Hartman and Lemay. *Presentation Success: A Step-by-Step Approach*. Thomson Learning, 2000.

Note: The Communication Skills Lab should be equipped with computers, microphones, an internet connection, overhead projector, screen, sound system, audio/video recording facilities, and seating arrangement for GDs and mock interviews. The student activities may be recorded and students may replay them to analyse and improve their pronunciation, tone, expressions, body language, etc.

Traditional language lab softwares are not mandatory and may be used by students to practice and enhance their language competence. Such softwares are usually elementary in nature and are mostly based on British/American English (pronunciation, accent and expression). They should preferably be in Indian English.

COMPILER DESIGN

Paper Code: ETCS-302
Paper: Compiler Design

L	T/P	C
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: This course aims to teach students the principles involved in compiler design. It will cover all the basic components of a compiler, its optimizations and machine code generation. Students will be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.

UNIT- I

Brief overview of the compilation process, structure of compiler & its different phases, lexical analyzer, cross compiler, Bootstrapping, quick & dirty compiler, Shift-reduce parsing, operator- precedence parsing, top-down parsing, predictive parsing, LL(1) and LL(k) grammar, bottom up parsing, SLR, LR(0), LALR parsing techniques.

[T1][T2][R1][No. of Hrs. 12]**UNIT- II**

Design and implementation of a lexical analyzer and parsing using automated compiler construction tools(eg. Lex, YACC, PLY), Syntax-directed translation schemes, implementation of syntax directed translations, intermediate code, postfix notation, three address code, quadruples, and triples, translation of assignment statements, Boolean expressions, control statements, Semantic Analysis, Type Systems, Type Expressions, Type Checker, Type Conversion

[T2][R1][R3][R4][R5][No. of Hrs. 12]**UNIT- III**

Symbol table, data structures and implementation of symbol tables, representing scope information. Run Time Storage Administration, implementation of a simple stack allocation scheme, storage allocation in block structured languages and non block structured languages, Error, Lexical-phase errors, syntactic-phase errors, semantic errors.

[T1][T2][R2][No. of Hrs. 10]**UNIT-IV**

The principle sources of optimization, loop optimization, the DAG representation of basic blocks, value number and algebraic laws, global dataflow analysis, Object programs, problems in code generation, a machine model, a single code generator, register allocation and assignment, code generation from DAGs, peephole optimization.

[T1][T2] [No. of Hrs. 10]**Text Books:**

- [T1] Alfred V. Aho & J.D. Ullman, "Compiler Principles, Techniques & Tools", Pearson
 [T2] Kenneth C. Loudon, "Compiler Design", Cengage Publication

Reference Books:

- [R1] Kakde O.G., "Compiler Design", Laxmi Publication
 [R2] Trembley and Sorenson, "Theory and Practice of Compiler Writing", McGraw Hill
 [R3] Vinu V. DAS, "Compiler Design Using FLEX and YACC", PHI
 [R4] Jhon R. Levine, Tony Mason and Doug Brown, "Lex & Yacc", O'Reilly.pdf
 [R5] Andrew W. Appel, Maia Ginsburg, "Modern Compiler Implementation in C", Cambridge University Press

OPERATING SYSTEMS

Paper Code: ETCS-304

Paper: Operating Systems

L	T/P	C
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 goal of this course is to provide an introduction to the internal operation of modern operating systems. The course will cover processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.*

UNIT I

Introduction: What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems, OS – A Resource Manager.

Memory Organization & Management: Memory Organization, Memory Hierarchy, Memory Management Strategies, Contiguous versus non- Contiguous memory allocation, Partition Management Techniques, Logical versus Physical Address space, swapping, Paging, Segmentation, Segmentation with Paging

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Thrashing, Demand Segmentation, and Overlay Concepts.

[T1] [T2][R2][R3] [No. of hrs. 10]

UNIT II

Processes: Introduction, Process states, process management, Interrupts, Interprocess Communication

Threads: Introduction, Thread states, Thread Operation, Threading Models.

Processor Scheduling: Scheduling levels, pre emptive vs no pre emptive scheduling, priorities, scheduling objective, scheduling criteria, scheduling algorithms, demand scheduling, real time scheduling.

Process Synchronization: Mutual exclusion, software solution to Mutual exclusion problem, hardware solution to Mutual exclusion problem, semaphores, Critical section problems. Case study on Dining philosopher problem, Barber shop problem etc.

[T1][T2][R3] [No. of hrs. 10]

UNIT III

Deadlocks: examples of deadlock, resource concepts, necessary conditions for deadlock, deadlock solution, deadlock prevention, deadlock avoidance with Bankers algorithms, deadlock detection, deadlock recovery.

Device Management: Disk Scheduling Strategies, Rotational Optimization, System Consideration, Caching and Buffering

[T1][T2][R1] [No. of hrs. 10]

UNIT IV

File System: Introduction, File Organization, Logical File System, Physical File System , File Allocation strategy, Free Space Management, File Access Control, Data Access Techniques, Data Integrity Protection, Case study on file system viz FAT32, NTFS, Ext2/Ext3 etc.

[T1] [T2][R4][R5] [No. of hrs. 10]

Text Books:

[T1] Deitel & Dietel, “Operating System”, Pearson, 3rd Ed., 2011

[T2] Silberschatz and Galvin, “Operating System Concepts”, Pearson, 5th Ed., 2001

[T3] Madnick & Donovan, “Operating System”, TMH,1st Ed., 2001

Reference Books:

[R1] Tannenbaum, “Operating Systems”, PHI, 4th Edition, 2000

[R2] Godbole, “Operating Systems”, Tata McGraw Hill, 3rd edition, 2014

[R3] Chauhan, “Principles of Operating Systems”, Oxford Uni. Press, 2014

[R4] Dhamdhare, “Operating Systems”, Tata McGraw Hill, 3rd edition, 2012

[R5] Loomis, “Data Management & File Structure”, PHI, 2nd Ed.

DATA COMMUNICATION & NETWORKS**Paper Code: ETEC-310**

L	T/P	C
3	1	4

Paper: Data Communication & Networks**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.

Objectives: The objective of the paper is to provide an introduction to the fundamental concepts on data communication and the design, deployment, and management of computer networks.

UNIT- I

Data Communications : Components, protocols and standards, Network and Protocol Architecture, Reference Model ISO-OSI, TCP/IP-Overview ,topology, transmission mode, digital signals, digital to digital encoding, digital data transmission, DTE-DCE interface, interface standards, modems, cable modem, transmission media-guided and unguided, transmission impairment, Performance, wavelength and Shannon capacity. Review of Error Detection and Correction codes.

Switching: Circuit switching (space-division, time division and space-time division), packet switching (virtual circuit and Datagram approach), message switching.

[T1, T2, R1, R4] [No. of Hours: 11]**UNIT- II**

Data Link Layer: Design issues, Data Link Control and Protocols: Flow and Error Control, Stop-and-wait ARQ. Sliding window protocol, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to –Point Access: PPP Point –to- Point Protocol, PPP Stack,

Medium Access Sub layer: Channel allocation problem, Controlled Access, Channelization, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, high-speed LANs, Token ring, Token Bus, FDDI based LAN, Network Devices-repeaters, hubs, switches bridges.

[T1, T2,R1][No. of Hours: 11]**UNIT- III**

Network Layer: Design issues, Routing algorithms, Congestion control algorithms, Host to Host Delivery: Internetworking, addressing and routing, IP addressing (class full & Classless), Subnet, Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6.

[T1, T2,R1][No. of Hours: 11]**UNIT- IV**

Transport Layer: Process to Process Delivery: UDP; TCP, congestion control and Quality of service.

Application Layer: Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Mail (SMTP), file transfer (FTP), HTTP and WWW.

[T2, T1, R1, R4][No. of Hours: 11]**Text Books:**

- [T1] A. S. Tannenbum, D. Wetherall, “Computer Networks”, Prentice Hall, Pearson, 5th Ed
 [T2] Behrouz A. Forouzan, “Data Communications and Networking”, Tata McGraw-Hill, 4th Ed

Reference Books:

- [R1] Fred Halsall, “Computer Networks”, Addison – Wesley Pub. Co. 1996.
 [R2] Larry L, Peterson and Bruce S. Davie, “Computer Networks: A system Approach”, Elsevier, 4th Ed
 [R3] Tomasi, “Introduction To Data Communications & Networking”, Pearson 7th impression 2011
 [R4] William Stallings, “Data and Computer Communications”, Prentice Hall, Imprint of Pearson, 9th Ed.
 [R5] Zheng , “Network for Computer Scientists & Engineers”, Oxford University Press
 [R6] Data Communications and Networking: White, Cengage Learning

WEB ENGINEERING

Paper Code: ETCS-308
Paper: Web Engineering

L	T/P	C
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: This paper gives understanding of web designing to the students.

UNIT - I

History of the Internet, Basic internet protocols, World Wide Web (W3C), HTTP: Hypertext Transfer Protocol.

Markup languages-XHTML: Introduction to HTML, basics of XHTML, HTML elements, HTML tags, lists, tables, frames, forms, defining XHTML's abstract syntax, defining HTML documents.

CSS style sheets: Introduction, CSS core syntax, text properties, CSS box model, normal flow box layout, other properties like list, tables, DHTML, XML, XML documents & vocabulary, XML versions & declarations, Introduction to WML.

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

UNIT – II

Client Side Programming: JAVA Scripts, basic syntax, variables & data-types, literals, functions, objects, arrays, built-in objects, JAVA Script form programming, Intrinsic event handling, modifying element style, document trees,

Server side programming – Java Servlets: Servlet architecture, life cycle, parameter data, sessions, cookies, servlet capabilities, servlets & concurrency. Introduction to JSP, JSP Tags, JSP life cycle, custom tags.

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

UNIT - III

Security Threats, Security risks of a site, Web attacks and their prevention, Web security model, Session management, authentication, HTTPS and certificates, Application vulnerabilities and defenses.

Client-side security, Cookies security policy, HTTP security extensions, Plugins, extensions, and web apps, Web user tracking.

Server-side security tools, Web Application Firewalls (WAFs) and Fuzzers.

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

UNIT – IV

Introduction to Web 2.0 and Web 3.0, Concepts and Issues, Latest Trends in Web Technologies. Web Security concerns. Applications of Web Engineering Technologies in distributed systems etc. Case studies using different tools.

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

Text Books:

[T1] Web Technologies: A Computer Science Perspective, Jackson, Pearson Education India, 2007.

[T2] Web Engineering: A Practitioner's Approach by Roger S Pressman, David Lowe, TMH, 2008.

Reference Books:

[R1] Achyut Godbole, Atul Kahate, "Web Technologies", McGraw-Hill Education, Third Edition.

[R2] Uttam K Roy, "Web Technologies", Oxford University Press, 2012.

[R3] Chris Bates, "Web Programming", Wiley

[R4] Web Engineering by Gertel Keppel, Birgit Proll, Siegfried Reich, Werner R., John Wiley.

[R5] Thinking on the Web: Berner's LEE, Godel and Turing, John Wiley & Sons Inc.

ARTIFICIAL INTELLIGENCE**Paper Code: ETCS-310****Paper: Artificial Intelligence**

L	T/P	C
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 learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

UNIT-I**Introduction:** Introduction to intelligent agents

Problem solving: Problem formulation, uninformed search strategies, heuristics, informed search strategies, constraint satisfaction Solving problems by searching, state space formulation, depth first and breadth first search, iterative deepening

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

UNIT-II

Logical Reasoning : Logical agents , propositional logic, inferences ,first-order logic, inferences in first order logic, forward chaining, backward chaining, unification , resolution

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

UNIT-III

Game Playing: Scope of AI -Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques- search knowledge, abstraction

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

UNIT-IV

Learning from observations: Inductive learning, learning decision trees, computational learning theory, Explanation based learning

Applications: Environmental Science, Robotics, Aerospace, Medical Sciences etc.

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

Text Book:

[T1] Rich and Knight, "Artificial Intelligence", Tata McGraw Hill, 1992

[T2] S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Edu.

Reference Books:

[R1] KM Fu, "Neural Networks in Computer Intelligence", McGraw Hill

[R2] Russel and Norvig, "Artificial Intelligence: A modern approach", Pearson Education

MICROPROCESSORS AND MICROCONTROLLERS

Paper Code: ETEE-310

Paper: Microprocessors and Microcontrollers

L	T/P	C
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 microprocessor systems and microcontroller.

UNIT- I

Introduction to Microprocessor Systems: Architecture and PIN diagram of 8085, Timing Diagram, memory organization, Addressing modes, Interrupts. Assembly Language Programming.

[T1][No. of hrs. 10]

UNIT- II

8086 Microprocessor: 8086 Architecture, difference between 8085 and 8086 architecture, generation of physical address, PIN diagram of 8086, Minimum Mode and Maximum mode, Bus cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts.

[T2][No. of hrs. :12]

UNIT- III

Interfacing of 8086 with 8255, 8254/ 8253, 8251, 8259: Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor.

[T1][No. of hrs. :12]

UNIT-IV

Overview of Microcontroller 8051: Introduction to 8051 Micro-controller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer's model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer & Counter Programming, Interrupt Programming.

[T3][No. of hrs. 11]

Text Books:

- [T1] Muhammad Ali Mazidi, "Microprocessors and Microcontrollers", Pearson, 2006
 [T2] Douglas V Hall, "Microprocessors and Interfacing, Programming and Hardware" Tata McGraw Hill, 2006.
 [T3] Ramesh Gaonkar, "MicroProcessor Architecture, Programming and Applications with the 8085", PHI

References Books:

- [R1] Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. MCKinlay "The 8051 Microcontroller and Embedded Systems", 2nd Edition, Pearson Education 2008.
 [R2] Kenneth J. Ayala, "The 8086 Microprocessor: Programming & Interfacing The PC", Delmar Publishers, 2007.
 [R3] A K Ray, K M Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw Hill, 2007.
 [R4] Vaneet Singh, Gurmeet Singh, "Microprocessor and Interfacing", Satya Prakashan, 2007.

OPERATING SYSTEMS (LINUX PROGRAMMING AND ADMINISTRATION) LAB

Paper Code: ETCS-352	L	T/P	C
Paper: Operating Systems (Linux Programming and Administration) Lab	0	2	1

List of Experiments:

1. Write a program to implement CPU scheduling for first come first serve.
2. Write a program to implement CPU scheduling for shortest job first.
3. Write a program to perform priority scheduling.
4. Write a program to implement CPU scheduling for Round Robin.
5. Write a program for page replacement policy using a) LRU b) FIFO c) Optimal.
6. Write a program to implement first fit, best fit and worst fit algorithm for memory management.
7. Write a program to implement reader/writer problem using semaphore.
8. Write a program to implement Banker's algorithm for deadlock avoidance.

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

DATA COMMUNICATION & NETWORKS LAB**Paper Code: ETEC-358****L T/P C****Paper: Data Communication & Networks Lab****0 2 1****List of Experiments:**

1. PC to PC Communication
2. Parallel Communication using 8 bit parallel cable & Serial communication using RS 232C
3. Ethernet LAN protocol
4. To create scenario and study the performance of CSMA/CD protocol through Simulation
5. To create scenario and study the performance of token bus and token ring protocols through simulation
6. To create scenario and study the performance of network with CSMA / CA protocol and compare with
7. CSMA/CD protocols.
8. Implementation and study of stop and wait protocol
9. Implementation and study of Go back-N and selective repeat protocols
10. Implementation of distance vector routing algorithm
11. Implementation of Link state routing algorithm.

All Practical can be conducted using C-Language and LAN Emulator.*NOTE:- At least 8 Experiments out of the list must be done in the semester.**

WEB ENGINEERING LAB**Paper Code: ETCS-356****Paper: Web Engineering Lab**

L	T/P	C
0	2	1

Web Engineering Lab experiment based on syllabus of (ETCS-308).**NOTE:- At least 8 Experiments from the syllabus must be done in the semester.**

MICROPROCESSORS AND MICROCONTROLLERS LAB

Paper Code: ETEE-358	L	T/P	C
Paper: Microprocessors and Microcontrollers Lab	0	2	1

List of Experiments:

1. Write a program to add and subtract two 16-bit numbers with/ without carry using 8086.
2. Write a program to multiply two 8 bit numbers by repetitive addition method using 8086.
3. Write a Program to generate Fibonacci series.
4. Write a Program to generate Factorial of a number.
5. Write a Program to read 16 bit Data from a port and display the same in another port.
6. Write a Program to generate a square wave using 8254.
7. Write a Program to generate a square wave of 10 kHz using Timer 1 in mode 1(using 8051).
8. Write a Program to transfer data from external ROM to internal (using 8051).
9. Design a Minor project using 8086 Micro processor (Ex: Traffic light controller/temperature controller etc)
10. Design a Minor project using 8051 Micro controller

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

ADVANCED COMPUTER NETWORKS**Paper Code: ETIT-401****Paper: Advanced Computer Networks**

L	T/P	C
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 different network protocols with emphasis on TCP/IP protocol suite.

UNIT-I**Network Layer:**

ARP,RARP,ICMP,IPv4 Routing Principles, Routing and overview, DVR and LSR, the IGRP and EIGRP, BGP, Routing Information Protocol (RIP), OSPF (IPv4 / IPv6).

Multicasting in IP Environments-Broadcasting, Multicasting, IGMP and Multicast Listener Discovery (MLD). The Distance Vector Multicast Routing Protocol (DVMRP), Multicast OSPF (MOSPF), Protocol Independent Multicast (PIM).

[T1][No. of Hours 10]**UNIT-II**

Transport Layer: Transport layer overview, UDP, TCP (Flow Control, Error Control, and Connection Establishment), TCP Protocol: TCP Tahoe, TCP Reno.

[R1, R3][No. of Hours 10]**UNIT-III****Optical Networking:**

Introduction to Optical networking, its benefits and drawbacks, SONET layered architecture, frame format, SONET network configuration, its advantages and benefits. **Quality of Service:** Introducing QoS, Queue Analysis, QoS Mechanisms, Queue Management algorithms, Resource Reservation, Diffserv and Intserv.

[T2] [No. of Hours 10]**UNIT-IV****Overview of latest concepts:**

TCP/IP Applications: VoIP, NFS, Telnet ,FTP,SMTP, SNMP, Finger, Whois and WWW, IP v6 and Next Generation Networks, xAAS(PAAS,SAAS,HAAS) and Cloud Computing, Big data, Elements of Social Network.

[R2][No. of Hours 12]**Text Books:**

- [T1] Douglas E. Comer, "Internet networking with TCP/IP", Pearson. TCP/IP, Vol. 2
 [T2] B. A. Forouzan, "TCP/IP Protocol Suite", TMH, 2nd Ed., 2004.

Reference Books:

- [R1] TCP/IP Illustrated, Volume 1 (The Protocols) by W. Richard Stevens, Pearson Education.
 [R2] U. Black, "Computer Networks-Protocols, Standards and Interfaces", PHI, 1996.
 [R3] W. Stallings, "Computer Communication Networks", PHI, 1999.

CRYPTOGRAPHY & NETWORK SECURITY**Paper Code: ETIT-403****Paper: Cryptography & Network Security**

L	T/P	C
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.

Objectives: Syllabus should be proposed so as to be covered in 42 to 45 lectures (assuming 14 or 15 weeks session). Syllabus should be evenly divided into 4 Units only.

UNIT- I:

Basic Cryptographic Techniques, Computational Complexity, Finite Fields, Number Theory, DES and AES, Public Key Cryptosystems, Traffic Confidentiality, Cryptanalysis, Intractable (Hard) Problems, Hash Functions, OSI Security Architecture Privacy of Data.

[T1, T2][No. of Hrs: 11]**UNIT- II:**

Linear Cryptanalysis, Differential Cryptanalysis, DES, Triple DES, Message Authentication and Digital Signatures, Attacks on Protocols, Elliptic Curve Architecture and Cryptography, Public Key Cryptography and RSA, Evaluation criteria for AES, Key Management, Authentication requirements Digital forensics including digital evidence handling: Media forensics, Cyber forensics, Software forensics, Mobile forensics.

[T1, T2][No. of Hrs: 11]**UNIT- III:**

Buffer Flow attack, Distributed Denial of service attack, Weak authentication, Design of Substitution Boxes (S-Boxes), Hash Functions, Security of Hash Functions, Secure Hash Algorithm, Authentication applications, Kerberos, IP security, Pretty Good Privacy (PGP), Web Security Light weight cryptography for mobile devices, Side channel attacks.

[T1, T2][No. of Hrs: 11]**UNIT- IV:**

System security, Security Standards, Intruders, and Viruses, Firewalls, Malicious software, Intrusion Detection System, Intrusion Prevention System, Trusted Systems, Virus Counter measures, Authentication Strategies.

[T1, T2][No. of Hrs: 11]**Text Book:**

- [T1] William Stallings, "Cryptography And Network Security - Principles and Practices", Prentice Hall of India, Third Edition, 2003.
- [T2] Wade Trappe, Lawrence C Washington, " Introduction to Cryptography with coding theory", 2nd ed, Pearson, 2007.

Reference Book:

- [R1] R.Rajaram, "Network Security and Cryptography" SciTech Publication, First Edition, 2013.
- [R2] Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003
- [R3] Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
- [R4] <http://www.iiitd.edu.in/~gauravg/>

WIRELESS COMMUNICATION**Paper Code: ETEC-405****Paper: Wireless Communication**

L	T/P	C
3	0	3

INSTRUCTIONS TO PAPER SETTER:**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 course is to introduce various wireless networks, mobile networks and their basic architecture starting from 2G through to 3G and 4G.

UNIT – I

Introduction To Wireless Communication Systems: Evolution of mobile radio communications; examples of wireless comm. systems; paging systems; Cordless telephone systems; overview of generations of cellular systems, comparison of various wireless systems.

Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.

Introduction to Wireless Channels and Diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Introduction to Diversity modeling for Wireless Communications

[T1,T2][No. of Hrs. 11]**UNIT - II**

2G Networks: Second generation, digital, wireless systems: GSM, IS_136 (D-AMPS), IS-95 CDMA. Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling, mobile management, voice signal processing and coding. **Spread Spectrum Systems-** Cellular code Division Access Systems-Principle, Power Control, effects of multipath propagation on code division multiple access.

[T1,T2][No. of Hrs. 11]**UNIT - III**

2.5G Mobile Data Networks: Introduction to Mobile Data Networks, General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes, EDGE, Wireless LANs, (IEEE 802.11), Mobile IP.

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G, Introduction to 4G.

[T1,T2][No. of Hrs. 11]**UNIT – IV**

Wireless Local Loop (WLL): Introduction to WLL architecture, WLL technologies. Wireless personal area networks (WPAN): Blue tooth, IEEE 802.15, architecture, protocol stack. Wi-Max, introduction to Mobile Adhoc Networks.

Global Mobile Satellite Systems, Case studies of IRIDIUM and GLOBALSTAR systems.

[T1,T2][No. of Hrs. 11]**Text Books:**

- [T1] Raj Pandya, "Mobile & Personnel communication Systems and Services", Prentice Hall India, 2001.
 [T2] Theodore S. Rappaport, "Wireless Communication- Principles and practices," 2nd Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.

Reference Books:

- [R1] T.L.Singhal "Wireless Communication", Tata McGraw Hill Publication.
 [R2] Jochen Schiller, "Mobile communications," Pearson Education Pvt. Ltd., 2002.
 [R3] Yi –Bing Lin & Imrich Chlamatac, "Wireless and Mobile Networks Architecture," John Wiley & Sons, 2001.
 [R4] Lee, W.C.Y., "Mobile Cellular Telecommunication", 2nd Edition, McGraw Hill, 1998.
 [R5] Smith & Collins, "3G Wireless Networks," TMH, 2007
 [R6] Schiller, Jochen, "Mobile Communications", 2nd Edition, Addison Wesley

EMBEDDED SYSTEMS

Paper Code: ETEC-401
Paper: Embedded Systems

L	T/P	C
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: The objective of the paper is to enable a student to design an embedded system for specific tasks.

UNIT- I

Overview of Embedded Systems: Characteristics of Embedded Systems. Comparison of Embedded Systems with general purpose processors. General architecture and functioning of micro controllers. 8051 micro controllers.

PIC Microcontrollers: Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals.

[T1][No. of hrs. 12]**UNIT- II**

ARM Processors: Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture.

Bus structure: Time multiplexing, serial, parallel communication bus structure. Bus arbitration, DMA, PCI, AMBA, I2C and SPI Buses.

[T2][No. of hrs. 12]**UNIT- III**

Embedded Software, Concept of Real Time Systems, Software Quality Measurement, Compilers for Embedded System.

[T3][No. of hrs. 10]**UNIT-IV**

RTOS: Embedded Operating Systems, Multi Tasking, Multi Threading, Real-time Operating Systems, RT-Linux introduction, RTOS kernel, Real-Time Scheduling.

[T3][No. of hrs. 10]**Text Book:**

- [T1] Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002
 [T2] ARM System Developer's Guide: Designing and Optimizing System Software, Andrew N. Sloss, Dominic Symes, Chris Wright, Morgan Kaufman Publication, 2004.
 [T3] Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000

References Books:

- [R1] The Design of Small-Scale embedded systems, Tim Wilmshurst, Palgrave2003
 [R2] Embedded System Design, Marwedel, Peter, Kluwer Publishers, 2004.

OPTOELECTRONICS AND OPTICAL COMMUNICATION

Paper Code: ETEC-403

Paper: Optoelectronics and Optical Communication

L	T/P	C
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 12.5 marks

Objective: The objective of this paper is to introduce the student about Optical Fiber, Wave propagation, Detectors and its structures and functions.

UNIT - I

Introduction: Optical Fiber: Structures, Wave guiding and Fabrication – Nature of light, Basic optical laws and Definition, Optical fiber modes and Configuration, Mode theory for circular waveguides, Single mode fibers, Graded index fiber, Fiber materials, Fabrication and mechanical properties, Fiber optic cables, Basic Optical Communication System, Advantage of Optical Communication System .

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

UNIT – II

Attenuation in Optical Fibers: Introduction, Absorption, Scattering, Very Low Loss Materials, All Plastic & Polymer-Clad-Silica Fibers.

Wave Propagation: Wave propagation in Step-Index & Graded Index Fiber, Overall Fiber Dispersion-Single Mode Fibers, Multimode Fibers, Dispersion-Shifted Fiber, Dispersion, Flattened Fiber, Polarization.

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

UNIT – III

Source & Detectors: Design & LED's for Optical Communication, Semiconductor Lasers for Optical Fiber Communication System and their types, Semiconductor Photodiode Detectors, Avalanche Photodiode Detector & Photo multiplier Tubes. Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling. Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers .

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

UNIT – IV

Optical Fiber Communication Systems: Data Communication Networks – Network Topologies, Mac Protocols, Analog System. Advanced Multiplexing Strategies – Optical TDM, Sub carrier Multiplexing, WDM Network. Architectures: SONET/SDH. Optical Transport Network, Optical Access Network, Optical Premise Network. **Applications**-Military Applications, Civil, Consumer & Industrial Applications.

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

Text Books:

- [T1] J. Gowar, "Optical Communication System", IEEE Press – 2nd Edition.
 [T2] R.P.Khare, "Fiber Optics and Opto Electronics" Oxford Publication

Reference Books:

- [R1] Optical Information Processing – F. T. S. Yu – Wiley, New York, 1983
 [R2] G. P. Agrawal, Fiber optic Communication Systems, John Wiley & sons, New York, 1992
 [R3] A. Ghatak, K. Thyagarajan, "An Introduction to Fiber Optics", Cambridge University Press
 [R4] J. H. Franz & V. K. Jain, "Optical Communication Components & Systems", Narosa Publish, 2013
 [R5] John M. Senior, "Optical Fiber Communications", Pearson, 3rd Edition, 2010.

CLOUD COMPUTING**Paper Code: ETIT-407****Paper: Cloud Computing**

L	T/P	C
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 12.5 marks

Objective: To enable students to understand the basic concepts of Cloud Computing and to apply these concepts for designing, evaluating, simulations and comparing various applications in Cloud Computing.

UNIT I**Introduction to Cloud Computing**

Overview of Parallel Computing, Grid Computing, Distributed Computing and its Variants (eg. MANETs, Peer to Peer, Cloud), Introduction to Autonomic Computing, Evolution of Cloud Computing and its vision, Issues and Challenges in Cloud Computing, Applications of Cloud Computing.

[T1, T2][No. of Hours: 10]**UNIT II****Cloud Computing Architecture**

Cloud Computing Architectures: features of Clouds: components, types, technologies, Service Models (Services: IaaS, PaaS, SaaS), Deployment Models (Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud) various cloud management platforms and tools.

[T1, T2][No. of Hours: 12]**UNIT III****Virtualization of Clouds**

Virtualization: Introduction, Evolution, Virtualized Environment characteristics, Server Virtualization, VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions. Cloud Security Mechanisms (Encryption, PKI, SSO, IAM), Service Management in Cloud Computing (SLA, Billing & Accounting etc).

[T1, T2][No. of Hours: 12]**UNIT IV****Advanced Cloud Applications**

Specialized Cloud Architecture: Direct I/O Access, Load Balanced Virtual Switches, Multipath Resource Access, Federated Clouds, Basics of Cloud Mobility, Enterprise cloud computing: Data, Processes, Components, Architectures, applications, Enterprise Software (ERP, SCM, CRM)

Case Studies on Open Source and Commercial available tools and platforms (Microsoft Azure, Google AppEngine, Amazon Web services, Hadoop, Eucalyptus, Cloud SIM etc).

[T1, T2][No. of Hours: 11]**Text Books:**

- [T1] Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Mastering Cloud Computing, Tata McGraw Hill, New Delhi, India, 2013.
- [T2] Thomas Erl, Zaigam Mahmood, Ricardo Puttini, Cloud Computing Concepts, Technology & Architecture, 1st Reprint, Pearson India, 2013 (T2)
- [T3] Kumar Saurabh, Cloud Computing, 2nd Edition, Wiley, 2013 (T3)
- [T4] Gautam Shroff, "Enterprise Cloud Computing", Cambridge University Press.

Reference Books:

- [R1] Barrie Sosinsky, Cloud Computing Bible, Wiley
- [R2] A. Srinivasan and J. Suresh, Cloud computing a practical approach for learning and Implementation, Pearson India 1st edition
- [R3] Michael Miller, Cloud Computing, Pearson, 2008.
- [R4] Mukesh Singhal, Niranjan G. Shivaratri, TMH Edition. (Must be included for the basics of distributed systems basics from which all distributed systems have been originated).

DISTRIBUTED DATABASES**Paper Code: ETIT-409****Paper: Distributed Databases**

L	T/P	C
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: The objective of this paper is to facilitate the student with principles and foundations of Distributed databases.

UNIT I

Architecture of distributed systems: network operating system, distributed operating systems, Distributed database systems. (a) Federated database systems, (b) multi database systems, and (c) Client/Server systems, Distributed DBMS architecture.

Distributed database design: Top down design- Designing issues, Fragmentation, Allocation, Data dictionary, Bottom up design- Schema Matching, Schema Integration, Schema Mapping, Data Cleaning

Data and Access Control: views in centralised and distributed DBMS, Data security, Semantic Integrity Control.

[T1, R1][No. of Hours: 10]**UNIT II**

Query Processing: Characterization of query processors, Layers of query processing, Query Decomposition: Normalization, Analysis, Elimination of redundancy,

Data Localization: Reduction of primary horizontal fragmentation, Reduction of vertical fragmentation, reduction of derived fragmentation, hybrid fragmentation.

Optimization of Distributed Query: Join ordering, Semi join based algorithms, optimization

[T1, T2][No. of Hours: 11]**UNIT III**

Transaction Management: Properties of transactions, Types of transactions- flat transactions, nested transactions, workflow.

Distributed Concurrency Control: Serializability theory, Locking based concurrency control Algorithm, Tim-stamp based algorithms,

Deadlock Management: Prevention, Avoidance, Detection and Resolution

[T1, T2][No. of Hours: 10]**UNIT IV**

Distributed DBMS Reliability: Local Reliability protocol, Distributed Reliability protocol- two phase commit protocol, three phase commit protocol.

Parallel Database System: System architecture, Parallel query processing, Load Balancing, Database Clusters. Web Data Management: Web Search-crawling, indexing ranking, Web Querying, Distributed XML Processing.

[T1, R2][No. of Hours: 11]**Text Books:**

[T1] Principles of Distributed Database Systems. Ozsu and Valduriez. Prentice Hall.

[T2] Distributed Database Principles and Systems. Ceri and Pelagatti. McGraw Hill.

Reference Books:

[R1] Distributed Systems: Concept and Design. Coulouris, Dollimore, and Kindberg. AW.

[R2] Recovery Mechanisms in Database Systems. Kumar and Hsu, Prentice Hall.

[R3] Concurrency Control and Recovery in Database Systems. Bernstein, Hadzilacos and Goodman, AW

SEMANTIC WEB TECHNOLOGIES**Paper Code: ETIT-411****Paper: Semantic Web Technologies**

L	T/P	C
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: This is the aim behind the Semantic Web, which is also being referred to as Web 3.0 and which is heavily embedded in the Artificial Intelligence area. Its long-term goal is that of enhancing the human and machine interaction by representing the data in an understandable way for the machine.

UNIT-I

Introduction: Why Semantics-Data integration across the web, Traditional data modelling methods, semantic relationships, metadata, Building models, Calculating with knowledge, Exchanging information, Semantic web technology.

[T1, T2][No. of Hours: 10]**UNIT-II**

RDF Resource description language: Simple Ontology's in RDF and RDF schema- Introduction, syntax for RDF, advanced features, Simple ontology's in RDF schemas.

RDF Formal semantics: Why semantics, Model theoretic semantic for RDF(S), Semantic reasoning with deduction rules, the semantic limits of RDF(S).

[T1, T2][No. of Hours: 12]**UNIT-III**

Web Ontology Languages (OWL): OWL syntax and intuitive semantics, owl species, Description logics, Model theoretic semantics of owl, Automated Reasoning with OWL.

[T1, T2][No. of Hours: 10]**UNIT-IV**

Rules and Queries: Ontology and Rules-What is Rule, Data log as a first order rule language, Combining Rules with OWL-DL, Rule interchange format RIF.

Query Language: SPARQL-Query language for RDF, Conjunctive queries for OWL-DL.

[T1, T2][No. of Hours: 12]**Text Books:**

- [T1] Foundation Of Semantic Web Technology:-Pascal Hitzler, Marcus Krotzsch, Sebastian Rudolph.by Chapman and Hall Book(CRC Press).
- [T2] Programming The Semantic Web:-Toby Segaran, Colin Evans, Jamie Taylor by O'Reilly Media Publication.

Reference Books:

- [R1] A Semantic Web Primer MIT Press.
- [R2] Knowledge Representation: Logical, Philosophical, and Computational Foundations, John Sowa,(ISBN-13:978-0534949655)
- [R3] Foundations of Semantic Web Technologies, Pascal Hitzler, Markus Krotzsch, Sebastian Rudolph (ISBN:978-1-4200-9059-5).
- [R4] Agency and the Semantic Web, Christopher Walton, ISBN-13: 978-0199292486.
- [R5] Artificial Intelligence: A Modern Approach, 3rd Edition, Stuart Russell, Peter Norvig (ISBN-13:978-0-13-604259-4).

SOFTWARE TESTING

Paper Code: ETIT-413
Paper: Software Testing

L	T/P	C
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 introduce the students about the knowledge of software testing, types of testing and testing tools.

UNIT I

Introduction: What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.

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

UNIT II

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

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

UNIT III

Reducing the number of test cases:

Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing

Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

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

UNIT IV

Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Testing Tools: Static Testing Tools, Dynamic Testing Tools, Characteristics of Modern Tools.

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

Text Books:

- [T1] William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995.
- [T2] Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
- [T3] Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
- [T4] Louise Tamres, "Software Testing", Pearson Education Asia, 2002

Reference Books:

- [R1] Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.
- [R2] Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.
- [R3] K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, New Delhi, 2003.
- [R4] Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994.
- [R5] Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990.
- [R6] Watts Humphrey, "Managing the Software Process", Addison Wesley Pub. Co. Inc., Massachusetts, 1989.
- [R7] Boris Beizer, "Software System Testing and Quality Assurance", Van Nostrand Reinhold, New York, 1984.
- [R8] Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.

DIGITAL SIGNAL PROCESSING**Paper Code: ETIT-415****Paper: Digital Signal Processing**

L	T/P	C
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.

Objectives: The aim of this course is to provide in depth knowledge of various digital signal processing techniques and design of digital filters, learn the concept of DFT FFT algorithms, and design of digital filters using different approximations, DSP processor and architecture. The prerequisites of this subject are basic knowledge of signal and systems.

UNIT-I:

Frequency Domain Sampling: The Discrete Fourier Transform, Properties of the DFT, Linear filtering methods based of the DFT.

Efficient computation of the DFT: Principal Of FFT, Fast Fourier Transform Algorithms, Applications of FFT Algorithms, A linear filtering approach to computation of the DFT.

Application of DFT, Design of Notch filter

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

UNIT-II:

Design & Structure of IIR filters from analog filters: Impulse Invariance; Bilinear transformation and its use in design of Butterworth and Chebyshev IIR Filters; Frequency transformation in Digital Domain, Direct, Cascade, Parallel & transposed structure

Design & structure of FIR filters: Symmetric and anti-symmetric FIR filters; Design of Linear Phase FIR filters using windows, Frequency Sampling Method of FIR design, Direct, Cascade, Frequency Sampling, transposed structure

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

UNIT-III:**Implementation of Discrete Time Systems:**

Lattice structures, Lattice and Lattice-Ladder Structures, Schur - Cohn stability Test for IIR filters; Discrete Hilbert Transform.

Linear predictive Coding:

Lattice filter design, Levenson Darwin Technique, Schur Algorithm

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

UNIT-IV:

Quantization Errors in Digital Signal Processing: Representation of numbers, Quantization of filter coefficients, Round-off Effects in digital filters.

Multirate Digital Signal Processing: Decimation, Interpolation, Sampling rate conversion by a rational factor; Frequency domain characterization of Interpolator and Decimator; Polyphase decomposition.

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

Text Books:

[T1] Oppenheim & Schaffer, Digital Signal Processing, PHI-latest edition.

[T2] Proakis and Manolakis, Digital Signal Processing, PHI Publication

Reference Books:

[R1] S. K. Mitra, Digital Signal Processing, TMH edition 2006

[R2] Johnny. R. Johnson, Introduction to Digital Signal Processing, PHI-latest edition

[R3] R.Babu ,Digital Signal Processing , SciTech Publication.

.NET AND C# PROGRAMMING**Paper Code: ETIT-419****Paper: .NET and C# Programming**

L	T/P	C
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: This course provides a solid foundation in the C# programming language, and covering the fundamental skills that are required to design and develop object-oriented applications for the web and Microsoft Windows by using Microsoft Visual C# .NET and the Microsoft Visual Studio .NET development environment.

UNIT I

MS.NET Framework Introduction: Framework Components, Framework Versions, Types of Applications which can be developed, Base Class Library, Namespaces, MSIL / Metadata and PE files, The Common Language Runtime (CLR), Managed Code, MS.NET Memory Management / Garbage Collection, Common Type System (CTS), Common Language Specification (CLS), Types of JIT Compilers, Security Manager, control application development

Language basics: Why Datatypes, Global, Stack and Heap Memory, Reference Type and Value Type, Datatypes & Variables Declaration, Implicit and Explicit Casting, Checked and Unchecked Blocks – Overflow Checks, Casting between other datatypes, Boxing and Unboxing, Enum and Constant, Operators, Control Statements, Working with Arrays and methods.

[T1, T2] [No. of Hours: 11]**UNIT II**

Introduction to Object Oriented Features: What is an Object, state of an Object, Lifecycle of an Object, relationship between Class and Object, define Application using Objects, Principles of Object Orientation, Encapsulation, Inheritance, Polymorphism, Encapsulation is binding of State and Behaviour together, Inheritance is based on “is a” relationship, Understanding Polymorphism with Examples.

Constructor & Destructor, Working with "static" Members, Constructor in Inheritance, Type Casting of Reference Types, Static and Dynamic Binding and Virtual Methods, Abstract Class Object as Parent of all classes, Interface, Syntax for Implementation of Interface, Explicit Implementation of Interface members, Types of Inheritance, exceptional handling.

[T1, T2] [No. of Hours: 10]**UNIT III**

Working with Collections and Generics: IList and IDictionary, typesafety issue with ArrayList and Hashtable classes, IEnumerable and IEnumerator, Sorting Items in the collection using IComparable, custom generic classes, Generic Collection Classes.

Operator Overloading, Partial Classes, Importance of Attributes, working with components/assemblies, data stream and files: text stream, binary stream, working with file system, Serialization & Deserialization, multithreading.

[T1, T2] [No. of Hours: 11]**UNIT IV**

WinForms: Introduction, Controls, Menus and Context Menus, Menu Strip, Toolbar Strip, Graphics and GDI, SDI and MDI Applications, Dialog box, Form Inheritance, Developing Custom, Composite and Extended Controls, Data Access using ADO.NET, Data Access using ADO.NET- dataset, XML, debugging and tracing, Delegates & Events: Delegate Declaration, Sample Application, Chat Application using Delegates, += and -= Operator (Events), Chat Application using Delegates and Events, General Syntax for Delegates and Events.

[T1, T2] [No. of Hours: 12]**Text Books:**

- [T1] Stephen Walther, "ASP.NET 3.5 Unleashed or ASP.NET 4.5 Unleashed," Pearsons Publication,
- [T2] George Shepherd, "Microsoft ASP.NET 3.5 Step by Step", PHI learning Publication Eastern Economy
- [T3] Chris Love, Marco Bellinaso, "ASP.NET 3.5 Website Programming Problem - Design – Solution," Wrox publication 2012

Reference Books:

- [R1] George Shepherd, "Microsoft ASP.NET 4.0 Step by Step", PHI learning Publication Eastern Economy
- [R2] Imar Spaanjaars, "Beginning ASP.NET 3.5 In C# and VB," Wiley / Wrox publication, 2009
- [R3] Bill Evjen, Scott Hanselman, Devin Rader, "Professional ASP.NET 3.5 in C# and VB," Wiley publication, 2008
- [R4] Matthew MacDonald, "The Complete Reference: ASP.NET", Tata McGraw Hill, 2002.
- [R5] Jason N. Gaylord et al, "Professional ASP.NET 4.5 in C# and VB," wrox publication, 2013



ENTERPRISE COMPUTING IN JAVA**Paper Code: ETIT-421****Paper: Enterprise Computing in JAVA**

L	T/P	C
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: In this course student will learn about J2EE technology and will be able to develop dynamic websites. This course will explain how Enterprise JavaBeans (EJBs) contain the application's business logic and business data.

Pre-requisites: Core java**UNIT I**

Introduction to J2EE and building J2EE applications, MVC architecture, Introduction to servlets and its life cycle , problems with cgi-perl interface , generic and http servlet , servlet configuration, various session tracking techniques, servlet context, servlet configuration, servlet collaboration.

[T1, T2] [No. of Hours: 10]**UNIT II**

JSP Basics and Architecture: JSP directives, Scripting elements, standard actions, implicit objects, JSP design strategies.

Struts: Introduction of Struts and its architecture, advantages and application of Struts.

[T1, T2] [No. of Hours: 12]**UNIT III**

EJB Fundamentals: Motivation for EJB, EJB Echo system, J2EE technologies, Enterprise beans and types, distributed objects and middleware, developing EJB components, remote local and home interface, bean class and deployment descriptor.

[T1, T2] [No. of Hours: 10]**UNIT IV**

Introducing session beans: Session beans life time, statefull and Stateless session beans, lifecycle of session beans.

Introducing Entity beans: Persistence concepts, features of entity beans, entity context,

Introduction to JMS & Message driven beans.

[T1, T2] [No. of Hours: 10]**Text Books:**

[T1] Ed Roman, Scott W Ambler, Tyler Jewell, "Mastering Enterprise Java Beans", Wiley, 2nd Ed., 2005.

[T2] Govind Sesadri , "Enterprise Java Computing: Application and Architectures", Cambridge University Publications, 1999.

Reference Books:

[R1] Ted Neward, "Effective Enterprise Java", Addison -Wesley, 2004.

[R2] Jim Farley, William Crawford, " Java Enterprise in a Nutshell", O'Reilly and Associates, 3rd Ed.

[R3] Austin Sincock , "Enterprise Java for SAP" , A Press Publications.

[R4] Joe Wigglesworth and McMilan Paula, "Java Programming: Advanced Topic", Thomson, 3rd Ed., 2003.

[R5] Subrahmanyam Allamaraju, Cedric Buest, "Professional Java Server Programming, J2EE, Apress, 1.3 Ed., 2005.

[R6] Ivan Bayross and Sharanam Shah, "Java Server Programming", Shroff.

[R7] John Hunt and Chris Loftus, "Guide to J2EE: Enterprise Java" Springer Verlag Publications.

[R8] Govind Seshadri, "Enterprise Java Computing: Application and Architectures", Cambridge University Press, 1999.

SYSTEM AND NETWORK ADMINISTRATION

Paper Code: ETIT-423

Paper: System and Network Administration

L	T/P	C
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: This course is intended for B.Tech students, who wish to improve skills through hands-on experience in System Administration and Network Administration.

System Administration:

UNIT- I

System Hardware: PC and Server Hardware Architecture, Operating System Administration: UNIX, Windows, MAC OS.

Centralization and Decentralization: Centralized Authentication, Active Directories; LDAP;

Storage: RAID, Storage Area Network (SAN), Direct Attached Storage (DAS), Network Attached Storage (NAS); Data Integrity Backup and Recovery.

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

UNIT- II

Lab Management: System Configuration, Cloning, Monitoring and Administering them; workstations, server, Data centers Data Center Management: Administering, Surveillance, Access Control,

Special Topics: High Performance Computing, Virtualization and Cloud Computing.

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

Network Administration:

UNIT- III

Network administrator (definition and functions), Network Planning, Routine system maintenance

Computer Networks: OSI & TCP/IP Model, clean architecture;

Switching & Routing: Layer 2 & Layer 3 switching; Routing; VLAN; Cisco L2 and L3 Switch Configuration; DHCP Configuration; IPv6, Wireless LAN: 802.11 a/b/g/n/ac WiFi; Access Point and Wireless Router configuration.

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

UNIT-IV

Internet Architecture: ISP Architecture; DNS Resolution; Content Mirroring, Internet Applications: DNS, Web, Mail, Proxy, NTP;

Perimeter Security: Firewall, UTM,

Network Security: LAN and WLAN Security issues; IP Spoofing; Dictionary Attack; DoS and DDoS Attack; Rogue/Misconfigured/External APs; Network Troubleshooting: ping, traceroute, nslookup, dig, tcpdump; Network Monitoring: SNMP; MRTG.

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

Text Books:

- [T1] Thomas A Limoli, Christina J. Hogan , Strata R. Chalup " Theory and Practise of System and Network administration " Addison-Wesley Professional; 2 edition 2007
- [T2] Subramaniam Mani, Subramanian " Network Management: Principles And Practice" Pearson Education India, 2006

References Books:

- [R1] Evi Nemeth, Garth Snyder, Trent R. Hein , Ben Whaley "UNIX and Linux System Administration Handbook" (4th Edition), 2010
- [R2] Craig Hunt, "TCP/IP Network Administration" "O'Reilly Media, Inc.", 2002
- [R3] Bill McCarty Learning Red Hat Linux "O'Reilly Media, Inc.", 2003

GRID COMPUTING

Paper Code: ETIT-425
Paper: Grid Computing

L	T/P	C
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 enable students to understand the basic concepts of Grid computing with performance issues, Web services, monitoring, optimization, security and resource management.

UNIT I

Fundamentals: Overview of Distributed Systems and its variants like grid computing, cloud computing, Cluster Computing etc. Introduction to Grid Computing, its components (Functional View, A Physical View, Service View), key issues and benefits, Characterization and Architecture of Grid, Grid - Types, Topologies, Components, Layers. Grid Computing Standards and Applications.

[T1, T2] [No. of Hours: 11]**UNIT II**

Web Services and Grid Monitoring: OGSA and WSRF: Overview, Services, Schema and architecture. Grid Monitoring Systems: Overview, architecture, GridICE, JAMM, MDS and Other monitoring Systems (Ganglia and GridMon), Grid portals.

[T1, T2] [No. of Hours: 11]**UNIT III**

Grid Security and Resource Management:

Grid Security: A Brief Security Primer, PKI, X509 Certificates, Grid Security

Grid Scheduling and Resource Management: Scheduling Paradigms, Working principles of Scheduling, A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

[T1, T2] [No. of Hours: 11]**UNIT IV**

Data Management and Grid Middleware-

Data Management: Categories and Origins of Structured Data, Data Management, Challenges, Database integration with grid, Architectural Approaches-Collective Data Management Services, Federation Services . Grid Middleware: List of globally available Middlewares, Globus Toolkit.

[T1, T2] [No. of Hours: 11]**Text Books:**

- [T1] Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons.
 [T2] Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson 2004.
 [T3] Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrastructure, Morgan Kaufman – 2004.

References Books:

- [R1] C.S. R. Prabhu, "Grid and Cluster Computing", PHI 2014
 [R2] Barry Wilkinson, "Grid Computing", CRC Press.
 [R3] Joel M. Crichlow, "Distributed Systems – Computing over Networks", PHI, 2014.
 [R4] RajKumar Buyya, "High Performance Cluster Computing – Volume I Architectures and Systems", Pearson, 2013.

ADVANCED DATABASE ADMINISTRATION**Paper Code: ETIT-427****Paper: Advanced Database Administration**

L	T/P	C
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: The objective of the paper is to facilitate the student with the advancements in the Database Administration that are required for the student to become a DBA.

UNIT-I

Creating a Database – Database configuring Assistant (DBCA), Password management, Using DBCA to delete a database.

Managing the database instance – Management framework, starting and stopping database control, Initialising parameter files, starting up and shutting down database instance.

Managing Database storage structure – Storage structure, How table data is stored? Tablespaces and data files, Space Management in Tablespaces, Tablespace management.

[T1][T2][No. of Hrs. 11]**UNIT-II**

Database user security – Creating a user, Authenticating users, Unlocking a user account and resetting the password, Privileges and role, System privileges, object privileges.

Managing Schema Objects – Table types, Action with tables, creating views, sequences, What is partition and why use it? Creating a Partition, Partitioning method, Index organised tables and heap tables, creating index-organised tables, cluster, cluster types, sorted hash cluster.

Managing data and concurrency – Manipulating with data through SQL, function procedure, packages, Triggers, locking concepts, detecting and resolving lock conflicts.

[T1][T2][No. of Hrs. 11]**UNIT-III**

Managing undo Data – Monitoring Undo, Administering Undo, Configuring Undo Retention, Sizing Undo tablespace.

Implementing database security – database transparent encryption (TDE), TDE Process, Implementing TDE.

Performance management - troubleshooting, tuning.

[T1][T2][No. of Hrs. 10]**UNIT-IV**

Performing Backup and Recovery – Configuring Recovery Manager, using Recovery manager, Recovering from noncritical Losses , recovery from loss of control file , data file and redo file.

Performing flashback – Flashback database , Flashback database Architecture, Configuring flashback Database using enterprise manager, Monitoring Flashback database

Moving data- General Architecture , Loading data with SQL *loader , Data pump , Data pump export and import.

[T1][T2][No. of Hrs. 11]**Text Books:**

[T1] Sam R. Alapati “ Expert Oracle Database 11G Administration “ Dreamtech Press.

[T2] Darl Kuhn “Pro Oracle Database 11g Administration”, Apress

References Books:

[R1] Ken Simmons, Sylvester, Carstarphen” Pro SQL Server 2012 Administration”, Dreamtech Press

[R2] Sheeri K Cabral, Keith Murphy,” MySQL Administrator's Bible” John Wiley & Sons

[R3] Steve Fogel, Paul Lane, “Oracle Database Administrator’s Guide, 10g” Oracle

[R4] Craig S. Mullins, “Database Administration”, Addison-Wesley

PROBABILISTIC GRAPHICAL MODELS**Paper Code: ETIT-429****Paper: Probabilistic Graphical Models**

L	T/P	C
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: The objective of the paper is to facilitate the student probabilistic graphical models, parameter learning, convexity and Bayesian networks.

UNIT-I

Bayesian network, Examples (HMM, diagnostic system, etc.), Separation and independence, Markov properties and minimalism, Markov network, Examples (Boltzmann machine, Markov random field, etc.), Cliques and potentials, Markov properties

[T1, T2, R1][No. of Hrs. 11]**UNIT-II**

Exact inference, Complexity, Bucket elimination, Junction tree, Belief propagation (message passing), Application to HMM, Sum- and Max-product algorithms.

[T1, R1][No. of Hrs. 11]**UNIT-III**

Parameter learning, Exponential family, Bayesian learning, Expectation-Maximization (EM)

[T1, T2][No. of Hrs. 10]**UNIT-IV**

Approximate inference, Convexity, Mean field approach, Structured variational method, Loopy belief propagation, Characterization of solution spaces, Sampling methods.

[T1, T2, R2][No. of Hrs. 10]**Text Books:**

[T1] Bayesian Networks and Beyond by Daphne Koller and Nir Friedman

[T2] An Introduction to Probabilistic Graphical Models by Michael I. Jordan

Reference Books:

[R1] Probabilistic Networks and Expert Systems by Cowell, Dawid, Lauritzen, and Spiegelhalter, Springer 1999.

[R2] Learning in Graphical Models by M. Jordan (editor), MIT Press, 1999.

SOCIOLOGY AND ELEMENTS OF INDIAN HISTORY FOR ENGINEERS

Paper Code: ETHS-419

L T/P C

Paper: Sociology and Elements of Indian History for Engineers

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: The objective of this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.

UNIT I

Module 1A: Introduction to Elements of Indian History: What is History? History Sources-Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography.

[3 Lectures]

Module 1B: Introduction to sociological concepts-structure, system, organization, social institution, Culture social stratification (caste, class, gender, power). State & civil society.

[7 Lectures]

[T1][No. of Hrs. 10]

UNIT II

Module 2A: Indian history & periodization; evolution of urbanization process: first, second & third phase of urbanization; Evolution of polity; early states of empires; Understanding social structures-feudalism debate.

[3 Lectures]

Module 2B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

[7 Lectures]

[T1][No. of Hrs. 10]

UNIT III

Module 3A: From Feudalism to colonialism-the coming of British; Modernity & struggle for independence.

[3 Lectures]

Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

[9 Lectures]

[T1][No. of Hrs. 12]

UNIT IV

Module 4A: Issues & concerns in post-colonial India (upto 1991); Issues & concerns in post-colonial India 2nd phase (LPG decade post 1991).

[3 Lectures]

Module 4B: Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.

[10 Lectures]

[T1][No. of Hrs. 13]

Text Books:

[T1] Desai, A.R. (2005), Social Background of Indian Nationalism, Popular Prakashan.

[T2] Giddens, A (2009), Sociology, Polity, 6th Edition

Reference Books:

[R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan

[R2] Haralambos M, RM Heald, M Holborn, (2000), Sociology, Collins

ADVANCED COMPUTER NETWORKS LAB**Paper Code: ETIT-453****Paper: Advanced Computer Network Lab**

L	T/P	C
0	2	1

List of Experiments:

1. Configuration and logging to a CISCO Router and introduction to the basic user Interfaces. Introduction to the basic router configuration and basic commands.
2. Configuration of IP addressing for a given scenario for a given set of topologies.
3. Configure a DHCP Server to serve contiguous IP addresses to a pool of four IP devices with a default gateway and a default DNS address. Integrate the DHCP server with a BOOTP demon to automatically serve Windows and Linux OS Binaries based on client MAC address.
4. Configure, implement and debug the following: Use open source tools for debugging and diagnostics.
 - a. ARP/RARP protocols
 - b. RIP routing protocols
 - c. BGP routing
 - d. OSPF routing protocols
 - e. Static routes (check using netstat)
5. Configure DNS: Make a caching DNS client, and a DNS Proxy; implement reverse DNS and forward DNS, using TCP dump/Wireshark characterise traffic when the DNS server is up and when it is down.
6. Configure FTP Server on a Linux/Windows machine using a FTP client/SFTP client characterise file transfer rate for a cluster of small files 100k each and a video file of 700mb. Use a TFTP client and repeat the experiment.
7. Configure a mail server for IMAP/POP protocols and write a simple SMTP client in C/C++/Java client to send and receive mails.
8. Implement Open NMS+ SNMPD for checking Device status of devices in community MIB of a linux PC. Using yellow pages and NIS/NFS protocols implement Network Attached Storage Controller (NAS).

Extend this to serve a windows client using SMB. Characterise the NAS traffic using wireshark.

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

CRYPTOGRAPHY & NETWORK SECURITY**Paper Code: ETIT-455****Paper: Cryptography & Network Security**

L	T/P	C
0	2	1

List of Experiments:

1. Design a program for encryption and decryption using mono-alphabetic substitution or poly-alphabetic substitution
2. Write a program to implement DES and AES algorithm for Encryption and Decryption.
3. Study of Account and password management. PAM, password cracking.
4. To configure common services like IIS, Apache, Open SSH, WU-FTP.
5. Study of Security analysis tools: Nessus, Microsoft baseline security analyzer.
6. Study of Security configuration tools: Bastille, Microsoft IIS lockdown tool.
7. To identify organization's Firewall IP address.
8. To determine organization's Firewall Access Control.

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

WIRELESS COMMUNICATION LAB**Paper Code: ETEC-463****Paper: Wireless Communication Lab**

L	T/P	C
0	2	1

List of Experiments:

1. Eight experiments suggested on kits for GSM, CDMA and any possible experiments covering the subjects.
2. Setting up wireless network with and without infrastructure support.
3. Configuring Access Point with bridging mode (Point to Point and Point to Multi Point).
4. Configuring Routing between wired and wireless Networks.
5. Configuring Security in wireless network with and without infrastructure support.

NOTE: At least 8 Experiments from the syllabus must be done in the semester.

EMBEDDED SYSTEMS LAB**Paper Code: ETIT-459(ELECTIVE)****L T/P C****Paper: Embedded Systems Lab****0 2 1****List of Experiments:**

1. Introduction to microcontroller and interfacing modules.
2. To interface the seven segment display with microcontroller 8051
3. To create a series of moving lights using PIC on LEDs.
4. To interface the stepper motor with microcontroller.
5. To display character 'A' on 8*8 LED Matrix.
6. Write an ALP to add 16 bits using ARM 7 Processor
7. Write an ALP for multiplying two 32 bit numbers using ARM Processor
8. Write an ALP to multiply two matrices using ARM processor

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

SYSTEM AND NETWORK ADMINISTRATION LAB

Paper Code: ETIT-459(ELECTIVE)	L	T/P	C
Paper: System and Network Administration Lab	0	2	1

List of Experiments:

System Administration:

1. To install two or more operating systems on a computer.
2. Installation of Red Hat Linux using Graphical mode.
3. Installation of Red Hat Linux using command prompt
4. Creating a user in Linux server and assigning rights
 - i. Configuring and Troubleshooting of /etc/inittab.
 - ii. Configuring and Troubleshooting of /etc/passwd
5. Configuring and Troubleshooting of /etc/grub.conf

Network Administration:

Linux TCP/IP Network Configuration

Practical Examples of Nmap Commands for Linux System/Network Administrators

The Nmap aka Network Mapper is an open source and a very versatile tool for Linux system/network administrators. Nmap is used for exploring networks, perform security scans, network audit and finding open ports on remote machine. It scans for Live hosts, Operating systems, packet filters and open ports running on remote hosts.

1. Scan a System with Hostname and IP Address
2. Scan Multiple Hosts
3. Scan a whole Subnet
4. Scan Multiple Servers using last octet of IP address
5. Enable OS Detection with Nmap
6. Scan a Host to Detect Firewall
7. Scan a Host to check its protected by Firewall
8. Scan Ports Consecutively
9. Print Host interfaces and Routes
10. Scan a TCP Port
11. Scan a UDP Port

DIGITAL SIGNAL PROCESSING LAB**Paper Code: ETIT-459(ELECTIVE)****L T/P C****Paper: Digital Signal Processing Lab****0 2 1****List of Experiments:****Software Experiments:**

1. Generation of basic signals sine, cosine, ramp, step, impulse and exponential in continuous and discrete domains using user defined functions.
2. Write a MATLAB program to find convolution (linear/circular) and correlation of two discrete signals.
3. Perform linear convolution using circular convolution and vice versa.
4. Write a MATLAB program to
 - i. Find 8 point DFT, its magnitude and phase plot and inverse DFT.
 - ii. Find 16 point DFT, its magnitude and phase plot and inverse DFT.
5. Perform the following properties of DFT-
 - i. Circular shift of a sequence.
 - ii. Circular fold of a sequence.
6. Write a MATLAB Program to design FIR Low pass filter using
 - i. Rectangular window
 - ii. Hanning window
 - iii. Hamming window
 - iv. Bartlett window
7. Write a MATLAB program to
 - i. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Butterworth Approximation.
 - ii. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Chebyshev Approximation.

Hardware Experiments using Texas Instruments Kits-DSK 6713:

8. Introduction to Code composer Studio.
9. Write a program to generate a sine wave and see the output on CRO
10. Write a Program to Generate ECHO to give audio file.
11. Write a program to demonstrate Band Stop filter by FIR.

Additional Experiments:

12. Write a program to generate a cos wave and see the output on CRO
13. Write a program to blink the LED
14. Write a program to display a string on LCD.

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

MOBILE COMPUTING**Paper Code: ETIT-402****Paper: Mobile Computing**

L	T/P	C
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: Should have studied papers such as Communication systems, Data communications and networking and wireless networks. To learn the basic concepts, aware of the GSM, SMS, GPRS Architecture. To have an exposure about wireless protocols –Wireless LAN, Bluetooth, WAP, Zig Bee issues. To Know the Network, Transport Functionalities of Mobile communication. To understand the concepts of Adhoc and wireless sensor networks. Introduce Mobile Application Development environment.

UNIT-I

Mobile Physical Layer: Review of generation of mobile services, overview of wireless telephony, cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

Mobile Computing Architecture: Issues in mobile computing, three tier architecture for mobile computing, design considerations, Mobile file systems, Mobile databases. WAP: Architecture, protocol stack, Data gram protocol, Wireless transport layer security, Wireless transaction protocol, wireless session protocol, application environment, and applications.

[T1] [T2][T3] [No. of Hrs. 12]**UNIT-II**

Mobile Data Link Layer: Wireless LAN over view, IEEE 802.11, Motivation for a specialized MAC, Near & far terminals, Multiple access techniques for wireless LANs such as collision avoidance, polling, Inhibit sense, spread spectrum, CDMA, LAN system architecture, protocol architecture, physical layer MAC layer and management, Hiper LAN.

Blue Tooth: IEEE 802.15 Blue tooth User scenarios, physical, MAC layer and link management. Local Area Wireless systems: WPABX, IrDA, ZigBee, RFID, WiMax.

[T1] [T2][T3] [No. of Hrs. 11]**UNIT-III**

MOBILE IP Network Layer: IP and Mobile IP Network Layer- Packet delivery and Handover Management- Location Management- Registration- Tunnelling and Encapsulation-Route Optimization- Dynamic Host Configuration Protocol, Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), VoIP –IPSec.

Mobile Transport Layer: Traditional TCP/IP, Transport Layer Protocols-Indirect, Snooping, Mobile TCP.

[T1] [T2][T3] [No. of Hrs. 11]**UNIT-IV**

Support for Mobility: Data bases, data hoarding, Data dissemination, UA Prof and Caching, Service discovery, Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, Mobile devices and File systems, Data Synchronization, Sync ML.

Introduction to Wireless Devices and Operating systems: Palm OS, Windows CE, Symbion OS, Android, Mobile Agents. Introduction to Mobile application languages and tool kits.

[T1] [T2][T3] [No. of Hrs. 11]**Course Outcomes:**

1. Gain the knowledge about various types of Wireless Data Networks and Wireless Voice Networks. 2. Understand the architectures, the challenges and the Solutions of Wireless Communication.
3. Realize the role of Wireless Protocols in shaping the future Internet.
4. Able to develop simple Mobile Applications Using Toll kit.

Text Books:

- [T1] J. Schiller, "Mobile Communications", 2nd edition, Pearson, 2011.
- [T2] Raj Kamal "Mobile Computing" Oxford Higher Education, Second Edition, 2012.
- [T3] Dharam prakash Agrawal and Qing-An Zeng, "Introduction to Wireless and Mobile Systems" 3rd edition, Cengage learning 2013.

Reference Books:

- [R1] Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal "Mobile Computing", Tata McGraw Hill Pub, Aug – 2010
- [R2] Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farrell "Wireless Networking Complete" Morgan Kaufmann Series in Networking, 2009 (introduction, WLAN MAC)
- [R3] Vijay K Garg "Wireless Communications & Networking" Morgan Kaufmann Series, 2010
- [R4] M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
- [R5] Charles Perkins, Mobile IP, Addison Wesley.
- [R6] Charles Perkins, Ad hoc Networks, Addison Wesley.
- [R7] Uwe Hansmann, Lothar Merk, Martin S. Nicklous, Thomas Stober, "Principles of Mobile Computing", Springer.
- [R8] Evaggelia Pitoura and George Samarus, "Data Management for Mobile Computing", Kluwer Academic Press, 1998

Laboratory session: The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc.,

Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

Tool Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

- [R1] Donn Felker, "Android Application Development For Dummies", Wiley, 2010
- [R2] Reto Meier, "Professional Android 2 Application Development", Wrox's Prog. to Programmer Series.
- [R3] Ed Burnette, 'Hello, Android: Introducing Google's Mobile Development Platform' third edition' Pragmatic Programmers, 2012
- [R4] Jerome (J.F) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.
- [R5] Reza B'Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University press, 2005.
- [R6] R. Riggs, A. Taivalsaari, M. VandenBrink, "Programming Wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-201-74627-1, Addison Wesley, 2001.

ADHOC AND SENSOR NETWORKS**Paper Code: ETEC-406****Paper: Ad Hoc and Sensor Networks**

L	T/P	C
3	0	3

INSTRUCTIONS TO PAPER SETTER:**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 of 12.5 marks.

Objective: The prerequisites are data communication networks, wireless communication and networks. The objective of the paper is to introduce infrastructure less wireless networking.

UNIT I**Ad Hoc Wireless Networks:**

Introduction. Issues in Ad Hoc Wireless Networks. Ad Hoc Wireless Internet.

MAC Protocols for Ad Hoc Wireless Networks:

Introduction, Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols. Contention-Based Protocols with Reservation Mechanisms. Contention-Based MAC Protocols with Scheduling Mechanisms. MAC Protocols in Directional Antennas. Other MAC Protocols

[T1, T2][No. of Hrs. 11]**UNIT II****Routing Protocols for Ad Hoc Wireless Networks:**

Introduction to Routing algorithm, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks. Classifications of Routing Protocols. Table-Driven Routing Protocols. On-Demand Routing Protocols. Hybrid Routing Protocols. Routing Protocols with Efficient Flooding Mechanisms. Hierarchical Routing Protocols. Power-Aware Routing Protocols.

Transport Layer and Security Protocols for Ad Hoc Wireless Networks:

Introduction. Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks. Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks. Classification of Transport Layer Solutions. TCP Over Ad Hoc Wireless Networks. Other Transport Layer Protocols for Ad Hoc Wireless Networks. Security in Ad Hoc Wireless Networks. Network Security Requirements. Issues and Challenges in Security Provisioning. Network Security Attacks. Key Management. Secure Routing in Ad Hoc Wireless Networks.

[T1, T2][No. of Hrs. 12]**UNIT III****Wireless Sensor Networks:**

Introduction. Sensor Network Architecture. Data Dissemination. Data Gathering. MAC Protocols for Sensor Networks. Location Discovery. Quality of a Sensor Network. Evolving Standards. Other Issues.

Hybrid wireless Networks:

Introduction. Next-Generation Hybrid Wireless Architectures. Routing in Hybrid Wireless Networks. Pricing in Multi-Hop Wireless Networks. Power Control Schemes in Hybrid Wireless Networks. Load Balancing in Hybrid Wireless Networks.

[T1, T2][No. of Hrs. 11]**UNIT IV****Wireless Geolocation Systems:**

Introduction. What is wireless Geolocation? Wireless Geolocation System Architecture. Technologies for Wireless Geolocation. Geolocation Standards for E-911 Services. Performance Measures for Geolocation Systems. Questions. Problems.

Recent Advances in Wireless Networks:

Introduction. Ultra-Wide-Band Radio Communication. Wireless Fidelity Systems. Optical Wireless Networks. The Multimode 802.11 -IEEE 802.11a/b/g. The Meghadoot Architecture, introduction to vehicular sensor networks.

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

Text Books:

- [T1] Siva Ram Murthy, C. and Manoj,B. S., Adhoc Wireless Networks Architectures and Protocols, Prentice Hall, PTR, (2004) 2nd ed.
- [T2] Perkins, Charles E., Ad hoc Networking, Addison Wesley, (2000) 3rd ed.

Reference Books

- [R1] Toh, C. K., Ad hoc Mobile Wireless Networks Protocols and Systems, Prentice Hall, PTR, (2001) 3rd Edition.
- [R2] Pahlavan, Kaveh., Krishnamoorthy, Prashant., Principles of Wireless Networks, - A united approach - Pearson Education, (2002) 2nd ed.
- [R3] Wang X. and Poor H.V., Wireless Communication Systems, Pearson education, (2004) 3rd ed.
- [R4] Schiller Jochen., Mobile Communications, Person Education – 2003, 2nd ed.
- [R5] Carlos De Morais Cordeiro and Dharam P Agrawal, “Adhoc and Sensor Networks- Theory & Applications”, 2nd Ed, Cambridge Univ Press India Ltd

HUMAN VALUES & PROFESSIONAL ETHICS – II

Paper Code: ETHS-402

L T/P C

Paper : Human Values & Professional Ethics-II

1 0 1

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.
3. Two internal sessional test of 10 marks each and one project report* carrying 5 marks.

Objectives:

1. *The main object of this paper is to inculcate the skills of ethical decision making and then to apply these skills to the real and current challenges of the engineering profession.*
2. *To enable student to understand the need and importance of value-education and education for Human Rights.*
3. *To acquaint students to the National and International values for Global development*

UNIT I - Appraisal of Human Values and Professional Ethics:

Review of Universal Human Values: Truth, Love, Peace, Right conduct, Non violence, Justice and Responsibility. Living in harmony with 'SELF', Family, Society and Nature. Indian pluralism - the way of life of Islam, Buddhism, Christianity, Jainism, Sikhism and Hinduism, Greek - Roman and Chinese cultural values. Sensitization of Impact of Modern Education and Media on Values:

- a) Impact of Science and Technology
- b) Effects of Printed Media and Television on Values
- c) Effects of computer aided media on Values (Internet, e-mail, Chat etc.)
- d) Role of teacher in the preservation of tradition and culture.
- e) Role of family, tradition & community prayers in value development.

Review of Professional Ethics: Accountability, Collegiality, Royalty, Responsibility and Ethics Living. Engineer as a role model for civil society, Living in harmony with 'NATURE', Four orders of living, their inter-correctness, Holistic technology (eco-friendly and sustainable technology).

[T1][T2][R1][R5][R4][No. of Hrs. 03]

UNIT II – Engineers responsibility for safety:

Safety and Risks, Risk and Cost, Risk benefit analysis, testing methods for safety. Engineer's Responsibility for Safety Social and Value dimensions of Technology - Technology Pessimism – The Perils of Technological Optimism – The

Promise of Technology – Computer Technology Privacy

Some Case Studies: Case Studies, BHOPAL Gas Tragedy, Nuclear Power Plant Disasters, Space Shuttle Challenger, Three Mile Island Accident, etc.

[T1] [T2] [R4] [R2][No. of Hrs. 03]

UNIT III – Global Issues:

Globalization and MNCs: International Trade, Issues,

Case Studies: Kellogg's, Satyam, Infosys Foundation, TATA Group of Companies

Business Ethics: Corporate Governance, Finance and Accounting, IPR.

Corporate Social Responsibility (CSR): Definition, Concept, ISO, CSR.

Environmental Ethics: Sustainable Development, Eco-System, Ozone depletion, Pollution.

Computer Ethics: Cyber Crimes, Data Stealing, Hacking, Embezzlement.

[T1] [T2] [R4][No. of Hrs. 05]

UNIT IV - Engineers Responsibilities and Rights and Ethical Codes:

Collegiality and loyalty, Conflict of interests, confidentiality, occupational crimes, professional rights, responsibilities. To boost industrial production with excellent quality and efficiency, To enhance national economy, To boost team spirit, Work Culture and feeling of job satisfaction, National integration, Examples of some illustrious professionals.

Need for Ethical Codes, Study of some sample codes such as institution of Electrical and Electronics Engineers, Computer Society of India etc., Ethical Audit.

Development and implementation of Codes: Oath to be taken by Engineering graduates and its importance**,

[T1] [T2] [R4][R2][No. of Hrs. 05]

Text Books:

- [T1] Professional Ethics, R. Subramanian, Oxford University Press.
 [T2] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

References Books:

- [R1] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers' Manual by the same author
 [R2] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press
 [R3] Values Education: The paradigm shift, by Sri Satya Sai International Center for Human Values, New Delhi.
 [R4] Professional Ethics and Human Values – M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi
 [R5] A Textbook on Professional Ethics and Human Values – R.S. Naagarazan – New Age International (P) Limited, Publishers New Delhi.
 [R6] Human Values & Professional Ethics- S B Gogate- Vikas publishing house PVT LTD New Delhi.
 [R7] Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill
 [R8] Charles E Harris, Micheal J Rabins, "Engineering Ethics, Cengage Learning
 [R9] PSR Murthy, "Indian Culture Values and Professional Ethics", BS Publications
 [R10] Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press
 [R11] Charles D Fleddermann, "Engineering Ethics", Prentice Hall.
 [R12] George Reynolds, "Ethics in Information Technology", Cengage Learning
 [R13] C, Sheshadri; The Source book of Value Education, NCERT
 [R14] M. Shery; Bhartiya Sanskriti, Agra (Dayalbagh)

*Any topic related to the experience of the B.Tech student in the assimilation and implementation of human values and professional ethics during the past three years of his/her studies in the institute OR A rigorous ethical analysis of a recent case of violation of professional ethics particularly related to engineering profession.

**All students are required to take OATH in writing prior to submission of major project and the record of the same is to be maintained at the college level and/or, this oath may be administered by the head of the institutions during the graduation ceremonies. The draft for the same is available alongwith the scheme and syllabus.

BIG DATA ANALYTICS**Paper Code: ETIT-406****Paper: Big Data Analytics**

L	T/P	C
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 introduce the students about knowledge of Data Management, Big Data stacks and Data analysis.

UNIT-I

Big Data Introduction: The Evolution of Data Management, Defining Big Data, Traditional and advanced analytics. Distributed Computing, need of distributed computing for big data, economics of computing, latency problem.

Examining Big Data Types, Structured Data, sources of big structured data, role of relational databases in big data, Unstructured Data, sources of unstructured data, role of a CMS in big data management.

[T1][R1][No. of Hrs. 11]**UNIT-II**

Big Data Stack: Redundant Physical Infrastructure, Security Infrastructure, Operational Databases. Organizing Data Services and Tools, Analytical Data Warehouses, Big Data Analytics, Big Data Applications.

Virtualization and big data: Server virtualization, Application virtualization, Network virtualization, Processor and memory virtualization, Data and storage virtualization, Managing Virtualization with the Hypervisor.

[T1][No. of Hrs. 10]**UNIT-III**

MapReduce Fundamentals, Putting map and reduce Together, Optimizing MapReduce Tasks. Hadoop, Hadoop Distributed File System (HDFS), Name Nodes, Data nodes, Hadoop MapReduce.

[T1][T2][R1][No. of Hrs. 11]**UNIT-IV**

Big Data Analytics: Basic analytics, Advanced analytics, Operationalized analytics, Monetizing analytics, Text Analytics and Big Data, Social media analytics, Text Analytics Tools for Big Data, Attensity, Clarabridge, OpenText.

Integrating Data Sources: Dealing with Real-time Data Streams and Complex Event Processing, Operationalizing Big Data, Applying Big Data within Your Organization, Security and Governance for Big Data Environments.

[T1][No. of Hrs. 11]**Text Books:**

[T1] Judith S. Hurwitz, Alan F. Nugent, Fern Halper, Marcia A. Kaufman, "Big Data For Dummies", John Wiley & Sons, Inc.(2013)

[T2] Robert D. Schneider, "Hadoop For Dummies", John Wiley & Sons, Inc. (2012)

Reference Books:

[R1] Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, by Paul Zikopoulos, McGraw Hill 2012.

SOCIAL NETWORK ANALYSIS

Paper Code: ETIT-408
Paper: Social Network Analysis

L	T/P	C
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 introduce the students about knowledge of social network analysis and framework for network analysis.

UNIT-I

Social network analysis: network definition, manipulation, calculation, visualization. Graph terminology and definitions. Representing networks: Adjacency matrix and properties. Weighted, directed, bipartite networks. Trees. Some sample networks.

[T1, R1][No. of Hrs. 10]**UNIT-II**

Linear Algebra / Graph Properties: Eigenvectors and eigenvalues. Graph Laplacian. Markov matrices. Paths, walks, cycles. Degree, density. Degree distribution. Diameter, average path length. Average and local clustering. Centrality measures: degree, betweenness, closeness, Katz, Bonacich. Review of Poisson random graphs. Growing random networks. Preferential attachment. Properties and phase transitions. Degree distributions. Fitting networks to data. Exponential random graph models.

[T1][No. of Hrs. 11]**UNIT-III**

Frameworks for evaluating results in network analysis: autocorrelation, matching techniques, QAP regression, exponential random graphs, and other models. Computational considerations. Lab: Applying ERGM analysis. Graph partitioning. Spectral partitioning. Modularity and modularity maximization. Betweenness clustering. Lab: Calculating and comparing clustering approaches.

[T1][No. of Hrs. 11]**UNIT-IV**

Game theory basics: players, moves, payoffs. Nash equilibrium. Efficiency and optimality. Examples. Network formation as a game. Pairwise stability. Positive and negative externalities. Processes on Networks: Diffusion on networks. SIS and SIR infection models and predictions. Search on networks. Networked adoption games.

[T1][No. of Hrs. 10]**Text Books:**

[T1] Jackson, M. O. Social and Economic Networks. Princeton U. Press, 2008. ISBN: 978-0-691-14820-5.

Reference Books:

[R1] Social Network Analysis (Google eBook), John Scott, SAGE, 2012

SOFT COMPUTING**Paper Code: ETIT-410****Paper: Soft Computing**

L	T/P	C
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 understand the various concepts of neural networks and fuzzy logic.

UNIT-I**Neural Networks:**

History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

[T1, T2][No. of Hrs. 11]**UNIT-II****Fuzzy Logic:**

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation, Operations.

[T1, T2][No. of Hrs. 11]**UNIT-III****Fuzzy Arithmetic:**

Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic:

Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers,

Uncertainty based Information:

Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

[T1, T2][No. of Hrs. 11]**UNIT-IV****Introduction of Neuro-Fuzzy Systems:**

Architecture of Neuro Fuzzy Networks.

Application of Fuzzy Logic:

Medicine, Economics etc.

Genetic Algorithm:

An Overview, GA in problem solving, Implementation of GA.

[T1, T2][No of Hrs 11]**Text Books:**

- [T1] Hertz J. Krogh, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley, California, 1991.
- [T2] G.J. Klir & B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
- [T3] Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
- [T4] F. O. Karray and C. de Silva, "Soft computing and Intelligent System Design", Pearson, 2009.

Reference Books:

- [R1] "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
- [R2] Freeman J.A. & D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison Wesley, Reading, Mass, (1992).

BIOINFORMATICS

Paper Code: ETIT-412
Paper: Bio Informatics

L	T/P	C
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: The objective of the paper is to facilitate the student with the basics of Bioinformatics using Machine Learning.

UNIT- I

Introduction: Biological data in digital symbol sequences, genomes, proteins and proteomes, biological sequences, molecular function and structure. Biological Databases: Sequence databases, mapping databases, information retrieval, genomic databases.

Machine Learning Foundations: The probabilistic framework and examples.

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

UNIT- II

Machine Learning Algorithms: Introduction, dynamic programming, gradient descent, EM/GEM algorithms, Markov-Chain Monte Carlo methods, simulated annealing, evolutionary and genetic algorithms, learning algorithms.

Neural Network: Theory and Applications. Hidden Markov Models: Theory and applications

[T1][No. of hrs. 12]

UNIT- III

Probabilistic graphical models in bioinformatics: Markov Models and DNA symmetries, gene finders, hybrid models and neural network parameterization of graphical models, single model case, bidirectional recurrent neural networks for protein secondary structure prediction.

Probabilistic models of evolution: phylogenetic trees.

[T1] [No. of hrs. 11]

UNIT-IV

Stochastic grammars and linguistics: Introduction, formal grammars, Chomsky hierarchy, applications of grammars, learning algorithms, applications of SCFGs. Microarrays and gene expression: Introduction, Probabilistic modelling of array data, clustering, gene regulation.

[T1][No. of hrs. 10]

Text Books:

[T1] P.Baldi , S.Brunak ,”Bioinformatics : The machine learning approach” 2nd Edition, MIT Press.

[T2] A.D.Baxevanis, B.F.F.Quellette “Bioinformatics: A Practical guide to the analysis of genes and proteins” 3rd Edition, Wiley-Interscience.

References Books:

[R1] TK Attwood & DJ Parry-Smith,” Introduction to Bioinformatics”, Pearson Education

[R2] Edward Keedwell and Ajit Narayanan, “Intelligent Bioinformatics” John Wiley & Sons, Ltd.

[R3] A Tramontano, “Introduction to Bioinformatics”, Chapman & Hall/CRC.

[R4] D.Roy, “Bioinformatics” , Narosa Publishing House

[R5] David Mount, “Bioinformatics: sequence and genome analysis”, Cold spring harbour Lab

WEB APPLICATION DEVELOPMENT USING .NET**Paper Code: ETIT-414****Paper: Web Application Development Using .NET**

L	T/P	C
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: This course teaches how to develop business applications using .NET 3.5. It starts with C# and VB.NET languages and then moves on to developing web applications using ASP.NET. It teaches LINQ and AJAX, new extensions to ASP.NET 3.5

UNIT I

Introduction to .NET 3.5: Introduction to .NET Framework, Components of .NET - CLR and Class Library, MSIL, CTS etc.

Introduction to C# 3.0: Language elements of C#, OOP with C#, Properties and static members, Inheritance, overriding and shadowing, Runtime polymorphism - virtual and abstract methods, Boxing, unboxing, Interfaces and structures, Exception Handling. Introduction to VB.NET 9.0: structure of VB.NET, Control structures, OOP with VB.NET, Properties, Default properties, Inheritance, overriding and shadowing, Interfaces, structures and Exception handling.

[T1, T2][No. of Hrs. 12]**UNIT II**

Fundamentals of ASP.NET: server-side scripting, create simple ASP.NET, Server-side event processing, Validation Controls, Working with Rich Controls and Navigation related controls, Master pages and themes, Cookies and their application, Sessions and Applications, Working with GLOBAL.ASAX, Error handling, Debugging and tracing, Page output caching, Data caching.

MS SQL Server: Architecture of SQL Server, Using Query Analyzer, Working with Transact SQL, stored procedures and functions, creating database triggers.

ADO.NET: Introduction, SQL Connect, SQL Command, SQL Data Reader object to access SQL Server, connect to Ms Access, and Oracle, Data Set, Data Table etc, Retrieving and manipulating data using Grid View, Details View, List View, Form View and Data List, Calling stored procedures of SQL Server.

[T1, T2][No. of Hrs. 12]**UNIT III**

XML: introduction, well-formed XML and valid XML, DOM and SAX, XML Reader and writer, Validating XML with Schema and DTD, Loading data from XML to Database, Writing data from Database to XML, Transforming XML content using XSLT.

Web Services: introduction, role in web applications, Component and protocols - SOAP, WSDL, Proxy class, create web service, Web services accessing database.

Advanced Programming: Operator overloading, Conversion operators, Delegates, Multithreading, Event Handling, Generics, Iterators, Auto properties, Lambda Expressions.

[T1, T2][No. of Hrs. 11]**UNIT IV**

LINQ: Language Integrated Query: LINQ to Objects, LINQ to SQL, Object-Relational Mapping, LINQ to XML.

AJAX: What is AJAX, related technologies, Using ASP.NET AJAX – Script Manager, Update Panel, Timer, Update Progress etc., Using ASP.NET AJAX Control Toolkit – Always Visible Control, AutoComplete, Confirm Button, Filtered Text Box etc., Calling Web Services using AJAX.

[T1, T2][No. of Hrs. 10]**Text Books:**

- [T1] Stephen Walther, "ASP.NET 3.5 Unleashed or ASP.NET 4.5 Unleashed," Sams Pearsons Publication,
 [T2] George Shepherd, "Microsoft ASP.NET 3.5 Step by Step", PHI learning Publication Eastern Economy Edition
 [T3] Chris Love, Marco Bellinaso, "ASP.NET 3.5 Website Programming Problem - Design – Solution," Wrox publication 2012

Reference Books:

- [R1] George Shepherd, "Microsoft ASP.NET 4.0 Step by Step", PHI learning Publication Eastern Economy Edition
- [R2] Imar Spaanjaars, "Beginning ASP.NET 3.5 In C# and VB," Wiley / Wrox publication, 2009
- [R3] Bill Evjen, Scott Hanselman, Devin Rader, "Professional ASP.NET 3.5 in C# and VB," wiley publication, 2008
- [R4] Matthew MacDonald, "The Complete Reference: ASP.NET", Tata McGraw Hill, 2002.
- [R5] Jason N. Gaylord et al, "Professional ASP.NET 4.5 in C# and VB," wrox publication, 2013



VLSI DESIGN**Paper Code: ETIC-414****Paper: VLSI Design**

L	T/P	C
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 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 of 12.5 marks.

Objective: The prerequisite are analog devices, STLD, Digital system design and micro-electronics. The students are introducing to MOS technology, design rules and some applications.

UNIT I

Evolution of VLSI, MOS transistor theory, MOS structure, enhancement & depletion transistor, threshold voltage, MOS device design equations, MOSFET scaling and small geometry effects, MOSFET capacitances. NMOS inverter, CMOS inverter, DC characteristics, static load MOS inverter, pull up/pull down ratio, static & dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, body effect, latch up in CMOS.

[T1,T2][No. of Hours: 11]**UNIT II**

Stick diagram and design rules, lambda based design rules, switching characteristics & inter connection effects: rise time, fall time delays, noise margin. CMOS logic gate design: NAND, NOR, XOR and XNOR gates, Transistor sizing, combinational MOS logic circuits: pass transistor and transmission gate designs, Pseudo NMOS logic.

[T1,T2][No. of Hours: 11]**UNIT III**

Sequential MOS logic circuits: SR latch, clocked latch and flip flop circuits, CMOS D latch and edge triggered flip flop, dynamic logic circuits; basic principle, non ideal effects, domino CMOS logic, high performance dynamic CMOS circuits, clocking issues, clock distribution.

[T1,T2][No. of Hours: 11]**UNIT IV**

VLSI designing methodology, design flow, design Hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, computer aided design technology, adder design and multiplier design examples. Low power design concepts using CMOS Technology.

[T1,T2][No. of Hours: 11]**Text Books:**

- [T1] Basic VLSI Design - Pucknell Douglas A., Eshraghian Kamran, PHI Learning Pvt Limited, 2013.
 [T2] N. Weste and D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective - 4th Edition", Pearson Education, India.

Reference Book:

- [R1] S. M. Kang, Y. Leblebici, "CMOS digital integrated circuits analysis & design" Tata McGraw Hill, 3rd Edition.
 [R2] Digital Integrated Circuit Design- Ken Martin, Oxford University Press
 [R3] The MOS Transistor- Yaniiis Tsvividis and Colin Mcandrew, Oxford University Press, 2013
 [R4] J. M. Rabaey, "Digital Integrated Circuits" PHI Learning Pvt Limited, India
 [R5] J. P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Inc., New York, NY
 [R6] Neelam Sharma, "Digital Logic Design", Ashirwad Publication 2013-14

INFORMATION THEORY AND CODING**Paper Code: ETIT-416****Paper: Information Theory and Coding**

L	T/P	C
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: In this course the students will study a number of efficient encoding/decoding strategies which have proven important in practice with a categorization on the notion of decoding.

UNIT-I

Review of Probability Theory, Random Variables and Random Process. Information Theory Introduction, Uncertainty, Information, and Entropy, Information Rate, Conditional and Joint Entropies. Source Coding Theorem, Data Compaction, Prefix Coding, Kraft McMillan Inequality, Huffman Coding, Lempel Ziv Coding, Discrete Memoryless Channels, Mutual Information, Markov Sources, Channel Capacity.

[T1, T2][No. of hrs. 12]**UNIT-II**

Channel Coding Theorem, Differential Entropy and Mutual Information for Continuous Ensembles, Information Capacity Theorem and its implications, Information Capacity of a colored noise channel. Discrete Memoryless Channels and Channel Coding Theorem revisited.

[T1, T2, R1, R5][No. of Hrs. 10]**UNIT-III**

Linear Block codes, Repetition Codes, Syndrome Decoding, Hamming Codes, Dual Code, Cyclic Codes, Maximal Length Codes, CRC Codes, BCH Codes, Reed-Solomon Codes, Golay Codes, Convolutional Codes: Code Tree, Trellis and State Diagram.

[T1, R2, R4][No. of Hrs. 11]**UNIT-IV**

Decoding of Convolutional Codes: Maximum Likelihood decoding, Viterbi's algorithm, free distance of a convolutional code. Turbo Codes: Turbo Encoder and Decoder, Puncturing, Performance of Turbo Codes. Introduction to Cryptography.

[T1, R2, R3, R5] [No. of Hrs. 11]**Text Books:**

- [T1] Simon Haykins, "Communication Systems", 4th Edition Wiley, 2001.
 [T2] J G Proakis, "Digital Communications", Mc Graw Hill, 2001.

Reference Books:

- [R1] T M Gover, J M Thomos, "Elements of Information Theory", Wiley, 1999.
 [R2] Arijit Saha, Nilotpal Manna, Surajit Mandal, "Information Theory, Coding and Cryptography", Pearson Education, 2013.
 [R3] Schaum's Outlines, Analog and Digital Communications, Second Edition.
 [R4] Amitabha Bhattacharya, "Digital Communication", TMH 2006.
 [R5] J. H. van Lint.. Introduction to Coding Theory, Springer -Verlag.

HUMAN COMPUTER INTERACTION

Paper Code: ETCS-404

Paper: Human Computer Interaction

L	T/P	C
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 introduce the students about the interaction between and computer and human being.

UNIT I

Introduction: The Human, The Computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles and Theories.

Design Process: Interaction design basics, HCI in the software process, Design rules, Implementation support, Evaluation techniques, Universal design, User Support.

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

UNIT II

Models and Theories: Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modelling rich interaction.

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

UNIT III

Interaction Styles: Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation.

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

UNIT IV

Design Issues: Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization.

Outside the Box: Group ware, Ubiquitous computing and augmented realities, Hypertext, Multimedia and the World Wide Web.

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

Text Books:

- [T1] Alan Dix, Janet Finlay, "Human Computer Interaction", ISBN: 9788131717035 Pearson Education, 2004.
- [T2] Ben Shneiderman, "Designing the User Interface-Strategies for Effective Human Computer Interaction", ISBN:9788131732557, Pearson Education , 2010

Reference Books:

- [R1] Usability Engineering: Scenario-Based Development of Human-Computer Interaction, by Rosson, M. and Carroll, J. (2002)
- [R2] The Essentials of Interaction Design, by Cooper, et al. , Wiley Publishing(2007)
- [R3] Usability Engineering, by Nielsen, J. Morgan Kaufmann, San Francisco, 1993. ISBN 0-12-518406-9
- [R4] The Resonant Interface: HCI Foundations for Interaction Design , by Heim, S. , Addison-Wesley. (2007)
- [R5] Usability engineering: scenario-based development of human-computer interaction, By Rosson, M.B & Carroll, J.M. , Morgan Kaufman.(2002).

DIGITAL IMAGE PROCESSING**Paper Code: ETIT-418****Paper: Digital Image Processing**

L	T/P	C
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.

Objectives: The aim of this course is to provide digital image processing fundamentals, hardware and software, digitization, encoding, segmentation, feature extraction etc. It will enhance the ability of students to apply tools in image restoration, enhancement and compression and to apply the techniques in both the spatial and frequency domains. It will enhance the ability of students to identify the quality characteristics of medical images, differences between computer vision and image processing and help in studying the remote sensing images of the environmental studies.

UNIT- I:

Introduction and Digital Image Fundamentals: The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbors, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Image Enhancement in the Spatial Domain: Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothing and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

[T1, T2][No. of Hrs: 10]**UNIT- II:**

Filtering in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters.

Image Restoration: A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

[T1, T2][No. of Hrs. 12]**UNIT- III:**

Image Compression: fundamentals of compression, coding redundancy, Lossy and lossless compression, Spatial and temporal redundancy, Image compression models. Some basic compression methods

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Region Oriented Segmentation, Motion based segmentation.

[T1, T2][No. of Hrs. 12]**UNIT- IV:**

Representation and Description: Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition: Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

[T1, T2][No. of Hrs: 10]**Text Books:**

[T1] Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3rd edition, Pearson, 2002.

[T2] A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

Reference Books:

[R1] Bernd Jahne, "Digital Image Processing", 5th Ed., Springer, 2002.

[R2] William K Pratt, "Digital Image Processing: Paks Inside", John Wiley & Sons, 2001.

NEXT GENERATION NETWORKS**Paper Code: ETIT-420****Paper: Next Generation Networks**

L	T/P	C
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.

Objectives: The objective of this paper is to introduce the students about the advanced and next generation networks and wireless access and transportation technologies.

UNIT I**Converged Services for Next Generation Networks**

GSM/UMTS Network protocols: SS7 and 94tandardi basics, Supplementary Services: UMTS procedures. Intelligent Network: IN principles, CAMEL, Services: what are the challenges? , Integration, deployment issues. Next Generation Networks: IMS: the convergence. NGN architecture, NGN control architectures and protocols, Multi-access to the services: 3G, WiFi, DSL, Cable. TISpan, SIP, Service architectures, Transition of networks (PSTN, IP-based) to NGN, Ipv6-based NGN, MEGACO, H.248, P2P systems, P2P SIP, Social Networks: Web-NGN convergence, Telco 2.0, IPTV, RCS. UMTS 94tandardized94on at 3GPP: Standardisation process and principles in ETSI and 3GPP, Functionalities 94tandardized in UMTS from Release 99 to Release 9. Latest 3GPP updates: what happened in 2010?

[T1, T2][No. of Hrs. 12]**UNIT II****Wireless Access and Transport Technologies**

RAN architecture : Radio Access Network Architecture for GSM, GPRS and UMTS, network devices, interfaces and protocols , QoS definition and management in GPRS and UMTS, Access methods and radio resource management in mobile networks, mainly for: TDMA systems, CDMA systems and OFDMA systems. Scheduling issues for GPRS, UMTS and WiMAX : downlink, uplink Physical to logical channel mapping : for GSM , for UMTS Procedure and protocol used for resource allocation ,PDP Context and TBF allocation.

[T1][No. of Hrs. 12]**UNIT III****WPAN, WLAN, WMAN and Broadcast technologies**

WLAN, WPAN, WMAN, DVB-H: Introduction ,WiFi: Standards, performance, usage and applications, new evolutions ,WiMAX, DVB-H :Usage and standard, Security :Basics, architectures, algorithms, Bluetooth: Standard, performance, usage and applications , Zigbee, UWB: Standards and usage, Service discovery in wireless Networks (jxta, UPnP,...) , Security in Wireless Networks: PANs, LANs and cellular Wireless Networks Simulation (tools and methods)

[T1][No. of Hrs. 10]**UNIT IV****Optimization: Theory and Network applications**

Graph algorithms, linear programming basics, Introduction to Integer programming, Traffic engineering, Network topology calculus, Network optimal routing and dimensioning, Frequency assignment, Pricing, Game theory.

[T2][No. of Hrs. 10]**Text Books:**

- [T1] Next Generation Network Services: Technologies & Strategies by Neill Wilkinson, Publication, 2002 ISBN-10: 0471486671 | ISBN-13: 978-0471486671 | Edition: 1.
- [T2] Next Generation Networks: Perspectives and Potentials by Jingming Li Salina, Pascal Salina, Publisher:John Wiley & Sons, 2008, ISBN:0470724471, 9780470724477.

Reference book:

- [R1] Next-Generation Network Services: By Robert Wood, Published Nov 1, 2005 by Cisco Press. Part of the Networking Technology series
- [R2] Best Practices for Implementing Next Generation Networks (NGN) in the Asia and Pacific Region, International Telecommunication Union, Telecommunication Development Bureau, June 2012.

GPS AND GIS**Paper Code: ETIT-422****L T/P C****Paper: GPS and GIS****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

Objectives: To study the fundamentals and scope of Global Information System and Global Positioning System.

UNIT- I

Global Information System (GIS): Introduction, scope and benefits of GIS; application areas of GIS; functional components and elements of GIS; geographic objects: scale, accuracy and resolution.

GIS Cartography and Maps: Digital cartography: selection, classification and simplification; exaggeration and symbolization for cartographic abstraction; Types of Maps; map elements: projection, direction, scale and co-ordinates; Geodatabases; GIS map outputs; Topographic mapping.

[T1,T2][No. of Hrs: 11]**UNIT- II**

Geographic Data: Spatial and attribute data; vector and raster models; points, lines, polygon features; computed and associated attributes; grids, cells and image data; linking spatial and attributed data.

Geoprocessing: Geographic co-ordinate system: latitudes and longitudes; Geoids Spheroids ellipsoids and datum's; projections and transformations.

[T1,T2][No. of Hrs: 10]**UNIT- III**

Global Positioning System (GPS): Introduction; GPS components: systems, scales and codes; error and accuracy of GPS observation; Differential GPS.

Fundamentals of Satellite Orbits: Orbital Mechanics, Constellation Design

Remote Sensing (RS): Introduction; application of RS; electromagnetic radiation; spectral signatures; aerial/satellite image characteristics: spatial, spectral, radiometric and temporal.

[T1,T2][No. of Hrs: 11]**UNIT- IV**

Statistics: Spatial statistics; independent and dependent variables; continuous data: sampling, correlation, regression, frequency and descriptive analysis; discrete data.

Interpolation: Characteristic interpolators; deterministic interpolators; evaluating interpolators.

[T1,T2][No. of Hrs: 10]**Text Books:**

Note: There is no single textbook for this course. Suggested Readings:

- [T1] Burrough, P.A. and R.A. McDonnell, Principles of Geographic Information System, Oxford University Press, Oxford.
- [T2] Chang, K.T., Introduction to Geographic Information System, Tata Mc Graw-Hill, New Delhi.
- [T3] Heywood, I. et. al., An Introduction to Geographic Information Systems, Pearson Education, Delhi.
- [T4] Clarke, K., Analytical and Computer Cartography. 2nd Ed., Upper Saddle River.
- [T5] Garmin Corporation., GPS Guide for Beginners available at: <http://www.garmin.com/manuals/gps4beg.pdf>.
- [T6] LLiffe, J.C., Datum and Map Projections for remote Sensing, GIS and Surveying. New York : CRC Press.
- [T7] Curran, Paul J., Principles of Remote Sensing, Longman, London & New York.
- [T8] Lillesand, T. and R. Kiefer, Remote Sensing and Image Interpretation, Wiley, New York.

SATELLITE COMMUNICATION

Paper Code: ETEC-404

Paper: Satellite Communication

L	T/P	C
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.

Objectives: To study the most relevant aspects of satellite communication with emphasis on the most recent application & developments. It covers orbital mechanics, launching techniques, satellite link design, earth & space segment, error control coding and different multiple access techniques.

UNIT- I

Principles of Satellite Communication: Evolution & growth of communication satellite, Satellite frequency allocation & Band spectrum, Advantages of satellite communication, Active & Passive satellite, Applications of satellite communication. Synchronous satellite, Satellite Launch.

Satellite Orbits: Introduction, Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits, LEO, MEO, Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage.

[T1, T2, R1][No. of Hrs. 11]

UNIT- II

Satellite Link Design

Basic transmission, System noise temperature, G/T ratio, design of down links, uplink design, design of specified C/N, Atmospheric Absorption, Rain induced attenuation.

Space Segment: Power Supply, Altitude Control, Station Keeping, Thermal Control, TT&C sub system, Transponders, Antenna Sub system.

Earth Segment: Subsystem of earth station, Transmit-Receive Earth Station, different types of earth stations, frequency coordination.

[T1, T2, R1][No. of Hrs. 11]

UNIT- III

Multiple Access Techniques: FDMA, FDMA down link analysis. TDMA, Satellite-switched TDMA, code division multiple access, DAMA, On board signal processing for FDMA/TDM Operation.

Error Control for Digital Satellite Links: Error detection and correction for digital satellite links, error control coding, Convolutional codes, satellite links concatenated coding and interleaving, Automatic Repeat Request (ARQ).

[T1, T2, R2][No. of Hrs. 10]

UNIT- IV

Interconnection of Satellite Networks: Interconnection with ISDN, Interconnection of television networks.

Satellite Applications: Satellite mobile services, VSAT, GPS, Radarsat, INMARSAT, Satellite navigational system. Direct broadcast satellites (DBS)- Direct to home Broadcast (DTH), Worldspace services, Business TV(BTV)

[T1, R2, R3][No. of Hrs. 10]

Text Books:

- [T1] Dennis Roddy, "Satellite Communication", McGraw Hill International.
 [T2] T. Pratt, "Satellite Communication", John Willy and Sons (Asia) Pvt. Ltd.

Reference Books:

- [R1] T. Ha, "Digital Satellite Communication", McGraw Hill.
 [R2] Bruce R. Elbert, "The Satellite Communication Applications Handbook", Artech House Boston.
 [R3] Mark R. Chartrend, "Satellite Communication" Cengage Learning
 [R4] Handbook of Satellite Communication, Wiley.

E-COMMERCE AND M-COMMERCE**Paper Code: ETIT-428****Paper: E-Commerce and M-Commerce**

L	T/P	C
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: The objective of the paper is to impart knowledge about the fundamentals and advancements in the fields of Electronic Commerce (E-Commerce) and Mobile Commerce (M-Commerce) with the aim of enabling the students to explore the possibilities of practical applications and research aspects in the field of integrating business with Information Technology.

UNIT I

Introduction and Concepts: Networks and commercial transactions – Internet and other novelties; networks and electronic transactions today, Model for commercial transactions; Internet environment – internet advantage, worlds wide web and other internet sales venues; Online commerce solutions.

Security Technologies: Insecurity Internet; A brief introduction to Cryptography; Public key solution; Key distribution and certification; prominent cryptographic applications.

Electronic Payment Methods: Updating traditional transactions; secure online transaction models; Online commercial environments; digital currencies and payment systems; Offline secure processing; private data networks.

[T1] [T2] [R1] [R4] [No. of Hrs. 10]**UNIT II**

Protocols for Public Transport of Private Information: Security protocols; secure protocols; Secure hypertext transfer protocols; Secure sockets layers; Integrating security protocols into the web; Non technical provide.

Electronic Commerce Providers: On-line Commerce options: Company profiles.

Electronic Payment Systems: Digital payment systems; First virtual internet payment system; cyber cash model.

On-line Commerce Environments: Servers and commercial environments; Netscape product line; Netscape commerce server; Microsoft internet explorer and servers; open market.

Digital Currencies: Optional process of Digicash, Ecash Trail; Using Ecash; Smart cards, Electronic Data Interchange; Its basics; EDI versus Internet and EDI over Internet.

Strategies, Techniques and Tools: Internet Strategies: Internet Techniques, Shopping techniques and online selling techniques; Internet tools.

[T1] [R5] [No. of Hrs. 11]**UNIT III**

Supply chain management: Introduction, What is supply chain management? Focus on the value chain, Option for restructuring the supply chain, Using e-business to restructure the supply chain, Supply chain management implementation.

E-procurement: Introduction, What is e-procurement?, Drivers of e-procurement, Focus on estimating e-procurement cost savings, Risks and impacts of e-procurement, Implementing e-procurement, Focus on electronics B2B marketplaces, The future of e-procurement? Customer relationship management: Introduction, What is e-CRM?, conversion marketing, the online buying process, customer acquisition management, focus on marketing communications for customer acquisition, customer retention management focus on excelling in e-commerce service quality, customer extension Analysis and design: Introduction, process modeling, Data modeling, Design for e-business, Focus on user –centered site design, Focus on security design for e-business.

Implementation and maintenance: Introduction, Alternatives for acquiring e-business systems, Development of web-based content and services, focus on developing dynamic web content, testing, Changeover, Content management and maintenance, Focus on measuring and improving performance of e- business systems.

[T2] [R2] [R3] [No. of Hrs. 10]

UNIT IV

Introduction to M-commerce: Emerging applications, different players in m-commerce, M-commerce life cycle Mobile financial services, mobile entertainment services, and proactive service management.

Management of mobile commerce services, Content development and distribution to hand-held devices, content caching, pricing of mobile commerce services; emerging issues in mobile commerce: The role of emerging wireless LANs and 3G/4G wireless networks, personalized content management, implementation challenges in m-commerce, futuristic m-commerce services.

[T2] [R1] [R4] [No. of Hrs. 10]

Text Books:

- [T1] Ravi Kalakota, Andrew B. Whinston, "Frontiers of E-Commerce", 1st Edition, Sept. 1996, Addison Wesley Longman
- [T2] Dave Chaffey, "E-Business and E-Commerce Management", 3rd Edition, 2009, Pearson Education.

References Books:

- [R1] Henry Chan, Raymond Lee and etl., "E-Commerce Fundamental and Applications", 1st Edition, Nov. 2001, Wiley
- [R2] Brian Mennecke and Troy Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group, 2003.
- [R3] Nansi Shi, "Mobile Commerce Applications", IGI Global, 2004.
- [R4] Gary P. Schneider, "Electronic Commerce", Tenth Edition, May 2012, CENGAGE Learning India
- [R5] K. K. Bajaj, D. Nag "E-Commerce", 2nd Edition, Sept. 2005, McGraw Hill Education.
- [R6] P. T. Joseph, "E-Commerce an Indian Perspective", 4th Edition, July 2013, PHI Publication.
- [R7] Bhaskar Bharat, "Electronic Commerce - Technology and Application", 4th Edition, May 2013, McGraw Hill Education.

DISTRIBUTED SYSTEMS

Paper Code: ETIT-430
Paper: Distributed Systems

L	T/P	C
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 understand networking, operating systems and various issues.

UNIT-I**Fundamentals of Distributed Computing:**

Architectural models for distributed and mobile computing systems, Basic concepts in distributed computing.

Distributed Operating Systems:

Overview, network operating systems, Distributed file systems, Middleware, client/server model for computing.

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

UNIT-II**Communication:**

Layered protocols, RPC, RMI, Remote objects. Basic Algorithms in Message Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Message Passing, PVM and MPI.

Process Concepts:

Threads, Clients and Servers, Code migration, Agent based systems, Distributed objects, CORBA, Distributed COM.

[T1 [No. of Hours 10]

UNIT-III**Synchronization:**

Clock synchronization, Logical clocks, Election algorithms, Mutual exclusion, Distributed transactions, Naming concepts, Security in distributed systems

Distributed Databases:

Distributed Data Storage, Fragmentation & Replication, Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols.

[T2][No. of Hours 11]

UNIT-IV**Processing:**

Basic Concepts: Introduction to processing, processing terminology, Design of algorithms, Design of Parallel Databases, Parallel Query Evaluation.

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

Text Books:

- [T1] Tannenbaum, A, Maarten Van Steen. Distributed Systems, Principles and Paradigm, Prentice Hall India, 2002
- [T2] Elmarsi, Navathe, Somayajulu, Gupta, "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2007

Reference Books:

- [R1] Tanenbaum, A, "Modern Operating Systems", 2nd Edition, Prentice Hall India, 2001.
- [R2] Singhal and Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 1994
- [R3] Attiya, Welch, "Distributed Computing", Wiley India, 2006
- [R4] Coulouris, Dollimore and Kindberg, "Distributed Systems", Pearson, 2009.

SELECTED TOPICS OF RECENT TRENDS IN INFORMATION TECHNOLOGY**Paper Code: ETIT-432****L T/P C****Paper: Selected Topics of Recent Trends in IT****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 understand data warehousing and its types, design and concepts of Big Data.

UNIT I Data Warehousing

Introduction to Data Warehousing: Evolution of Data Warehousing, Data Warehousing concepts, Benefits of Data Warehousing, Comparison of OLTP and Data Warehousing, Problems of Data Warehousing.

Data Warehousing Architecture: Operational Data and Data store, Load Manager, Warehouse Manager, Query Manager, Detailed Data, Lightly and Highly summarized Data, Archive/Backup Data, Meta-Data, architecture model, 2-tier, 3-tier and 4-tier data warehouse, end user Access tools.

[T1][No. of Hours 10]**UNIT II Data Warehousing Tools and Technology**

Tools and Technologies: Extraction, cleaning and Transformation tools, Data Warehouse DBMS, Data Warehouse Meta-Data, Administration and management tools, operational vs. information systems.

OLAP & DSS support in data warehouse.

Distributed Data Warehouse: Types of Distributed Data Warehouses, Nature of development Efforts, Distributed Data Warehouse Development, Building the Warehouse on multiple levels.

[R1][R2][No. of Hours 12]**UNIT III Types of Data Warehouses & Data Warehouse Design**

Host based, single stage, LAN based, Multistage, stationary distributed & virtual data-warehouses.

Data warehousing Design: Designing Data warehouse Database, Database Design Methodology for Data Warehouses, Data Warehousing design Using Oracle, OLAP and data mining: Online Analytical processing, Data mining.

[T1][R1][No. of Hours 10]**UNIT IV Introduction to Big Data**

Big Data: Definitions, characteristics, Challenges of Conventional Systems, Web Data, Evolution Of Analytic Scalability, Analytic Processes and Tools - Analysis vs Reporting, Modern Data Analytic Tools, Statistical Concepts: Sampling Distributions, Re-Sampling, Statistical Inference, Prediction Error.

[T2][R3][R4][No. of Hours 12]**Text Books**

[T1] Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2003.

[T2] Adam Jorgensen, James Rowland-Jones, John Welch, Dan Clark, Christopher Prices, Brian Mitchell "Microsoft Big Data Solutions" Wley India.

Reference Books

[R1] W. H. Inmon, "Building the operational data store", 2nd Ed., John Wiley, 1999.

[R2] Kamber and Han, "Data Mining Concepts and Techniques", Hartcourt India P. Ltd., 2001

[R3] Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan, Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, 2012

[R4] Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, 2011

MOBILE COMPUTING LAB**Paper Code: ETIT-452****Paper: Mobile Computing Lab**

L	T/P	C
0	2	1

List of Experiments:

The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc.,

Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

Tool Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

For MANETS, use of NS2/NS3 is recommended for two experiments.

Reference Books:

- [R1] Donn Felker, "Android Application Development for Dummies", Wiley, 2010
- [R2] Reto Meier, "Professional Android 2 Application Development", Wrox's Prog. To Programmer Series.
- [R3] Ed Burnette, 'Hello, Android: Introducing Google's Mobile Development Platform' third edition' Pragmatic Programmers, 2012
- [R4] Jerome (J.F) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.
- [R5] Reza B'Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University press, 2005.
- [R6] R.Riggs, A. Taivalsaari, M.VandenBrink, "Programming Wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-201-74627-1, Addison Wesley,, 2001.

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

ADHOC AND SENSOR NETWORKS LAB**Paper Code: ETEC-458****Paper: Ad Hoc and Sensor Networks Lab**

L	T/P	C
0	2	1

Ad Hoc and Sensor Networks Lab Experiments based on syllabus ETEC-406.**NOTE:- At least 8 Experiments from the syllabus must be done in the semester.**

GPS AND GIS LAB**Paper Code: ETIT-458(ELECTIVE-II)****L T/P C****Paper: GPS and GIS Lab****0 2 1****Softwares for GPS:**

- a. openGTS
- b. GPSTk

Softwares for GIS:

- a. QGIS
- b. GRASS GIS
- c. GeoTools
- d. ArcView GIS

List of Experiments***First Set of Experiments:***

1. Using Handheld GPS for location & recording points
2. Recording point positions and data
3. Importing Juno Data into ArcMap
4. Set up a work area with basemap data
5. Entering data into Excel and Adding as Events to ArcMap
6. Using Pathfinder to download saved file from the GPS
7. Execute ArcMap
8. Loading an orthophoto into the Juno

Second Set of Experiments:

1. Introduction to Mapping, Triangulation & Navigation using ArcView GIS
2. GPS/GIS Data Conversion and Map Construction
3. GPS Data Gathering
4. DGPS Post Processing and GIS Data Transfer
5. ArcView processing and map presentation

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

NEXT GENERATION NETWORKS LAB**Paper Code: ETIT-458(ELECTIVE-II)****L T/P C****Paper: Next Generation Networks Lab****0 2 1****List of Experiments:**

1. Overview of IP Address
2. Design Ethernet Cables : Cross Cable, Straight Cable, Rollover Cable
3. Demonstrate to connect two computer without connecting devices
4. Demonstrate to connect two computer with connecting devices
5. Demonstrate to establish client-server connection with using of windows server 2008
6. Use of policies in Windows Server 2008
7. Overview of Router
8. Demonstrate the use of router to make a connection
9. Introduction to Network Address Translation
10. Overview of different interfaces in router
11. Implement IP Subnetting in IPV4
12. Implement IP routing using RIP
13. Implement IP routing using IGRP
14. Implement IP routing using EIGRP
15. Implement IP routing using OSPF
16. Configuration of VLAN
17. Configuration of VTP
18. Managing traffic with Standard IP Access List
19. Managing traffic with Extended IP Access List
20. Overview of MPLS

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