B. E. II YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2015

III SEMESTER EXAMINATION

Branch Code	Subject Code	Subject	Units	Credits	L	T/p	Exam H.	Marks
A.	**Written Papers**							
Ma	201 A	: Applied Engineering Mathematics – I (ECC)	1	3	2	-	3	50
ECC	202 A	: Network Theory (ECC)	1	3	3	1	3	75
ECC	203 A	: Solid state Electronics & Devices (ECC)	1	3	3	1	3	75
ECC	204 A	: Data Structures (ECC)	1	4	3	1	3	75
ECC	205 A	: Digital Electronics –I (ECC)	1	3	3	1	3	75
		Total (A)	5	16	14	4	-	350
B.	**Practicals & Sessionals**							
ECC	211 B	: Network Laboratory	-	-	-	2	-	50
ECC	212 B	: Electronic Devices Lab.	-	-	-	3	-	50
ECC	213 B	: Data Structures Lab.	-	3	-	3	-	50
ECC	214 B	: Digital Electronic Lab – I	-	-	-	2	-	50
ECC	215 B	: Computer Programming	1	3	-	3	-	50
		Total (B)	1	6	-	13	-	250
		Total of III Semester	6	22	14	17	-	600

B. E. II YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2015
IV SEMESTER EXAMINATION

Branch Code	Subject Code	Subject	Units	Credits	L	T/p	Exam H.	Marks
A.	**Written Papers**							
Ma	251 A :	Applied Engineering Mathematics – II (ECC)	½	3	2	-	3	50
ECC	252 A :	Electronic Circuits (ECC)	1	4	3	1	3	75
ECC	253 A :	Discrete Structures (ECC)	1	4	3	1	3	75
ECC	254 A :	Digital Electronic – II (ECC)	1	4	3	1	3	75
ECC	255 A :	Principles of Programming Languages (ECC)	1	4	3	1	3	75
		Total (A)	4½	19	14	4	-	350
B.	**Practicals & Sessionals**							
ECC	261 B :	Electronic Circuit Lab.	-	-	-	3	-	50
ECC	262 B :	Logic design Simulation and Testing	½	2	-	3	-	50
ECC	263 B :	Digital Electronics Lab. II	-	-	-	2	-	50
ECC	264 B :	Programing Languages Lab.	½	2	-	2	-	50
ECC	265 B :	Electronics workshop	½	1	-	2	-	50
		Total (B)	1½	5	-		12	- 250
		Total of IV Semester	6	24	14	16	-	600
Joint award for III & IV Semester (Marks not counted for award of division)								
FE 237 E Co – curricular activities			½	2				100

B. E. III YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2016
V SEMESTER EXAMINATION

Branch Code	Subject Code	Subject	Units	Credits	L	T/p	Exam H.	Marks
A. Written Papers								
ECC	301 A :	Theory and applications of Integrated Circuits (ECC)	1	4	2	1	3	50
ECC	302 A :	Object Oriented Programming (ECC)	1	4	3	1	3	50
ECC	303 A :	Design of Data Bases (ECC)	½	3	3	1	3	50
ECC	304 A :	Analog Communication Engg.(ECC)	1	4	3	1	3	50
ECC	305 A :	Radiation & Wave Propagation (ECC)	½	2	3	1	3	50
ECC	306 A :	Computer Organisation (ECC)	1	4	2	1	3	50
Total (A)			5	21	16	6	-	300
B. Practicals & Sessionals								
ECC	311 B :	Integrated Circuits Lab.	-	1	-	2	-	50
ECC	312 B :	OOP Lab.	1	1	-	2	-	75
ECC	313 B :	Databases Lab.	-	1	-	2	-	75
ECC	314 B :	Analog Communication Lab.	-	-	-	2	-	50
ECC	315 B :	Radiation & Wave Propagation Lab.	-	-	-	2	-	50
		Total (B)	1	3	-	10	-	300
		Total of V Semester	6	24	16	16	-	600

B. E. III YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2016
VI SEMESTER EXAMINATION

Branch Code	Subject Code	Subject	Units	Credits	L	T/p	Exam H.	Marks
A. Written Papers								
ECC	351 A :	Business Information Systems (ECC)	1	4	3	1	3	50
ECC	352 A :	Computer Graphics & Devices (ECC)	1	4	3	1	3	75
ECC	353 A :	Power and Industrial Electronics (ECC)	½	3	2	1	3	50
ECC	354 A :	Digital Communication System (ECC)	1	3	3	1	3	75
ECC	355 A :	Microprocessor & Microcomputer (ECC)	1	4	3	1	3	50
ECC	356 A :	Engineering Management & Economics (ECC)	½	3	2	1	3	50
		Total (A)	5	21	16	6	-	350
B. **Practicals & Sessionals**								
ECC	361 B :	Computer Graphics Lab.	-	-	-	2	-	50
ECC	362 B :	Power & Industrial Electronics Lab.	-	-	-	2	-	50
ECC	363 B :	Digital Communication Lab.	-	-	-	2	-	50
ECC	364 B :	Microprocessor Lab.	-	1	-	2	-	50
ECC	365 B :	Business Automation Lab	-	-	-	2	-	50
		Total (B)	-	2	-	10	-	250
		Total of VI Semester	5	22	16	16	-	600
Joint award for V & VI Semester (Marks not counted for award of division)								
FE	337 E Co –	curricular activities			½	2		100

B. E. IV YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2017
VII SEMESTER EXAMINATION

Branch Code	Subject Code	Subject	Units	Credits	L	T/p	Exam H.	Marks
A. Written Papers								
ECC	401 A :	VLSI Design Techniques (ECC)	1	4	3	1	3	75
ECC	402 A :	Design of Operating Systems (ECC)	1	4	3	1	3	75
ECC	403 A :	Advance Communication System (ECC)	½	5	3	1	3	75
ECC	404 A :	Advance Computer Technology (ECC)	1	5	3	1	3	75
	:	Elective - I (ECC)	1	5	3	1	3	75
		Total (A)	4½	23	15	5	-	375
B. **Practicals & Sessionals**								
ECC	421 B :	VLSI Simulation Lab.	-	-	-	3	-	75
ECC	422 B :	Operating Systems Lab.	-	-	-	3	-	75
ECC	423 B :	Advance Communication System Lab.	-	-	-	3	-	75
ECC	425 B :	Project	1	-	-	2	-	-
		Total (B)	1	-	-	11	-	225
		Total of VII Semester	5½	23	15	16	-	600

B. E. IV YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2017
VIII SEMESTER EXAMINATION

Branch Code	Subject Code	Subject	Units	Credits	L	T/p	Exam H.	Marks
A. Written Papers								
ECC	451 A :	Real Time and Embedded Systems (ECC)	½	4	3	1	3	50
ECC	452 A :	Computer Communication & Data Network (ECC)	½	4	3	1	3	50
ECC	453 A :	Multimedia systems (ECC)	½	4	3	1	3	50
ECC	454 A :	Mobile Communication and Computing (ECC)	½	4	3	1	3	50
	:	Elective – II (ECC)	1	4	3	1	3	50
		Total (A)	3	20	15	5	-	250
B. **Practicals & Sessionals**								
ECC	471 B :	Embedded Systems Lab. (ECC)	-	-	-	2	-	50
ECC	472 B :	Computer Networking Lab. (ECC)	-	-	-	3	-	75
ECC	473 B :	Multimedia Lab (ECC)	-	-	-	3	-	75
ECC	474 B :	Wireless and Mobile Lab (ECC)	½	-	-	2	-	50
ECC	475 B :	Project (ECC)	1	6	-	3	-	150
		Total (B)	1½	6	-	13	-	400
ECC	476 C :	Practical Training (ECC)	1	3	-	-	-	75
ECC	477 C :	Educational Tour (ECC)	¼	1	-	-	-	25
		Total of VIII Semester	5 ¾	30	15	18	-	750

Joint Award of VII and VIII Semester (Marks not counted for award of Division)

FE 437 E	: Co- curricular activities	½	2		100

B. E. II YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2015
III SEMESTER EXAMINATION

Ma 201 A - Applied Engineering Mathematics - I (ECC)

2L 3Hours,50 Marks

Differential Equations: Simultaneous differential equations, Total differential equation, Partial differential equation of the first order (Langrange's and Charpit's methods), Linear partial differential equations with constant coefficients.

Partial differential equations of the second order; classification, Monge's methods. Solution of Wave, Heat One dimensions and Laplace equations (two dimensional) by separation of variables method.

Complex Analysis: Analytic functions, complex integration, Cauchy's integral theorem, Cauchy's integral formula. Taylor's and Laurent's theorems. Singularities of an analytic function, Pole; Residue, Cauchy residue theorem. Use of calculus residues to evaluate integrals of the types $\int_{-\infty}^{+\infty} f(x)dx$ and $\int_{0}^{2\pi} f(x)dx$. Conformal and bilinear transformations.

Vector Calculus: Definitions of Gradient, divergence and curl. Various identities involving them. Green, Gauss and Stoke's theorems(statement and verification only).

Calculus of Variation: Classical problems, Euler-Langrange equations, Isoperimetric problem.

Statistics: Concept of probability, Binomial, Poisson and normal distributions. Coefficient of correlation and lines of regression.

ECC 202 A – Network Theory (ECC)

3L, 1T 3 Hours, 75 Marks

Network Equations: Topology incidence, cut-set end tie-set matrices. Mesh and nodal analysis of networks with independent and dependent sources. Duality, Transient and steady state solutions of D.C. and A.C. networks.

Network Theorems: Superposition, Thevenin, Norton, Reciprocity. Maximum power transfer. Millman and Tellegen's Theorems and their applications to D.C. and A.C. circuits

Resonance: Resonance in series and parallel- circuits. Q-Factor, bandwidth and selectivity.

Non-sinusoidal Periodic Waveforms: Fourier series- trigonometric and exponential forms. Response of network to non-sinusoidal periodic waveforms.

Two Port Networks: Different two port parameters and their inter-relations and characteristic functions, interconnection of two port networks, Brune's test. Network configurations. Symmetrical and asymmetrical two port communication networks. Iterative, Image and characteristic impedances, Propagation, attenuation, phase and Image transfer constants. Balanced, unbalanced and reciprocal networks; T.L. lattice and bridged T network

Network Functions: Generalized concept of complex frequency, Impedance and admittance functions. Exponential excitation and system functions. Driving point and transfer functions. Pole zero configuration of system functions.

ECC 203 A – Solid state Electronics Devices (ECC)

3L, 1T 3 Hours, 75 Marks

Introduction to Solid State Devices: Space charge region and junction capacitance. Minority carrier injection, carrier storage and transient response. Impact ionization and avalanche break-down.

Analytical theory of junction diodes, BJT, JFET, MOSFET, UJT, diffused transistors, avalanche transistors. Degenerated semi-conductors and theory of tunneling. Theory of tunnel diodes, Zener diodes, Varactor diodes, photo diodes, LEDs, photo-transistors, photo FETs and LASER. Elementary theory of composite junction. Ohmic junctions and hetro junctions.

Characteristics and small signal models of MOSFET, MISFET and MESFET; Characteristics of CMOS and BiCMOS; design of CMOS inverter: Power dissipation characterization, timing issues and noise margins; CMOS based NAND and NOR gates.

Single crystal growth, wafer preparation epitaxial growth deposition and characterization of oxide layers, masking Lnography, dopant diffusion, and ion- implantation.

Process integration, MOS based silicon microcircuits, BJT based silicon microcircuits, BiCMOS process flow.

ECC 204 A - Data Structure (ECC)

3L, 1T 3 Hours, 75 Marks

Complexity Analysis : Time and Space complexity of algorithms, asymptotic analysis, big O and other notations, importance of efficient algorithms, program performance measurement, data structure and algorithms.

Linear Lists : Abstract data type, sequential and linked representations, comparison of insertion, deletion and search operations for sequential and linked lists, list and chain classes, doubly linked lists, circular lists, linked lists through simulated pointers, skip lists, applications of lists in bin sort, radix sort, sparse tables.

Stacks and Queues : Abstract data types, sequential and linked implementation, exception handling in classes, representative applications such as parenthesis matching, towers of Hanoi, wire routing in a circuit, finding path in a maze, simulation of queuing systems equivalence problem.

Hashing : Search efficiency in lists and skip lists, hashing as a search structure, hash table, collision avoidance, linear open addressing, chains uses of hash tables in text compression. LZW algorithm.

Trees : Binary trees and their properties, terminology, sequential and linked implementations, tree traversal methods and algorithms, heaps as priority queues, heap implementation, insertion and deletion operations.

Heapsort, heaps in Huffman Coding, Leftist trees, tournament trees, use of winner trees in mergesort as an external sorting algorithm, bin packing.
Search Trees : Binary search trees, search efficiency, insertion and deletion operations, importance of balancing, AVL Trees, searching insertion and deletions in AVL trees, red- black trees, comparison with AVL trees, search insert and delete operations.
7. Multiway Trees : issues in large dictionaries, m-way search trees, B-trees, search insert and delete operations, height of B-trees 2-3 trees, sets and multisets in STL.

ECC 205A – Digital Electronics - I (ECC)

3L, 1T — 3 Hours, 75 Marks

Device Characteristics: Steady state and transient switching characteristics of diodes, BJTs, FETs, UJTs. Wave shaping circuits. Integrating and differentiating circuits, effects of time constant, relation of tilt time to time constants. Clipper and clamper circuits using diodes and transistors. Saturated and unsaturated transistor switches. Speed-up capacitors. Inverter circuits. Performance of pulse transformer and lumped distributed parameter electromagnetic delay lines.
Relaxation Oscillators: Theory, operation and performance of astable, monostable and bistable multivibrators. Different triggering circuits. Theory of Schmitt trigger. Comparison of performance of various circuits configurations of multivibrators and their fields of applications. Tunnel diode. UJT relaxation oscillator. Theory of astable and monostable blocking oscillators and their triggering methods.
Sweep Circuits: Free running and triggered modes. Theory and common circuits of voltage and current time base generators.
Sampling Gates: Theory, operation and applications of unidirectional and bi-directional sampling gates using diodes and transistors.

Ma 211 A – Special Mathematics (C,ChE,CSE,E,IT,M,Mi,PI,ECE,ECC,EEE)

(Common for Diploma passed candidates of all branches)

2L — 3 Hours, 50 Marks

Differential Calculus: Asymptotes, curvature. Envelopes, evolutes, Concavity, Convexity and singular points, curve tracing

Integral Calculus: Rectification and quadrate, Volumes and surfaces of Solids of revolution. Mean values of functions, differentiation under sign of integration

Differential Equations: Differential Equations of first order and first degree. Equations of the first order but not of the first degree. Linear differential equations with constant coefficients. Homogeneous Linear differential equations, second order differential equations with variable coefficients

B. E. II YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2015

IV SEMESTER EXAMINATION

Ma 251 A – Applied Engineering Mathematics - II (ECC)

2L 3 Hours, 50 Marks

Integral transforms: Laplace transform, various theorems. Inverse Laplace transform, Applications to solutions of ordinary and simultaneous differential equations. Infinite Fourier transform, various theorems and application to solution of first order partial differential equation.

Special Functions; Solutions of Bessel and Legendre's differential equations, Bessel function and Legendre polynimial of first kind. Their generating functions, recurrence relations, orthogonality, Rodrigue's formulae, and other properties. Solution of Hypergeometric differential equation, Gauss hypergeometric function, its integral representation. Gauss summation theorem, their transformations.

Numerical Methods: Newton-Gregory formula, Langrange's method, Gauss backward, Gauss forward, Stirling's methods for interpolation. Newton-Gregory, Stirling methods for numerical differentiation. Trapezoidal and Simpsons 1/3 and 3/8 rule for numerical integration. Numerical solution of ordinary differential equations of first and second order by Euler, Taylor, Milne's, Runge-Kutta methods. Bisection, Reguli-faisi, secant, Newton-Raphson methods for solution of algebraic and transcendental equations. Matrix representation of simultaneous equations. Gauss elimination, Jordan, Jacobi, Gauss-Siedal methods for simultaneous linear algebraic equations.

ECC 252 A – Electronic Circuits (ECC)

3L, IT 3 Hours, 75 Marks

Biasing: Biasing and stabilization techniques of BJT, JFET, MOSFET for use as amplifiers in various configurations. Small signal models for BJT, JFET and MOSFET in discrete and integrated form. Frequency dependence characterization and equivalent circuits. Miller effect.

Untuned small signal BJT amplifiers: Study of Single stage and multistage. RC coupled and transformer coupled amplifiers. Frequency response, bandwidth, gain and factors affecting them. Various two transistor integrated circuit amplifier stages. Introduction of d.c. amplifiers, differential amplifiers, Cascode and Darlington circuits. Follower circuits and boot-strapping.

Untuned large signal amplifiers: Classification of power amplifiers. Study of single ended,parallel and push-pull Class A, AB and B power amplifiers. Complementary, symmetry and quasi-complementary circuits, Driver and out-put stages, with and without out-put transformers for power amplifiers. Output circuit efficiency calculations for various classes and configuration of amplifiers. Thermal considerations. Derating curves.

Power Supply Circuit: Design factors and applications of various power supply filters and voltage multiplying rectifier circuits.

Regulated Power Supplies: Regulator circuits using solid state devices and monolithic ICS. Adjustable constant voltage power supplies. Adjustable constant current power supplies. Higher output power supplies with solid state pre-regulations. Protection circuits for power supplies. Rating and specifications.

ECC 253 A – Discrete Structures (ECC)

3L, 1T 3 Hours, 75 Marks

Introduction to Discrete Mathematical Structures, Formal Methods: Induction and Analogy, Abstraction.

Sets, sequences, empty set, power set, operations on sets, Venn diagram, ordered pair, principle of inclusion and exclusion.

Introduction to mathematical logic, statements and notations, well-formed formulas, tautologies, tautological implications, normal forms, the theory of Inference for statement calculus, predicate logic.

Graph Terminology, Degrees of Nodes, Isomorphic Graphs, Dijkstra's Shortest Path Algorithm, Planar Graphs, Eulerian Graphs, Hamiltonian Graphs, Traveling Salesman Problem.

Trees Introduction Rooted and other Trees, Representation of Prefix Codes, Representation of Arithmetic Expression, Representation of Prefix Codes, Spanning Trees, Traversing Binary Trees, Binary Search Trees.

Relations, matrix and graph representation of relation, properties of relations, partitions. Equivalence Relations, Compatibility Relations, Composition of Binary Relations, Transitive and Symmetric closures partially ordered set lattices.

Functions, Matrix representation of functions, composition of function, inverse-function.

Algebraic Structures, General properties of algebraic systems, groupoids, semigroup, monoids group rings. Applications of algebra to control structure of a program. Homomorphism, Congruences, admissible partitions. Group and their graphs.

ECC 254 A – Digital Electronics - II (ECC)

3L, 1T 3 Hours, 75 Marks

Counters and Registers: Binary and decade ripple counters. One bit counters. Up, down and up-down, synchronous counters. Programmable counters. Divide-by N counters. Storage registers, shift-right, shift-left and bi-directional shift registers. Serial input, serial output, parallel input, parallel output, parallel-in-serial out, serial in parallel out and Universal shift registers and synchronous parallel loading of shift registers. Static and dynamic MOS shift registers. Ring and Johnson counters

Arithmetic Circuits: Digital Comparators, half, and full adders; parallel and serial binary adders, half and full binary subtractors. BCD adders and subtracters. Binary multipliers and divider circuits

Miscellaneous Sub-systems: Encoders, decoders and code converters. Parity checking circuits. Multiplexers and demultiplexers. Digital to analog and analog to digital converters.

Semi-conductor memories: Random and sequential access memories. RAM, ROM, PROM, EPROM.EEPROM, EAPROM, EPLA, GALs. MOS and CMOS memories

ECC 255 A – Principles of Programming Languages (ECC)

3L, 1T — 3 Hours, 75 Marks

Importance of programming languages, brief history, features of good programming language. Translators, Syntax, semantics, virtual computers. Binding and binding time.

Elementary and structured data types, their specification and implementation. Type checking and type conversion, vectors arrays, records, character string, variable size data structures. Sets, input and output files.

Evolution of the concept of data type, abstraction, encapsulation and information hiding, subprograms, type definition and abstract data types.

Implicit and explicit sequence control, sequence control within expression and between statements. Subprogram sequence control, Recursive subprograms. Exception and exception handlers, Coroutines and scheduled subprograms. Task and concurrency, exceptions.

Names and referencing environments, Static, dynamic and block structure, Local data and local referencing environments.

Dynamic and static scope of shared data, Block structure, parameters and their transmission. Tasks and shared data. Storage requirement for major run –time elements. Program and system controlled storage management. Static and stack – based storage management. Fixed size and variable – size heap storage management.

ECC 262 B - Logic design Simulation and testing (ECC)

3P — 50 Marks

Sequential Logic: Storage devices and sequential sub-systems. Introduction to synchronous and asynchronous sequential systems. Mealey and Moore circuits. Cost vs. speed.

Synchronous Sequential Systems: Introductory examples. The finite state model – basic definition. Memory elements and their excitation functions. Synthesis of synchronous sequential circuits. Analysis and design of synchronous sequential circuits. State assignment and reduction technique. Introduction to threshold logic and relay circuits.

Asynchronous Sequential Systems: Fundamental mode circuits, Analysis procedure. Circuits with latches. State assignment in Asynchronous sequential circuits. Design of pulse mode asynchronous sequential circuits. Problems in asynchronous circuits – Races and Hazards.

Ma 261 A – Special Mathematics (C,ChE,CSE,E,IT,M,Mi,PI,ECE,ECC,EEE)

(Common for Diploma passed candidates of all branches)

2L — 3 Hours, 50 Marks

Statics: Composition and resolution of coplanar forces Moments. Equilibrium of coplanar forces acting at a point, Equilibrium of three forces acting on a rigid body. Resultant and equilibrium of coplanar forces acting on a rigid body friction. Common catenary.

Dynamics: Composition and resolution of velocities and accelerations. Relative velocity. Rectilinear motion, linear constant acceleration. Vertical motion under gravity. Rectilinear motion under variable law offers and also in resisting medium. Kinematics of uniplaner motion

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V SEMESTER EXAMINATION

ECC 301 A - Theory and applications of Integrated Circuits (ECC)

2L, 1T 3 Hours, 50 Marks

Crystal Growth : Czochralski and Bridgman growth, wafer preparation and specifications.
Epitaxial Growth : Thermodynamics of vapour phase growth, selective growth, MOCVD, Molecular beam epitaxy technology gas source MBE and chemical beam epitaxy.
Oxidation : Deal – Grave model, linear and parabolic rate coefficients, oxide characterization, types of oxidation and their kinematics, oxidation induced stacking faults, oxidation systems.
Etching : Wet etching, basic regimes of plasma etching, reactive ion etching and its damages, lift – off, and sputter etching.
Lithorgraphy : Optical, electron, X-ray and ion-beam, contact/ proximity and projection printers, advanced mask concepts, alignment.
Metallization : Applications and choices, physical vapor deposition, patterning, problem areas, multilevel metallization.
VLSI Process Integration : NMOS and CMOS IC technology, MOS Memory IC Technology, bipolar IC fabrication.
Assembly Technique and packaging : Package types, packaging design consideration, VLSI assembly technologies.
Yield and Reliability : Yield loss in VLSI, yield loss modeling, reliability requirements, accelerated testing, BIST.
Applications – CMOS inverter, combinational & sequential logic, Arithmetic Building blocks - Adder, multiplier, shifters; Memory and Array Structure: Core, ROM, RAM, peripheral circuitry, memory reliability and yield, SRAM and DRAM design, flash memory.

ECC 302 A - Object Oriented Programming (ECC)

3L, 1T 3 Hours, 50 Marks

A review of C. Concepts of object oriented programming using C++. Data Types: elementary and derived data types, literals.

Operators and expressions: Operators, association and precedence rules of operators, expressions using unary, binary and ternary operators.

Statements: declarations as statements, selection statements, iteration statements, goto statement, break statement return statement, try –catch block.

Functions: void functions, functions with return value, call by value and call by reference parameter passing, default parameters, recursive functions, inline functions.

Classes: classes, object friend functions, classes within a class, local classes, global classes constructors, destructors.

Derived classes: single and multiple derivation of classes, multilevel and hybrid derivation of classes, constructors, destructors.

Polymorphism: Function and operator overloading, virtual functions.

Streams: input and output of built –in data types, manipulators.

File streams : opening a file, accessing a file, closing a file.

Exceptions: catching exceptions, rethrowing the exception, standard exceptions.

Templates: defining a template, template instantiation, function templates, class templates.

Elementary case study of a object oriented database in C++.

ECC 303 A – Design of Data Bases (ECC)

3L, 1T 3 Hours, 50 Marks

Introduction to database systems. A historical perspective, file systems v/s DBMS, advantages of a DBMS, Data abstraction, models, instances and schemes. Data independence, Data definition and manipulation languages. Database manager, administration and users. Overall system structure.

Entities and entity sets. Relationships and relationship sets. Attributes, mapping, keys, E-R diagram and is conversion to tables. Design of an E-R database scheme.

Structure of relational database. The relational algebra. The tuple and domain relational calculus. Modification of databases and views.

Query languages, SQL and query by examples. Pitfall in relational database design. Normalization using functional, multi valued and join dependencies. Domain key normal form.

Data storage: Physical storage media, files organization, organisation of records into blocks, sequential files, mapping relational data to files data dictionary storage, buffer management.

Basic concept of indexing and hashing, properties of indexes, index specification in SQL, B* – Tree and B - Tree index files. Hash base indexing, static hash functions, dynamic hash function.

Introduction to object oriented model : object structure, class hierarchy, multiple inheritance, object identity, object containment, physical organization, object oriented queries, scheme modification. Comparison between RDBMS and OODBMS, crash recovery, failure classification, storage hierarchy.

Transaction model, log-based recovery, Buffer Management, check points, shadow paging, failure with loss of non-volatile storage, stable storage implementation, concurrency control schedule. Testing for serializability, lock-based protocols, Time stamp based protocols, validation techniques.

ECC 304 A - Analog Communication Engineering (ECC)

3L, 1T 3 Hours 50 Marks

Introduction to analog techniques for electrical communication. Concept of baseband and carrier transmission. Elementary study of AM, DSBSC SSB, FM and PM.

Amplitude Modulation : Analysis of standard AM waves and signal power distribution. Different circuits for amplitude modulation and their comparison. Methods of generating DSBSC, SSB and VSB – AM and their characteristics. Envelope and coherent demodulation methods for standard AM. DSBSC, SSB signals. Design considerations of AM modulators and demodulators. Frequency Division Multiplexing.
Angle modulation : Theory of frequency and phase modulations. Spectrum and BW of FM and PM signals. Direct and indirect methods of generating narrow – band and wide band FM. Discriminators and PLL demodulators for FM and PM. Pre-emphasis and de – emphasis. Idea of noise suppression properties of FM and PM systems. Concept of FDM

ECC 305 A - Radiation & Wave Propagation (ECC)

3L, 1T 3 Hours, 50 Marks

Transmission Lines : Type of transmission lines, General transmission line equations. Line constants and equivalent circuits. Infinite line, Lines with reflections.
Coaxial cables: Transmission lines at audio and radio frequencies. Losses in transmission lines. Transmission equalizers. Characteristics of quarter wave, half wave and other lengths. Smith chart and its applications. Transmission line applications. Stub matching.
Radio Wave Propagation : Mechanism of radio wave propagation. Reflection, refraction interference and diffraction of radio waves. Theory of ground wave, space wave and sky wave propagation. Effect of conductivity, dielectric constant, curvature and surface imperfections of earth on wave propagation, Duct propagation and tropospheric scattering.
Radiation : Retarded potentials and concept of electromagnetic radiation. Alternating current element and radiated power, radiation resistance. Radiation from dipole and monopole antennas.
Antennas: Quarter wave and half wave antennas. C-Impedance, mutual impedance and directional characteristics of antennas. Antennas patterns. Effective length and effective area of antennas , Antennas gain efficiency, beamwidth and polarization. Antenna temperature.

ECC 306 A - Computer organization (ECC)

2L, 1T 3 Hours, 50 Marks

Elements of Computer Organization
Evolution of Computers : Generations of Computers, modeling of Computers at Gates, Registers and Processors level.
CPU Architecture : Fixed and floating point arithmetic and ALU organization. Instruction format, types, sequencing and interpretation. Instruction fetch and execute cycles. Addressing techniques. Hardwired and Micro – programmed control.
Secondary Memories : Magnetic memories core, tape, disk and floppy disc, introduction to magnetic bubble and CCD memories.
I/O Devices : Principle and construction of Keyboard, Mouse, digitizer, joystick, optical scanner, Resistive membrane touch screen, Tele-typewriter, CRT Terminals, TFT monitors, Line Dot Matrix, Daisy Wheel, Ink Jet and Laser printers.
Communication of I/O with CPU and memory : Speed mismatch of I/O v/s memory and CPU. Communication methods for I/O to CPU and Memory : Polling, interrupt, DMA and I/O channel.

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VI SEMESTER EXAMINATION

ECC 351 A - Business Information Systems (ECC)

3L, 1T 3 Hours, 50 Marks

Introductory concepts : Data and information – creation and qualities; Systems and Business Information Systems – resources, categories; E-business.
Business Automation Hardware – Input and output techniques for business such as Bar-codes, OMR, Printers and storage devices.
Characteristics categories and design of Business Automation Software – graphics, spreadsheets, database, multimedia and web based software.
Networks, telecommunication and internet technologies and devices for business – EDI, RFID, Modems, B2B and B2C.
Information Security – Control over information systems, malware, encryption, decryption, protection of business information.

ECC 352A – Computer Graphics & Devices (ECC)

3L, 1T 3 Hours, 75 Marks

Introduction to computer graphics. Application areas, Display devices, raster scan, random scan, color monitor, display file, frame buffer.

Points, line, plane and coordinates. Character, vector circle generation algorithms, antialiasing techniques. Representation of polygons. Interfacing and filling polygon. 2 –D Transformations, translation, rotation, scaling, shearing, reflection, composite transformations, raster transformations.

Windows, multiple windowing, view-port, viewing transformation. Clipping algorithm for point, line using Sutherland and Cohen, polygon, text clipping. Segment and segment operation.

Interactive graphics, user dialogue, Input modes, Interactive picture construction technique.

Concept of 3 – D, representation of 3 – D object, 3 – D transformation, translation, rotation, reflection, scaling. Parallel, perspective, isometric projections.

Basic illumination models, halftone, dithering, color model RGB & CMY.

Design and operation of devices such as mouse, tablet, joystick, touch screen, laser and inkjet printers, plotters, LCD and CRT monitors, 3-D display techniques.

ECC 353 A – Power & Industrial Electronics (ECC)

2L, 1T 3 Hours, 50 Marks

Power electronics devices: Characteristics and operation of SCR, PUT, SUS, SBS, SCS, TRIAC, DIAC, IGBT, GTO, MCA and light activated thyristors. Ratings and rating extension by series/parallel operation.

Electronic Power Control: Electronic methods of power control. SCR firing methods, Phase control techniques. Line commutation and different types of commutation. One, two and four quadrant converters. Bridge inverters, series and parallel inverters. Cyclo converters. Introductory study of DC choppers.

Electrical Drives: Performance characteristics of series, shunt and compound d.c. motors. Motor starters. Characteristics of single and three phase induction motors, Universal motor, Amplidyne and selsyns.

AC and DC Motor Speed Control: Philosophy of speed control, open and closed control and single and three phase AC, DC and universal motors using thyristors. PWM inverter technique and introduction to variable frequency drive

Misc. Industrial Applications: Photo relays and their applications, X-ray tubes. Particle accelerators. Principle of Electron Microscope, Uninterruptible supplies. Switched mode power supplies

Programmable Logic Controllers (PLC): Advantages of PLC, CPU configurations, Digital and analog inputs and outputs, ladder circuits and process flow diagram. Console and operator panel.

ECC 354 A - Digital Communication System (ECC)

3L, 1T — 3 Hours, 75 Marks

Random Signals: Power and energy signals. Introduction to probabilistic and statistical description of discrete and continuous communication processes. Marginal, conditional and joint probability density and density and distribution functions. Stationarity and ergodicity. Auto correlation and Cross correlation functions, Energy spectral density and Power spectral density. Simple linear system analysis under random excitation in time and frequency domains.

Introduction to techniques ASK, FSK, PSK, BPSK, QPSK and simple QAM.

Digital Communication : Sampling theorem and principle of pulse analog modulation. Elements of PCM, Delta and adaptive delta modulation.

Study of components of digital communication system. Concept TDM, synchronous and asynchronous transmission. Introduction to bit, word and frame synchronization.

Noise : Various noise sources in amplifier ASK, FSK BPSK, and simple QAM and communication systems, Comparison of various electronic devices for noise performance, Signal to noise ratio and noise figure. Equivalent noise bandwidth. Noise temperature, Effect of cascading, statistical properties of noise Representation of white and band pass noise in communication systems.

Comparison of analog and digital communication systems. System Performance: Noise – performance of analog CW and pulse modulation systems using coherent and non – coherent. Baseband PCM and delta modulation systems, performance in terms of probability of error and S/N ratio. Probability of error performance of band pass systems.

ECC 355 A - Microprocessor & Microcomputer (ECC)

3L, 1T — 3 Hours, 50 Marks

Microprocessor Architecture: Architecture of 8 – bit 8085, Z80, 6800 microprocessors; their instruction sets and addressing modes. Assembly language programming of Intel's 8085 Microprocessor. Introduction to assemblers.
Microprocessor Interfacing : Interfacing of address; data and control buses Memory and I/O devices, Interrupt and DMA for 8085 microprocessor.
Introduction of Micro controllers : Architecture and instruction set of MCS – 51 series of micro controllers. Application of Micro controllers.
16 and 32 – bit Microprocessors: CPU architecture addressing modes and feature of 16 and 32 bit microprocessor – 8086. Salient features of 80286, 80386, 80486 and Pentium series microprocessors.
Bus standards: Introduction to multibus VME, RS – 232-C, IEEE 488, PCI, USB, RS 422 and 485.

ECC 356 A - Engineering management and Economics (ECC)

2L, 1T 3 Hours, 50 Marks

Principle and Techniques of Management: Management function. Theories of management and their application to Indian condition. Responsibility, authority, leadership, motivation, co-ordination and co-operation, change agent, Importance of organization charts and their application to Electronic Industries.
Financial Management : Objectives, functions and importance of financial management, Book – keeping, journals and ledgers, Balance sheet, profit and loss accounts, fund flows and financial ratios. Sources of finance and Financial Institutions. Interest and depreciation. Salvage value.
Marketing Management : Concept of Marketing and its various components.
Stores and Purchase Management : Function of store and Purchase management. Economic order quantity. A-B-C analysis. Inventory control and management. Purchase procedure in Government , Public and Private undertakings, Floating of tenders and Contracts.
Forms of Business : Proprietorship, partnership, joint stock companies joint sectors and co-operative movements.
Cost Accountancy : Various types of costs, profit/ volume ratio, Break even analysis and marginal costing.
Production planning and control : Job Batch and mass production, production efficiency, productivity. Site selection. Production planning Routing, scheduling and follow up. Elements of time and motion study. Quality control and quality assurance.
Nature and Scope of Economics: Basic concept of managerial economics. Supply and demand, free competition, monopoly and oligopoly.

B. E. IV YEAR (ELECTRONICS & COMPUTER ENGINEERING) 2017

VII SEMESTER EXAMINATION

ECC 401 A - VLSI Design Techniques (ECC)

3L, 1T 3 Hours, 75 Marks

Introduction: Layout and design rules, materials for VLSI fabrication basic algorithmic concepts for physical design, physical design processes and complexities.
Partition: Kernigham – Lin's algorithm, Fiduccia Mattheyes algorithm, Krishnamurty extension, hMETIS algorithm, multilevel partition techniques.
Floor- planning: Hierarchical design, wirelength estimation, slicing, and non –slicing floorplan , polar graph representation, operator concept, Stockmeyer Algorithm for floorplanning, mixed integer linear program.

Placement: Design types: ASICs SoC, microprocessor RLM; Placement techniques: Simulated annealing, partition – based, analytical, and Hall's quadratic; Timing and congestion considerations.
Routing: Detailed global and specialized routing channel ordering, channel routing problems ad constraint graphs routing algorithms, Yoshimura and Kuh's method, zone scanning and net merging, boundary terminal problem, minimum density spanning forest problem, topological routing, cluster graph representation.
Sequential Logic Optimization and Cell Binding: State based optimization, state minimization, algorithms; Library Binding and its algorithms, concurrent binding.

ECC 402 A – Design of Operating System (ECC)

3L, 1T 3 Hours, 75 Marks

Introduction to operating system, operating system functions, batch processing systems, multiprogramming systems, time sharing systems, real time operating systems.

Process management, process concept, process scheduling, operation on processes, cooperating processes interprocess communication.

CPU scheduling, scheduling algorithms first come first served, shortest job first, priority based, round robin, multilevel queue multilevel feedback queue.

Process synchronization, critical section problem, semaphores, monitor. Deadlocks, prevention, deadlock avoidance, deadlock detection.

Memory management, contiguous allocation, paging, segmentation, virtual memory, demand paging, page replacement, page replacement algorithms first in first out algorithms, optimal algorithm, least recently used algorithm.

File concepts, directory structure, file protection, allocation of disk space.

I/O systems, I/O hardware polling, interrupts, direct memory access. Disk scheduling, disk scheduling algorithms first come first served algorithms, shortest seek time first algorithm, SCAN algorithm, C-SCAN algorithm, C-LOOK algorithm.

Protection and security in an operating system, access matrix capabilities.

ECC 403A - Advance Communication systems (ECC)

3L, 1T 3 Hours, 75 Marks

Line – of Sight and Troposcatter Communication: Principle of working and essential features of microwave LOS and troposcatter communication Propagation study and performance requirements. Diversity techniques.
Satellite communications: Basic considerations. Up – link and down link parameters. Orbit and frequency selection. Transmission losses, noise and interference. Elements of multiple access techniques. Frequency reuse techniques. Functional description of earth stations.
Optical Communications: Ray propagation in optical fibers. Types of fibers. Losses and dispersion in fibers. Transmitter and receiver subsystem for optical communications. Laser and LED sources. Optical amplifier. Cable joints couplers and connectors. Splicing techniques. Modulation techniques. PIN and avalanche photo diode detectors. Characteristics of analog and digital transmission in optical communication systems. Noise considerations.

ECC 404 A – Advance computer Technology (ECC)

3L, 1T 3 Hours, 75 Marks

Introduction to parallel processing and trends: parallelism in uni-processor system, parallel computer structure, architectural classification schemes for parallel computers, multiplicity of instruction data streams, serial versus parallel computers, parallelism versus pipelining.

Memory system: hierarchical, associative and cache memory structures, virtual memory system, memory allocation and management.

Principles of pipelining: pipelining principles and classifications, general pipelines and reservation tables, interleaved memory organization, instruction pre-fetch and branch handling, data buffering and busing structures, internal forwarding and register tagging, hazard detection and resolution, job sequencing and collision prevention.

Structure for array processors: SIMD computer organization, masking and data routing mechanism Inter PE communication, introduction to associative array processing.

Multiprocessor architecture : Loosely and tightly coupled multiprocessors, processor characteristics for multiprocessing, interconnection networks, cache coherence protocols.

Introduction to advance processors: Data flow computers, the VLIW architecture, fault tolerant architecture and study of TANDEM HIMALAYAN K2 system architecture.

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VIII SEMESTER EXAMINATION

ECC 451 A – Real Time and Embedded systems (ECC)

3L, 1T — 3 Hours, 50 Marks

Introduction to embedded systems and their basics, Multitasking. Use of programming languages, Real time kernel, size of embedded programs.

Data Representation Fixed Precision Binary members, binary representation o Integers and Real numbers, ASCII and BCD.

Hardware requirements and time constraints, reliability and cost, design decisions.

Selection of microprocessor / Microcontroller for embedded systems, computing the size of memory required RAM and ROM.

S/W tools for embedded system development : Mixing C and assembly, C – Run time environment, Use of cross compilers, use of tools sets in Embedded Linux, GNU Tool chain for cross compiling.

Introduction to real – time computing: Characteristics of real – time system & tasks, performance measurement of real – time systems, estimation of program runtime.

Real – time system design: hardware requirements, systems development cycle, data – transfer techniques, synchronous and asynchronous data – transfer techniques, standard interfaces.

Real – time communication, fault – tolerance techniques, cause of failure, fault types, fault detection, redundancy, integrated failure handling.

ECC 452 A - Computer Communication and Data Networks (ECC)

3L, 1T — 3 Hours, 50 Marks

Computer communication: Layered Architecture of computer communication networks. DNA, SNA and ISO- OSI models. Properties of LANs, MANs, and WANs. Physical level, data link and transport protocols. Multiple access protocol organization. Routing techniques flow and congestion control in packet switched networks. Window scheme. Network interconnection – bridges and routers. Dead Lock avoidance. Elements of queuing analysis. Introduction to network security.

Data Networks: Structure and functions of network protocols. Data link control procedures. Operation of HDLC, SDLC, BISY NC, X.25 and x.21 Protocols Elements of Polling ALOHA, Reservation ALOHA, CSMA and token ring. Characteristic features of LANs.

Basics of Internet: Evolution; dialup, XDSL, ADSL, cable modem and other access methods. IP address and domain name system, TCP/IP, Internet applications and www.

ECC 453 A – Multimedia Technology (ECC)

3L, 1T — 3 Hours, 50 Marks

Introduction to multimedia and its applications, Characteristics of Text, Sound, Image, Animation, Video.

Multimedia Hardware : SCSI,MCI, Memory and storage devices, Output Hardware, Communication devices.

Introduction to Multimedia Systems: Architecture and components, multimedia distributed processing model, synchronization, orchestration and quality of service architecture.
Audio and Speech: Data acquisition, sampling and quantization, human speech production mechanism, digital model of speech production, analysis and synthesis psycho- acoustics, low bit rate speech compression, MPEG audio compression.
Images and Video: Image acquisition and representation, composite video signal, NTSC, PAL and SECAM video standards; Bilevel image compression standards, JPEG and MPEG.
Multimedia communication: Fundamentals of data communication and networking, bandwidth requirements of different media; real time constraints: Audio latency, video data rate; Multimedia over LAN and Internet, multimedia conferencing.
Multimedia Information Systems: Operating system support for continuous media applications, limitations of OS, new OS support, Media stream protocol, file system support for continuous media, data models for multimedia and hypermedia information, content based retrieval of unstructured data.

ECC 454 - Mobile Communication and computing (ECC)

3L, 1T 3 Hours, 50 Marks

Concept of mobile telecommunications. Mobile radio network issues, cell size coding, modulation and diversity Base station subsystems. Access methods. Location strategies for personal communications services. Cell design principles.

Elements of Radio Paging and microcellular radio communication: Fixed and dynamic channel assignment, Allocation of spectrum and channels, Concepts of hexagon cells, mobile identification system and registration of mobile, call procedure. Concepts of GSM and CDMA radio system architecture, roaming, digital speech and channel coding.

Mobililty computing: Issues, challenges, and benefits;
Network Programming: Process communication techniques, remote login, ftp, socket programming, RPC, RMI, Client – server programming.
Process Migration : Steps, advantages, application taxonomy, alternatives, case study of DEMOS/MP.

Mobile Computing : Physical mobility, challenges, limits and connectivity, mobile IP and cellular IP in mobile computing, case study of CODA.
Wireless LANs : Introduction to IEEE 802.11, Bluetooth and IrDA technologies and standards.
Introduction to Mobile Adhoc Networks: Hidden and exposed terminal problems; Routing protocols: DSDV, DSR, AODV. Elements of Wireless Sensor Networks - Motes, smart dust, TinyOS, routing protocols.
Handheld Devices and OS : Palm, HP; PalmOS, WindowCE, Windows Mobile. Conceptual study Mobile Internet and WAP, gateways, Mobile agents: Aglets, Tcl, PMADE.

LIST OF ELECTIVES

ECC 421 A - Robotic & Computer Vision (ECC)

3L, 1T — 3 Hours, 75 Marks

Definition, structure and application areas of Robotics; Introduction to the range of robots currently in use.
Direct kinematics of the robot arm, link description and its connection; Frame assignment; Concept of actuator space, joint space and Cartesian space; Inverse kinematics, algebraic solution, geometric solution; Solvability considerations and examples.
Manipulator dynamics, basic equations, Newton- Euler dynamic formulation; Lagrange formulation of the manipulator dynamics; Simulation.
Controller design, linear and non – linear control approaches, special considerations like coupling, time variation and model uncertainty; Computed torque, variable structure and adaptive control techniques.
Digital image fundamentals, digitization and 2- D parameters, types of operation; Basic tools: Convolution, Fourier transforms and statistical approaches.
Image analysis and processing. Basic enhancement and restoration techniques, unsharp masking, noise suppression, distortion suppression, segmentation, thresholding, edge finding, binary mathematical morphology, grey – value mathematical morphology.

ECC 422 A - Digital Signal Processing (ECC)

3L, 1T — 3 Hours, 50 Marks

Digital Signal Processing : Advantage of digital filters and processing. Fundamentals of discrete time systems. Fourier transform of sequences. Discrete – time filter structures. Z – Transform system representation solution of linear constant co- efficient difference equations. Digital filters design by transformation from analog filters. Simple realization of IIR and FIR filters DFT and FFT.

ECC 423 A - Microwave Engineering (ECC)

3L, 1T — 3 Hours, 75 Marks

Wave Guides : Theory of wave propagation in rectangular wave guides, cut off frequency. Dominant and higher modes. Generation of different modes and suppression of unwanted modes. Field distribution. SWR and impedance relations in wave guides. Coupling between coaxial lines and wave guides. Wave guide stub-matching.
Resonators: Theory and application of cavity resonators. Coupling to cavity, Q of cavity resonators.
Microwave Components: Attenuators, phase shifters, directional couplers, tees, isolators, circulators, tunings screws, coupling probe, loops, mixers and detectors. Use of scattering parameters.
Microwave Generators and Amplifiers: Theory of velocity modulation. Theory of operation and characteristics of two cavity and multicavity klystron, amplifier and oscillators. Reflex klystron O and M type travelling wave tube and backward wave oscillators – principle of operation . Construction, type and application of Magnetrons.

Microwave Solid State Devices: Special considerations for UHF and microwave transistors and oscillators. Parametric amplifiers. Manley- Rowe relation linearized equations. Parametric up converters. Negative resistance amplifiers. Principle of working and application of impact diode, hot carrier diode, PIN diode, Gunn diode and LSA diode Quantum mechanical explanation, description and application of MASER amplifiers.

ECC 424 A - Telematics (ECC)

3L, 1T 3 Hours, 75 Marks

Digital Telephony : Principle of working of SPC digital telephone exchanges. Digital switching, space, time. TS, ST, STS, TST switch blocks. Termination of subscriber lines Signalling systems with digital exchanges. Principle of common channel signalling. Synchronization aspect for digital telephony. Store Program Control for call processing.

Integrated Digital Networks: Data Communication terminology. Introduction to Circuits, message and packet switching concept. Basic aspects of multiplexing, signaling and synchronization in integrated digital networks. Overview of ISDN and BISDN. Concepts of basic rate and primary rate ISDN. Access and facilities provisions. Elements of fast packet switching, frame relay, ATM, SONET and SDH. Introduction to photonic switching.

ECC 425 A - Medical Electronics (ECC)

3L, 1T 3 Hours, 50 Marks

Introduction to Physiology : Physiological system of the human body. Nerve physiology. Function of nerves and myoneural junction. Cardiac muscle and its contractions. Blood flow system. Arterial pressure Mechanism of respiration, Function of Spinal cord. Generation, Propagation and distribution of action potentials.

Recording of Bio- Electric Events : Kinds of electrodes, amplifiers and display units for recording bioelectric potentials. Principles of ECG, EEG, and EMG. Electrophysiological signals from a micro electrode and salt bridge, Use of field effect – devices as electrometers. Principle of driven shield. Use of photon – coupled amplifiers. Artifacts.

Bio – Medical Measurement : Electronic methods of measuring blood pressure, blood flow, blood pH, skin and systemic body temperature and pulse rate.

Electronic Medical Instrument : Electronic pace makers. Implantable power sources. Defibrillators. Micro power transmitter for telemetering bio – signal. Surgical and therapeutic diathermy units. Physiological stimulators Basic diagnostic X – ray units. Introduction to patient monitoring and intensive care units.

ECC 426 A – Software Engineering (ECC)

3L, 1T 3 Hours, 75 Marks

Introduction, software characteristics and software crisis. The software engineering approach; software process & process maturity. Various software development models. Software life cycle concept.

The software project management concepts and team organization. Software process and project metrics. Software measurement. Metrics for software quality and its integration with the software process.

Software scope/ project estimation the COCOMO model and the Function Point approach.

Software quality assurance. Software reviews, cost impact and software defects. Formal Technical Reviews, software reliability.

Conventional methods for software engineering. Analysis concepts and principles. The software requirements specifications. Software prototyping.

Software design and software engineering, software architecture. Effective modular design functional independence, cohesion and coupling concepts. Component level / procedural design.

Software testing techniques and strategies.

ECC 427 A – Client – Server Technology (ECC)

3L, 1T 3 Hours, 75 Marks

Introduction Client/ Server architecture. Benefits, application, centralize multiuser, Distributed single user

Architecture, distributed computing environment.

Approach to Distribution: Distributed models, multi tiered environment, cooperative processing, application components, and distribution points. Presentation distribution, distributed processing, distributed function and transaction processing, data distribution.

Client technologies: Function, Application and tools, operating system, hardware plate forms, database access, interprocess communication tools.

Server technologies: Function, server operating system, hardware plate forms, data access, distributed data access, database engines.

System networks architectures: Components, layers, pear – to – pear communication between SNA layers.

Data Management: Distributed data management, method of the distribution, distributed data access. Database transaction management.

Distributed DBMS: Architecture, storing data in a distributed DBMS, distributed catalog, management, distributed query processing, Update distributed data. Introduction to distributed transactions, distributed concurrency control, and distributed recovery.

ECC 428 A – Object Oriented Software Engineering (ECC)

3L, 1T 3 Hours, 50 Marks

Object – oriented concepts and principles. Identifying the elements of an object model. Object oriented projects metrics and estimation.

Object – oriented analysis: Domain analysis, the OOA process, the object – relationship model.

Design for object – oriented systems. The system design process.

Object – oriented testing – testing OOA and OOD models. The object – oriented testing strategies. Inter class testing.

Technical metrics for O – O systems. Class – oriented metrics & metrics for O – O projects.

Advanced topics in software engineering. Component – based software engineering and development. Classifying and retrieving components. Review of CASE tools.

ECC 429 A – Information theory and coding (ECC)

3L, 1T — 3 Hours, 50 Marks

Uncertainty, information, measure of information, average information entropy, property of entropy, information rate. Discrete memoryless source. Source coding theorem.

Discrete memoryless channel, self and Mutual information, properties, channel capacity, channel coding theorem Shannon Hartley theorem, Information capacity theorem.

Data compaction, prefix coding, Huffman coding, Lempal – Ziv coding, Compression of information.

Type of errors, codes error control coding, linear block code, error detection and correction codes, syndrome decoding, cyclic codes, hamming code, BCH, convolution codes, encoders and decoders performance of codes.

ECC 430 A - Systems Software (ECC)

3L, 1T — 3 Hours, 50 Marks

Introduction to system software, machine architecture, machine level representation of programs, assembly language programming and optimizing program performance.
Assemblers, basic function, machine dependent and independent assembler features, assembler design options.
Two – pass, one – pass and multi- pass assembler design
Macro- processors, basic functions, machine independent features nested definitions and calls, design options.
General purpose macro – processor design, macro – processing within language translators.
Loaders and linkers, basic functions, machine dependent and independent features, linkers, loaders and editors, design options.
Relocating loaders and dynamic linking loader designs.