JIMS Engineering Management Technical Campus, Greater Noida

(Affiliated to GGSIP University, Dwarka, Delhi)

Department of Computer Science & Engineering

Academic Year 2018-19

VISION AND MISSION OF COMPUTER SCIENCE & ENGINEERING DEPARTMENT

Vision

To become a Center of Excellence in the computer sciences & Engineering discipline with a strong research and teaching environment that adapts swiftly to the challenges of the 21st century.

Mission

M1: To improve the problem solving capability of students through continual learning so as to produce quality engineers in the field of Computer Science.

M2: To bridge the gap between industry and academia by bringing state of the art technology.

M3: To encourage innovation through multidisciplinary research and development activities.

M4: To inculcate human values and ethics, to serve the society in all possible ways.

Program Specific Outcomes (PSO's):

PSO 1: To have excellent scientific and engineering breadth as to comprehend, analyze, design and solve real life problems using state-of-the-art technologies.
PSO 2: To lead a successful career in industries, pursue higher studies or entrepreneurial endeavours so that engineering graduates can face global challenge.
PSO 3: To effectively bridge the gap between industry and academia for effective communication skill, professional attitude, ethical values and a desire to learn.
PSO 4: To provide highly competitive environment, solidarity for successful professional career as engineer, scientist, entrepreneur, bureaucrats etc to the students for the betterment of society.

PSO TO MISSION STATEMENT MAPPING

PSO Statements:	M1	M2	M3	M4
PSO 1	3	2	2	3
PSO 2	3	2	2	3
PSO 3	3	3	3	3
PSO 4	2	3	3	3

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

Programme Outcome (POs)/Graduate Attributes

S. No.	Graduate Attributes	Program Outcomes (POs)
1	**Engineering knowledge:**	**PO1:**Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problem analysis:**	**PO2:**Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	**Design/development of solutions:**	**PO3:**Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	**Conduct investigations of complex problems:**	**PO4:**Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	**Modern tool usage:**	**PO5:**Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6	**The engineer and society:**	**PO6:**Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	**Environment and sustainability:**	**PO7:**Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	**Ethics:**	**PO8:**Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	**Individual and team work:**	**PO9:**Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	**Communication:**	**PO10:**Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance:**	**PO11:**Demonstrate knowledge understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	**Life-long learning:**	**PO12:**Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF POs TO PSOs

PEOs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PSO-1	3	3	3	2	3	2	3	2	3	1	3	2
PSO-2	3	3	3	2	3	2	3	2	3	3	3	2
PSO-3	3	3	3	2	2	2	2	3	3	3	3	2
PSO-4	3	3	3	3	3	3	3	3	3	2	3	3

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

Fundamentals of Computing

Course Code: ETCS-111	**Semester: 1**
L: T: P: 2:0:2	**Credit: 2**

After course completion students will be able to:	
CO1	Understand the parts of computer system and their utilization
CO2	Understand working of different type of operating systems
CO3	Restate the network types, topologies, protocols and media
CO4	Represent the features of libre office writer, impress and calc

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3					2						
CO2		2		2	3							
CO3			2	2		3			2			
CO4			2	2	2	2						

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	COURSE CONTENT	Hrs	Cos
1	**UNIT-I:** Five Component Model of a Computer, System and Application software (introduction) storage devices , primary (RAM, ROM, PROM, EPROM, cache) Memory and secondary (magnetic tape, hard disk, Compact disks) memory , peripheral devices , printers.	8	CO1
2	**UNIT-II:** Operating Systems: DOS Internal, External commands, Windows (2000 and NT) , Overview of architecture of Windows, tools and system utilities including registry, partitioning of hard disk, Overview of Linux architecture, File system, file and permissions, concept of user and group, installation of rpm and deb based packages.	8	CO2
3	**UNIT-III:** Basics of programming through flow chart , Networking Basics - Uses of a network and Common types of networks, Network topologies and protocols , Network media and hardware, Overview of Database Management System.	8	CO3
4	**UNIT-IV:** Libre / Open Office Writer : Editing and Reviewing, Drawing, Tables, Graphs, Templates Libre / Open Office Calc : Worksheet Management , Formulas, Functions, Charts Libre / Open Office Impress: designing powerful power-point presentation	8	CO4

Text Books:

[T1] Peter Norton, Introduction to computers, Sixth Edition Tata McGraw Hill (2007).
[T2] Andrews Jean, A+Guide to Managing & Maintaining Your PC, Cengage Publication 6/e

Reference Books/Link:

[R1] Anita Goel, Computer Fundamentals, Pearson Education.
[R2] Joiner Associates Staff, Flowcharts: Plain & Simple: Learning & Application Guide , Oriel Inc
[R3] http://www.openoffice.org/why/
[R4] http://www.libreoffice.org/get-help/documentation/

ASSESSMENT PATTERN:
Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

DATA STRUCTURE

Course Code:	**ETCS 209**
L:T:P:	**3:1:1**
Semester:	**THIRD**
Credit: 4	

After course completion students will be able to:	
CO1	Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include: arrays, linked lists, stacks, queues, binary trees, heaps, and hash tables.
CO2	Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
CO3	Students learn to analyze and compare algorithms for efficiency using Big-O notation.
CO4	Students implement projects requiring the implementation of the above data structures.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	3	2	3	1							
CO2	2	3	2	2	2							
CO3	1	2	2	1	1						2	
CO4	1	2	2	3	2	1	2	2				3

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	**COURSE CONTENT**	**HRS**	**COs**
1	**UNIT-I:** Introduction to programm ing 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 inter-conversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT, List manipulations, Single, double and circular lists.	12	1,2,3
2	**UNIT-II:** Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expreession trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.	12	1,2,4
3	**UNIT-III:** Multiway trees, B-Trees, 2-3 trees, 2-3-4 trees, B* and B+ Trees. Graphs, Graph representation, Graph traversal.	12	2,3,4
4	**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, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing: linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.	12	2,3,4

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.

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

FOUNDATION OF COMPUTER SCIENCE	
Course Code: ETCS-203	**Semester: 3rd**
L:T:P 3:1:0	**Credit: 4**

After course completion students will be able to:	
CO1	Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
CO2	Foundations of Software development: Ability to understand the structure and development methodologies of software systems. Possess professional skills and knowledge of software design process. Familiarity and practical competence with a broad range of programming language and open source platforms.
CO3	Foundation of mathematical concepts: Ability to apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm.
CO4	Applications of Computing and Research Ability: Ability to use knowledge in various domains to identify research gaps and hence to provide solution to new ideas and innovations

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	3	2	2	1	2	3	1	1	3
CO2	3	2	2	2	1	2	2	1	1	2	2	1
CO3	2	2	1	3	1	2	1	1	2	2	1	2
CO4	3	1	1	1	2	2	3	1	2	3	2	1

3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. N.	COURSE CONTENT	HRS	Cos
1	Formal Logic**:** Preposition, 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.	10	CO1
2	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.	12	CO2
3	**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..	11	CO3
4	**UNIT-IV:**	11	CO4

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

Text Books:

[T1] Norman L. Biggs, "Discrete Mathematics", Oxford, second edition.
[T2] Keneth 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.

Websites:

[W1] https://www.wikipedia.org/
[W2] https://www.tutorialspoint.com/discrete_mathematics/
[W3] https://onlinecourses.nptel.ac.in/

Journals:

[J1] https://www.journals.elsevier.com/discrete-mathematics
[J2] https://www.sciencedirect.com/journal/discrete-mathematics
[J3] www.sciencepublishinggroup.com/journal/index?journalid=605

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

CIRCUITS & SYSTEMS

Course Code: ETEE-207	**Semester:3rd Semester (CSE)**
L:T:P: 3:1:2	**Credit:4**

After course completion students will be able to:	
CO1	Understand basic concept of different types of signals, systems and waveforms with synthesis and their properties.
CO2	Understand response of different circuits for different Signals.
CO3	Understand types, inter conversionand inter connection of two port network. Application of Graph Theory to solve electric Network.Concept on Network function
CO4	Understand Concept of Synthesis and Filters

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	3	3	3	3	2	3	3
CO2	3	3	2	3	2	3	2	3	2	2	3	2
CO3	3	3	3	3	3	3	3	3	3	2	3	3
CO4	3	3	2	3	2	3	3	2	3	2	3	3

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant

S. NO.	COURSE CONTENT	Hrs	COs
	UNIT-I: Introduction to signals, their classification and properties, different types of systems, LTI systems and theirproperties, periodic waveforms and signal synthesis, properties and applications of Laplace transform of complex waveform.	10	CO1
	UNIT-II: System modeling in terms of differential equations and transient response of R, L, C, series and parallel circuitsfor impulse, step, ramp, sinusoidal and exponential signals by classical method and using Laplace transform.	12	CO2
	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 inter-conversion, interconnection of two 2-port networks, open circuit and short circuit impedances and ABCD constants, relation between image impedancesand short circuit and open circuit impedances. Network functions, their properties and concept of transform impedance, Hurwitz polynomial	10	CO3
	UNIT-IV: Positive real function and synthesis of LC, RC, RL Networks in Foster's I and II, Cauer's I& IIforms, Introduction of passive filter and their classification, frequency response, characteristic impedance of low pass, high pass, Band Pass and Band reject prototype section.	10	CO4

Text Books

1.W H Hayt "Engineering Circuit Analysis" TMH Eighth Edition
2.Kuo, "Network analysis and synthesis" John Weily and Sons, 2nd Edition.

Reference Books

1 S Salivahanan "Circuit Theory "Vikas Publishing House 1st Edition 2014
2. Van Valkenburg, " Network analysis" PHI, 2000.
3. Bhise, Chadda, Kulshreshtha, " Engineering network analysis and filter design" Umesh pub, 2000.
4. D. R. Choudhary, "Networks and Systems" New Age International, 1999
5. Allan H Robbins, W.C.Miller "Circuit Analysis theory and Practice"Cengage Learning Pub 5th Edition 2013
6. Bell "Electric Circuit" Oxford Publications 7th Edition.

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

COMPUTER GRAPHICS & MULTIMEDIA

Course Code: ETCS 211	**Semester: 3**
L:T:P : 3:1:2	**Credits: 4**

COs	At the end of the course the student should be able to understand the concepts in modern computer graphics and multimedia
CO1	To study the basic input and output devices in detail. To understand and analyse the algorithms and numerical problems of scan converting primitive drawings in 2D & 3D.
CO2	To understand and analyse the clipping and curve drawing concepts in 2D. To study the light models.
CO3	To learn the concepts of shading models and hidden surface removals along with the overview of multimedia tools and category.
CO4	To study the data compression techniques using different algorithms.

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	3	3	2	2	2	2	2	2
CO2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	2	2	2	3	3	3	3	3	3	3
CO4	3	3	3	3	2	3	2	2	3	3	2	2

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S.No.	Topic	No. of Lectures	Course Outcomes
1.	**UNIT-1:** 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.	11	CO1
2.	**UNIT-2:** 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.	11	CO2

3.	**UNIT-3:** 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.	11	CO3
4.	**UNIT-4:** 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.	11	CO4

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.

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

SWITCHING THEORY AND LOGIC DESIGN

Course Code: ETEC 205	**Semester: 3**
L:T:P: 3:1:1	**Credit: 4**

After course completion students will be able to:	
CO1	Represent numerical values in various number systems and perform number conversions between different number systems.
CO2	Analyze and design digital combinational circuits like decoders, encoders, multiplexers, and de-multiplexers including arithmetic circuits (half adder, full adder, Switching Theory and Logic Design). Design asynchronous sequential circuits. Understand the nomenclature and technology in the area of memory devices: ROM, RAM, PROM, PLD, FPGAs, etc.
CO3	Analyze sequential digital circuits like flip-flops, registers, counters. Design Finite state machine circuits.
CO4	Represent algorithm state machine problems and fault detection and location identification.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	3				1	1					
CO2	1	3	3	1	2							
CO3	1	3	2	3							1	
CO4	1	1	3		2			2				2

3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	**COURSE CONTENT**	**HRS**	**Cos**
1	**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	14	CO1
2	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.	10	CO2

3	**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.	10	CO3
4	**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.	10	CO4

Text Books:

[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 Book:

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

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

APPLIED MATHEMATICS-III

Course Code:	**ETMA-201**
L:T:P:	**3:1:0**
Semester:	**III**
Credit: 4	

After course completion students will be able :	
CO1	To get the knowledge about the Fourier series and Fourier transform
CO2	To understand the basic concept of difference equation and Z-transform
CO3	To study the numerical methods for solution of algebraic and transcendental equation, linear simultaneous equation, interpolation and extrapolation.
CO4	To study the numerical methods for numerical differentiation, numerical integration, numerical solution of ordinary differential equation.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	2	2	1	1	1	1	1	2	2
CO2	3	3	3	2	2	1	1	1	1	1	2	2
CO3	3	3	3	3	3	2	2	1	2	1	2	2
CO4	3	3	3	3	3	2	2	1	2	1	2	2

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	**COURSE CONTENT**		**COs**
1	**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.		CO1
2	**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.		CO2
3	**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:		CO3

	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.		
4	**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.		CO4

Text Books:

1. R.K. Jain and S.R.K. Iyengar," Numerical methods for Scientific and Engineering Computation", New Age Publishing Delhi-2014.
2. B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications, 2014 Edition.

Reference Books:

1. E. kresyzig," Advance Engineering Mathematics", Wiley publications
2. P. B. Patil and U. P. Verma, " Numerical Computational Methods", Narosa
3. Partial Differential Equations" Schaum's Outline Series, McGraw Hill.
4. Michael Greenberg, " Advance Engineering mathematics" , Pearson.
5. Schaum's Outline on Fourier Analysis with Applications to Boundary Value Problem, Tata McGraw-Hill

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember	**4**	**3**
Understand	**3**	**2**
Apply	**2**	**2**
Analyze	**2**	**1**
Evaluate	**3**	**1**
Create	**1**	**1**

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

DESIGN & ANALYSIS OF ALGORITHM

Course Code: ETCS -301	SEMESTER V
L T P: 3 1 2	CREDIT:4

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

After course completion students will be able to:	
CO1	*Argue the correctness of algorithms using inductive proofs and invariants. Analyze worst-case running times of algorithms using asymptotic analysis. Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.*
CO2	*Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms, and analyze them.*
CO3	*Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them.*
CO4	*Describe the various string matching algorithm and explain when an algorithm design situation call. Understanding of type of problem-P,NP*

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	2	3	3	2	2	3	3	3	1	2
CO2	1	1	2	3	3	1	2	3	3	3	1	2
CO3	1	1	2	3	3	2	2	3	3	3	1	2
CO4	1	1	2	3	3	2	2	3	3	3	1	2

[1=Highly Significant, 2=Moderate Significant, 3=Least Significant]

UNIVERSITY SYLLABUS

S. NO.	COURSE CONTENT	Hrs	CO
1	Asymptotic notations for time and space complexity, Big-Oh notation, Θ notation, _ 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.	10	CO-1
2	**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.	10	CO-2
3	**Greedy Algorithms:** Elements of Greedy strategy, overview of local and global optima, matroid, Activity selection problem, Fractional Knapsack problem, Huffman Codes, A task scheduling	10	CO-3

	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).		
4	**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).	10	CO-4

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

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

JAVA PROGRAMMING

Course Code: ETCS307	**Semester: V**
L: T: P: 3:1:1	**Credit: 4**

After course completion students will be able to:	
CO1	Understand the basic concept of Java like JVM, Platform independence, Security architecture of Java and Garbage collection.
CO2	Understand and apply principles of inheritance, polymorphism, encapsulation and method overloading. Identify classes, objects, members of a class and the relationships among them needed for a specific problem by applying exception handling so that the program execute smoothly even there are problems.
CO3	Understand the concept of thread, thread priority, synchronization and Multithreading and learn GUI programming by using different layout managers and applying event handling. Extend his/her knowledge of java programming for creating applets of his/ her own choice.
CO4	Develop programs using the Java Collection API as well as using the Java Database Connectivity by different databases and to learn socket programming. Develop the skills to apply java programming in problem solving.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	1	2	2	2	2	1	1	1	1
CO2	3	2	2	3	2	1	1	1	1	1	1	2
CO3	1	3	2	2	2	2	2	1	1	1	1	1
CO4	1	2	2	3	3	2	1	1	2	1	2	1

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	COURSE CONTENT	HRS	Cos
1	**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	11	CO1
2	**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.	12	CO2

3	**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	11	CO3
4	**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.	10	CO4

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.

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember	**4**	**3**
Understand	**3**	**2**
Apply	**3**	**1**
Analyze	**1**	**1**
Evaluate	**2**	**2**
Create	**2**	**1**

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	**40**
Understand	**10**
Apply	**10**
Analyze	**5**
Evaluate	**5**
Create	**5**

DIGITAL COMMUNICATION

Course Code: ETEC-303	**Semester: 5**
L: T: P: 3:1:1	**Credit: 4**

After course completion students will be able to:	
CO1	Describe **(REMEMBERING)** different line coding schemes, classify **(UNDERSTANDING)** digital modulation techniques with probability of error concepts.
CO2	Apply **(APPLYING)**the concept of probability theory in random theory of communication system and implement **(APPLYING)** it to calculate various numerical problems on this.
CO3	Design (**DESIGNING**) different receivers to calculate probability of error and signal to noise ratio and evaluate their performance.
CO4	Analyse **(ANALYSING**) different digital modulation techniques and apply (**APPLYING**) it in various communication systems.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2									1	
CO2	3	2		1							1	
CO3	2	3		3	3			2	1	2		
CO4	3	2		2	1			1			2	

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	COURSE CONTENT	Hrs	Cos
1	**UNIT- I:** **Introduction to Digital Communication:** **Line coding:** NRZ, RZ, Manchester encoding, differential Manchester encoding, AMI coding, high density bipolar code, binary with n-zero substitution codes, Review of Sampling theorem, uniform and non-uniform quantization, companding, μ-Law and A-Law compressors, Concept and Analysis of PCM, DPCM, DM and ADM modulators and demodulators, M-ary waveforms, S/N ratio for all modulation, probability of error for PCM in AWGN Channel and other modulation techniques, Duo Binary pulse.	11	Co1
2	**UNIT- II:** **Random Signal Theory:** Probability, Concept of Random variable (Stationary, Non stationary, WSS, SSS), Random process, CDF, PDF, Joint CDF, Joint PDF, marginal PDF, Mean, Moments, Central Moment Auto-correlation & Cross-correlation, covariance functions, ergodicity, power spectral density, Gaussian distribution, Uniform distribution, Rayleigh distribution, Binomial distribution, Poission distribution, Weiner distribution, Wiener-Khinchin theorem, Central limit theorem.	11	Co2

3	**UNIT- III Designing of Receiver:** Analysis of digital receiver, Prediction Filter, Design and Property of Matched filter, Correlator Receiver, Orthogonal Signal, Gram-Schmidt Orthogonalization Procedure, Maximum likelihood receiver, Coherent receiver design, Inter Symbol Interference, Eye Pattern	11	Co3
4	**UNIT- IV:** **Digital modulation schemes:** Coherent Binary Schemes: ASK, FSK, PSK, QPSK, MSK, G-MSK. Coherent M-ary Schemes, Incoherent Schemes (DPSK and DEPSK), Calculation of average probability of error for different modulation schemes, Power spectra of digitally modulated signals, Performance comparison of different digital modulation schemes. Review of 2 Latest Research Paper.	11	Co4

Text Books:

[T1] Simon Haykin, "Communication Systems" John Wiley & Sons, Inc 4th Edition.
[T2] Taub Schilling, "Principles of Communication Systems" TMH, 2nd Edition

Reference Book:

[R1] George Kennedy, "Communication System" TMH – 4th Edition
[R2] B. P. Lathi, "Modern Digital and Analog Communication System" Oxford University Press
[R3] Digital Communications by John G.Proakis; McGraw Hill.

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

SOFTWARE ENGINEERING

Course Code: ETCS303	**Semester: V**
L: T: P: 4:1:4	**Credit: 4**

After course completion students will be able to:	
CO1	Classify the software development process based on various parameters such as metrics, software design software modules. Determine and describe various phases, passes & models of software engineering.
CO2	Efforts & design metrics, software metrics,
CO3	The evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future.
CO4	To employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, lifelong learning and a zest for higher studies and also to act as a good citizen by inculcating in them moral values & ethics.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	1	2	1	2		1	1	3
CO2	3	2	1	2	2	1			1		1	2
CO3	3	2	2	2	2	2	1	1		1	1	3
CO4	2	1	2	2	3	2	1		2		2	2

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. No.	COURSE CONTENT	HRS	CO's
1	**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.	10	CO1
2	**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.	11	CO2
3	**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.	12	CO3
4	**UNIT-IV:**	11	CO4

	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.		

Text Books:

[T1] Godbole," Information Systems Security", Wiley
[T2] Merkov, Breithaupt," Information Security", Pearson Education

References:

[R1] Yadav, "Foundations of Information Technology", New Age, Delhi
[R2] Schou, Shoemaker, “Information Assurance for the Enterprise", Tata McGraw Hill
[R3] Furnell, "Computer Insecurity", Springer
[R4] http://www.iiitd.edu.in/~gauravg/

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom’s Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom’s Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

Industrial Management

Course Code: ETMS-311	**Semester: 5**
L: T: P: 3:0:0	**Credit: 3**

After course completion students will be able to:	
CO1	Understand the concept of industrial relation and legislation
CO2	Understand the involvement and impact of trade unions in finance
CO3	Restate the method procedure and need of work study
CO4	Demonstrate the requirement and utilization of quality control

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1							2		2			
CO2									2	3		
CO3					2		2					
CO4					3					2		

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	COURSE CONTENT	HRS	Cos
1	**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.	10	CO1
2	**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.	10	CO2
3	**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.	10	CO3
4	**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.	10	CO4

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.

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

INFORMATION SECURITY	
Course Code: ETCS 401	**Semester: VII**
L:T:P 4:1:4	**Credit: 4**

After course completion students will be able to:	
CO1	Definition and purpose of software engineering, standards will you set for the software designing, ethical issues for software engineering.
CO2	Understanding various software models, phases, passes & modules of software designing. Software metrics such as physical metrics, cost metrics, & design metrics.
CO3	Software designing paradigms involving scientific subjects, seamless design, status reports & crystal reports.
CO4	Create risk factors for software, developing test strategies for software, legal paradigms involved in handling sensitive information. Understanding reverse engineering concept, applying maintenance model to software design.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	3	2	2	1	2	1	1		3
CO2	3	2	1	2	2	1	1	2	1	2	2	3
CO3	2	2	3	2	1	1	2	1	1			3
CO4	2	1	2	1	2	2			2	1	2	1

3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	COURSE CONTENT	HRS	CO's
1	**UNIT-I:** **Information and Security:** **Information Systems:** Recent History, Distributed Information System and its Importance, Role of Internet and Web Services, Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security. Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles, Privacy of Data.	12	CO1
2	**UNIT-II:** **Networks and E-Security:** **Concepts in Internet and World Wide Web:** Brief review of Internet Protocols-TCP/IP, IPV4, IPV6. **Functions of various networking components:** Routers, bridges, switches, hub, gateway and Modulation Techniques. Need for security, Legal, Ethical and Professional Issues in Information Security, Risk Management, 11 Security Threats to E-Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards, **Digital forensics including digital evidence handling:** Media forensics, Cyber forensics, Software forensics, Mobile forensics.	11	CO2

3	**UNIT-III:** **Physical Security and Bio-metrics as Security:** **Physical Security:** Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control-Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges Framework for Information Security, Security Metrics, Information Security Vs Privacy	11	CO3
4	**UNIT-IV:** **Network Cryptography:** Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, **Policies Network Security:** Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunnelling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN.	10	CO4

Text Books:

[T1] Godbole," Information Systems Security", Wiley
[T2] Merkov, Breithaupt," Information Security", Pearson Education

References:

[R1] Yadav, "Foundations of Information Technology", New Age, Delhi
[R2] Schou, Shoemaker, “Information Assurance for the Enterprise", Tata McGraw Hill
[R3] Furnell, "Computer Insecurity", Springer
[R4] http://www.iiitd.edu.in/~gauravg/

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom’s Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom’s Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

After course completion students will be able to:	
CO1	Formulate problem by following Software Testing Life Cycle, Quality control, quality assurance.
CO2	Design Manual Test cases & identify the realistic problem for different category of software.
CO3	Use automation testing tool students will be able test the software.
CO4	Follow the process related activity and testing techniques to work as team member.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2			1			2				2	
CO2		3		1		1	2		2			1
CO3		2	2			2				1		
CO4			1			3		1	2	1		2

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. No.	COURSE CONTENT	Hrs	Cos
1	**UNIT-I:** **Introduction** **Software testing:** Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Software Testing Principles, Tester Role in Software Development, Artifacts of testing (Faults, Errors, and Failures), Limitations of Testing, Challenges in Software Testing, Testing and debugging, Verification, Validation, Test levels. **Software Quality:** Software Quality, Software Control, Quality Assurance, Quality Assurance Analyst, Quality Factor, Quality Management, Methods of Quality Management, Core components of Quality, Cost Aspect of Quality.	10	CO1
2	**UNIT-II:** **White Box and Black Box Testing:** Different Testing Techniques, Differences between testing techniques **Black Box Testing,** Boundary value analysis, Equivalence partitioning, Decision table, State/Graph based testing **White Box Testing:** Static testing techniques, Static analysis tools, Unit/Code functional testing, Control flow testing, Code complexity testing, Data flow testing Integration, System and Acceptance Testing: Integration testing approaches, System testing, Scenario Testing, Deployment testing, Non-functional testing techniques, **Acceptance Testing:** Acceptance criteria, types, test cases selection and execution.	10	CO2

3	**UNIT-III:** **Quality Assurance:** Quality Planning, Quality plan objectives, Planning process overview, Business Plan and Quality Plan, TQM (Total Quality Management), TQM concepts, Zero defect movement **Quality Standards:** Quality Models/Standards, Standards and guidelines, Types of Models, ISO Standards, CMM and CMMI, Six Sigma concepts, Quality Challenge, National Quality Awards.	10	CO3
4	**UNIT-IV:** Test Selection & Minimization for Regression Testing Regression testing, Regression test process, Selection of regression tests, Dynamic Slicing, Test Minimization, Tools for regression testing. Test Management and Automation Test Planning, Management, Execution and Reporting, Software Test Automation: Scope of automation, Design & Architecture for automation, Testing tools, Object Oriented Testing.	10	CO4

Text Books:

[T1] Yogesh Singh,"Software Testing", Cambridge University Press, 2011
[T2] Sagar Naik, Piyu Tripathy," Software Testing and Quality Assurance", Wiley

REFERENCE BOOKS:

[R1] Effective methods for Software Testing William Perry, Wiley
[R2] Aditya P. Mathur, "Foundation of Software Testing", Pearson Education.
[R3] Milind Limaye,"Software Quality Assurance, McGraw-Hill publication
[R4] Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Auerbach Publications, 2008

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

Data Mining and Business Intelligence

Course Code: ETCS 413	**Semester: VIIth**
L: T: P: 3:0:2	**Credit: 4**

After course completion students will be able to:	
CO1	Understand the distinctive features of database and data warehouse, different schemas supported by data warehouse and the concepts OLAP Operations and need of metadata and data cube in a typical DW.
CO2	Design both system and process architecture of a data warehouse of considerable complexity which makes use of various OLAP Servers and will also be acquainted with its backend tools and utilities and the methodology to test and tune a data warehouse.
CO3	Learn the architecture and application of a Data Mining System as a whole. Its various techniques (Mainly Classification and Prediction) and how data mining contributes towards knowledge discovery.
CO4	Learn ways and means to perform different Data Mining tasks like Association, Clustering through methods like Apriori approach, Backpropogation, K-Means, etc.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES

CO's/PO's → ↓	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	2	1	1	2	2	3	2	1	2	2	2	1
CO 2	2	3	2	3	2	3	1	1	2	2	1	2
CO 3	3	3	3	3	3	3	1	2	1	2	1	2
CO 4	3	3	3	3	3	3	2	2	2	1	1	3

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. No.	COURSE CONTENT	Hrs	Cos
1	**UNIT-I:** **Introduction to Data Warehousing:** Overview, Difference between Database System and Data Warehouse, The Compelling Need for data warehousing, Data warehouse – The building Blocks: Defining Features, data warehouses and data marts, overview of the components, Three tier architecture, Metadata in the data warehouse. **Data pre-processing:** Data cleaning, Data transformation ETL Process. ETL tools. **Defining the business requirements:** Dimensional analysis, information packages – a new concept, requirements gathering methods, requirements definition: scope and content.	12	CO1
2	**UNIT-II:** **Principles of Dimensional Modeling:** Objectives, From Requirements to data design, Multi Dimensional Data Model, Schemas: the STAR schema, the Snowflake schema, fact constellation schema. **OLAP in the Data Warehouse:** Demand for Online Analytical Processing, limitations of other analysis methods- OLAP is the answer, OLAP definitions and rules, OLAP characteristics, major features and functions, hyper cubes. **OLAP Operations:** Drill-down and roll-up, slice-and-dice , pivot or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, the DOLAP model, ROLAP versus MOLAP, OLAP	11	CO2

	implementation considerations. Query and Reporting, Executive Information Systems (EIS), Data Warehouse and Business Strategy.		
3	**UNIT-III:** **Data Mining Basics:** What is Data Mining, Data Mining Defined, The knowledge discovery process (KDD Process), Data Mining Applications- The Business Context of Data Mining, Data Mining for Process Improvement, Data Mining as a Research Tool, Data Mining for Marketing, Benefits of data mining, **Major Data Mining Techniques: Classification and Prediction:** Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, KNN Algorithm.	11	CO3
4	**UNIT-IV:** Cluster detection, K- means Algorithm, Outlier Analysis, memory-based reasoning, link analysis, Mining Association Rules in Large Databases: Association Rule Mining, genetic algorithms, neural networks. Data mining tools.	10	CO4

Text Books:

[T1] Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2004.
[T2] Kamber and Han, "Data Mining Concepts and Techniques", Hart Court India P. Ltd. Elsevier Publications Second Edition, 2001

Reference Books:

[R1] W. H. Inmon, "Building the operational data store", 2nd Ed., John Wiley, 1999.
[R2] "Data Warehousing", BPB Publications, 2004.
[R3] Pang- Ning Tan, Michael Steinbach, Viach, Vipin Kumar, Introduction to Data Mining, Pearson
[R4] Shmueli, "Data Mining for Business Intelligence : Concepts, Techniques and Applications in Microsoft Excel with XLMiner",Wiley Publications

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	

ADVANCE COMPUTER NETWORKS

After course completion students will be able to:	
CO1	Students develop knowledge of basic computer networks for networking data and configure the networks like switches, routers and optical fibres based technologies.
CO2	Students develop knowledge of applications of ACN including the ability to implement algorithms for the making distance shorted using different algorithm related to networking.
CO3	Students learn to analyze and compare algorithms for SPF using Dijaktras, Bellman ford.
CO4	Students implement projects requiring the implementation of the above ACN.

MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	3	1							
CO2	2	3	2	2	2							
CO3	1	2	2	1	1						2	
CO4	1	2	2	3	2	1	2	2				3

[3=Highly Significant, 2=Moderate Significant, 1=Least Significant]

S. NO.	COURSE CONTENT	Hrs	Cos
1	**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).	12	1,2,3
2	**UNIT-II** Transport Layer: Transport layer overview, UDP, TCP (Flow Control, Error Control, and Connection Establishment), TCP Protocol: TCP Tahoe, TCP Reno.	12	1,2,4
3	**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.	12	2,3,4
4	**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.	12	2,3,4

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,

ASSESSMENT PATTERN:

Continuous Internal Evaluation (25 Marks)

Bloom's Category Marks	Class Test (15)	Class Performance (10)
Remember		
Understand		
Apply		
Analyze		
Evaluate		
Create		

End Semester Examination (75 Marks)

Bloom's Category Marks	University Examination
Remember	
Understand	
Apply	
Analyze	
Evaluate	
Create	