

FOUR YEAR B. TECH.
(Electronics and Communication Engineering)
Second Year, 3rd SEMESTER
Batch 2015

(Session 2016-2017)

SCHEME OF PAPERS

CODE	TITLE OF PAPER	LOAD			
		L	T	P	CR.
ECE 201	Electronic Devices	3	1	0	3.5
ECE 202	Electrical and Electronic Instrumentation	3	1	0	3.5
ECE 203	Electro-Magnetic Field Theory	3	1	0	3.5
HSS 201	Management Practices & Organizational Behaviour	3	1	0	3.5
CPE 206	Visual Programming Using VB.NET	3	1	0	3.5
BAS 201	Numerical Methods & applications	3	1	0	3.5
ECE 251	Electronic Devices Lab*	0	0	2	1.0
CPE 256	Visual Programming Using VB.NET Lab*	0	0	2	1.0
BAS 251	Numerical Methods & applications Lab*	0	0	2	1.0
**	Environment & Road Safety Awareness				
		18	6	6	24

Total contact hours: 30

* ECE 251, CPE 256, BAS 251 are practical papers only. There will not be any theory examination for these papers.

* * In addition to above mentioned subjects, there will be an additional course on Environment & Road Safety Awareness as a qualifying subject.

Faculty of Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters

(Common for B.Tech. in Computer Science Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech./MBA Branches)

Applicable from 2014 Batch

The paper structure will be as shown below:

<div><p>Pattern of Question Paper TITLE OF SUBJECT (CODE----) Bachelor of Technology (Branch): End Semester Exam</p><p>TIME ALLOWED: 3 Hour Roll. No.....</p><p>Maximum Marks: 50</p><p>Note:- Section C is compulsory. Attempt any six questions by selecting three questions from section A & three questions from section B.</p><p>Section-A (From Section A of the syllabus) Q1. Q2. Q3. Q4. Q5 3x5</p><p>Section-B (From Section B of the syllabus) Q6. Q7. Q8. Q9. Q10. 3x5</p><p>Section-C (From whole syllabus) Q11 a)..... b) c) d) e) f) g) h)..... i)..... j)..... 10x2=20</p></div>

- Note for the paper setter:**
1. Total numbers of questions to be set are nine (11) as per the above format.
 2. There will be FIVE questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts.
 3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.
 4. The maximum limit on numerical problems to be set in the paper is 35% while minimum limit is 20%.
 5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
 6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
 7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
 8. Use of Scientific calculator should be clearly specified.

ECE 201

ELECTRONIC DEVICES

L	T	P	Cr
3	1	0	3.5

Section-A

Semiconductor Diodes: Qualitative analysis of a P-N junction as a diode, V-I characteristics and its temperature dependence, Break down diodes, Varactor diode, Tunnel diode, Semiconductor photo voltaic effect, Light emitting diodes.

Application of Diodes : Diodes as a clipper, Diode as a clamper, Sampling gate, Diode as a rectifier: Half wave rectifier, Full wave rectifier, Bridge rectifier, ripple factor, regulation, capacitor input filters, inductor input filter, L-type and π type-filters, Electronic Voltage regulator (Series and Shunt type).

Transistor Characteristics: Junction transistor current components, Transistor as an amplifier, Transistor construction: Common base, Common emitter, Common collector configuration, Various regions, photo transistor.

Transistor at Low frequencies: Graphical analysis of CE configuration two port devices and hybrid model, h-parameters, Conversion formulas for parameters of three configurations. Analysis of a transistor amplifier circuit using h-parameter, Miller theorem & its dual, comparison of amplifier configuration.

Section-B

Transistor Biasing and Thermal Stabilization: Need of biasing, Types of biasing circuits, Operating point, Bias stability, Stabilization against variation in I_{CO} , V_{BE} and β , Compensation techniques, Thermal run away, Thermal stability.

Field Effect Transistors: Junction field effect transistor, Pinch off voltage, JFET characteristics, and equivalent circuit, MOSFETS, Their construction and characteristics, Biasing of JFETs.

Integrated Circuits: Classifications based on level of integrations, IC technology, basic Monolithic IC's Epitaxial growth, Masking and etching, Diffusion of impurities, Transistors for Monolithic IC's, Monolithic IC's, Monolithic diodes, Integrated resistors, capacitors and inductors, Isolation methods.

RECOMMENDED BOOKS:

1. Integrated Electronics by Millman & Halkias Mc-Graw Hill Publication 1997 edition.
2. Electronic Devices and circuits, MC-Graw Hill Publication 1997 edition by Millman & Halkias.
3. Electronic Devices and Circuits, S. Salivahanan etal, Tata McGraw hill , New Delhi
4. Electronics Devices by Robert Boylsted, Tata McGraw Hill publications.

ECE 202 ELECTRICAL AND ELECTRONICS INSTRUMENTATION

L	T	P	Cr
3	1	0	3.5

Section-A

VOLTAGE & CURRENT MEASUREMENT: - Measurement of DC & AC current & voltage; Basics of indicating instruments.

Principle of operation and working of PMMC, dynamometer, Moving Iron, Rectifier and Thermocouple Instruments. VTVM, TVM-Ramp Type, Integrating Type, Potentiometric Type, Successive approximation Type, continuous Balance Type.

RLC Measurements: - Measurement of DC medium resistance (Wheatstone method.) AC Wheatstone Bridge, Maxwell, Hay, Wien and Schering Bridge, Twin-T & Bridged-T null networks, Q Meter.

Section-B

CRO & Display Devices:- Basic Block diagram, functions of Blocks & Basic CRO circuits, Measurement of voltage, current, frequency and phase angle, Dual beam oscilloscope, digital display devices: construction & working principle-LED, LCD, Nixie tube, Magnetic Recorders, Digital recorders, Introduction of digital storage oscilloscope.

Frequency & Period measurement: - Heterodyne frequency meter, Capacitor charge discharge method, Pulse counting method, Digital frequency meter, Period measurement.

Measurement of Power: - Measurement of Power using Bolometer Bridge method, Wattmeter: principle of operation of dynamometer Type & Induction Type, Measurement of Power & Power factor using one wattmeter, two wattmeter & 3 wattmeter method.

Recommended Books:-

- (a) Electrical & electronic Measurement & Instrumentation by A.K.Sawhney, Dhanpat Rai & Sons.
- (b) Electronic Instrumentation & Measurement Techniques by W.D.Cooper, PHI, New Delhi.
- (c) Electronic Measuremet by Terman & Pettit: Tata MCGraw Hall.
- (d) Electronic Instrumentation by H.S.Kalsi.

ECE 203 ELECTRO MAGNETIC FIELD THEORY

L	T	P	Cr
3	1	0	3.5

Section-A

Concepts of vector algebra; Del operator, Curl, Divergence, Gradient, Laplacian Operator Gauss divergence theorem, Stokes theorem.

Electrostatic Fields: Review of Coulomb's law, Gaussian law, Laplace's and Poisson's equation in various coordinate systems, Effect of dielectric on capacitance, Boundary conditions at electric interfaces.

Electromagnetic Induction: Faraday's law, self and mutual inductance of coaxial cable, Energy stored in Electric and Magnetic fields.

Magnetic Fields: Interaction of currents and magnetic fields, Ampere's law, Magnetic vector potential, Boundary conditions at magnetic interfaces.

Section-B

Maxwell's Equation: Continuity equation, Concept of displacement current, Maxwell's equation in integral and differential form for static and time varying fields, Concept of Poynting's vector, Poynting's theorem, Power loss in a plane conductor.

Electromagnetic Waves: Wave equation, Propagation of uniform plane wave in free space and conducting medium, Polarization, Reflection and Refraction of plane waves, Brewster angle, Surface impedance.

Transmission Lines: Equivalent circuit of transmission lines, primary and secondary constants, transmission line equation, condition for loss-less and distortion-less line, loading of lines, quarter wave transformer, concept of VSWR and reflection coefficients, stub matching, Smith Chart and its use in transmission lines.

RECOMMENDED BOOKS:

1. Kraus, Electromagnetics, McGraw Hill., New York
2. Sadiku, Elements of Electromagnetics, Oxford Press.
3. W.H. Hayt. Engineering Electromagnetics, McGraw Hill, New York
4. E.C. Jordan, Electromagnetic Waves and radiating systems, Prentice Hall of India, New Delhi.
5. T.A. John Engg. Electromagnetics & Fields.

HSS 201 MANAGEMENT PRACTICES & ORGANISAIONAL BEHAVIOUR

L	T	P	Credits
3	1	0	3.5

Section A

Introduction to Management: Definition, Importance and functions of Management. Theories of Management; Classical, Neo-classical and Modern. Planning: Nature of planning, planning process, types of plans, Importance and Limitations of Planning. Introduction to MBO (Management by Objectives). Social responsibility of business.

Decision Making: Importance and Process. Organization: Process of Organizing, Organizing Principles, Organization Chart, Authority and Responsibility relationship, Steps in Delegation of Authority. Communication: Process, channels, medium of communication, communication barriers. Controlling: Steps, types of control system, essentials of effective control system.

Section-B

Organizational Behavior: Concept, features and importance. Personality: determinants and development. Role of Values and Attitudes in individual's behavior. The concept of motivation and its theories. Perception: Concept, Process, Errors in perceptual accuracy, Role of perception in decision making.

Learning: Classical and Operant conditioning theory, Reinforcement-kinds and administration. Concept of group dynamics. Leadership theories and styles. Organizational conflict: Concept, Dimensions, conflict management techniques. Introduction to concept of power and politics in work related organization. Organization culture and effectiveness.

Recommended Books:

1. Aswathappa, K and Reddy G. Sudarsana, Management and Organisation Behaviour, Himalya Publishing House.
2. Pierce John L., Gardner Donald, Gardner Donald, Management and Organisational Behavior: An Integrated Perspective, Ed.1, Cengage Learning India
3. Laurie Mullins, Management and Organisation Behaviour, 7/e, Pearson Education.
4. Stephen, P. Robbins, Seema Sanghi and Timothy A Judge, Organizational Behavior 13/e, Pearson Education.
5. Stephen P. Robbins, Mary Coulter and Neharika Vohra, Management 10/e, Pearson Education.
6. Heinz, Weihrich and Harold Koontz, Essentials of Management, Tata McGraw Hill.
7. Gene Burton and Manab Thakur, Management Today: Principles and Practice, Tata McGraw-Hill.
8. P C Tripathy, P N Reddy, Principles of Management, Tata McGraw-Hill.
9. Dr. Neeru Vashishth, Principles of Management with case studies, Taxmann Publication.
10. L.M.Prasad, Principles & Practice of Management, Sultan Chand & Sons N Delhi
11. James Stoner, R Edward Freeman and Daniel R Gilbert, Management 6/e, Pearson Education.

CPE-206 VISUAL PROGRAMMING USING VB.NET

L	T	P	Cr
3	1	0	3.5

Section A

Introduction to .NET: NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries.

Introduction to Visual studio: Project basics, types of project in . Net, IDE of VB.NET- Menu bar, Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. Event driven programming: Methods and Events.

The VB.NET Language: Variables, Declaring variables, Data Type of variables, Scope & lifetime of a variable, Constants. Control flow statements: conditional statement, loop statement. MsgBox & Inputbox. Arrays, types of array, String.

Working with Forms: Loading, showing and hiding forms, controlling One form within another. GUI Programming with Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, Radio Button, Panel, Scroll bar, Timer, List View, Tree View, Toolbar, Status Bar. Their Properties, Methods and Events.

Common Dialog Controls: OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, Print Dialog.

MDI: SDI vs MDI, Designing menus, Adding Menus.

Section B

Procedures And Classes: Collections, Subroutines, Functions, Passing variable, Number of Argument, Optional Argument, Returning value from function, classes. Object & Classes, Namespaces, Error Handling, Debugging.

Using ADO.Net: Connection, Data Adapter, Data Sets, Data Commands, Advance Data Bound Controls, Introduction to Crystal Reports.

Building a custom window control: Adding new properties, methods and events, testing a control, enhancing existing controls.

Introduction to Database Concepts: Data independence, DBMS Architecture, components of a database system, Advantages and disadvantages of Database system, Schemas, Instances, ER Model.

Introduction to Relational Database Management System: DDL statements: Table Creation and Management: Create Alter, Drop and Rename Table, create view, DML statements: select, insert, update and delete. TCL statement: Commit, Rollback. Integrity Constraints in SQL: Primary key, Foreign Key, Not Null, Unique, Check, Basic SQL Query,

Note: This subject is common to all branches. Only basics of Database concepts and SQL are covered.

RECOMMENDED BOOKS:

1. Brian Siler & Jeff Spotts, "Microsoft Visual Basic.Net"
2. Matthew MacDonald, ".NET Insight for VB Developers"
3. "Mastering in VB.Net"
4. "Using Microsoft Visual Basic.NET" by Brian Siler and Jeff Spotts, Pearson Education.
5. Prateek Bhatia, Database Management system, Kalayani Publishers
6. Korth and Silberschatz Abraham, Database Concepts, McGraw Hall, 1991

BAS 201 NUMERICAL METHODS & APPLICATIONS

L	T	P	CR
3	1	0	3.5

Section-A

Solution of Algebraic and Transcendental Equations: Truncation error; Round-Off error; Absolute and Relative errors; Bisection method; Iteration method: Conditions for the convergence of the Iteration method, Acceleration of convergence-Aitken's δ^2 process; Newton-Raphson method: Conditions for the convergence; Comparison of Regula Falsi method and Secant method; Rate of convergence and geometrical representation of each method; Newton-Raphson method for system of non-linear equations.

Solution of system of non-homogeneous linear equations: Matrix inversion method; Gauss Elimination method: Partial and Complete Pivoting.; Gauss Jordan Elimination method; Triangularization method; Factorization method; Jacobi's method and Gauss-Seidal's method. Solution of Tridiagonal system of equations.

Eigen values and Eigen vectors of a matrix: Eigen values of Transpose of matrix, inverse of matrix, Hermitian matrix and Similar matrices; Iterative Methods to find Eigen values and Eigen vectors: Power method and Jacobi method. Diagonalization of a matrix. Curve fitting: Method of Least Squares-fitting a straight line, a second degree parabola and exponential curves.

Section-B

Numerical Differentiation and Integration: Numerical Differentiation using finite differences, Numerical Integration; Newton-Cotes methods, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.

Numerical Solution of Differential Equations: Numerical solution of first order ordinary differential equations using Taylor's series method; Picard's method; Euler's method; Improved Euler's method; Modified Euler's method; Runge-Kutta method of Second and Fourth order; Predictor-Corrector methods: Milne's method and Adam's method. Boundary values problems for ordinary differential equation by finite difference method.

RECOMMENDED BOOKS

1. Numerical Methods for Mathematics, Science and Engineering by Mathews, Prentice-Hall of India. Ed. Second.
2. Numerical Methods for Scientist and Engineering Computation by M. K. Jain, S. R. K. Iyengar and R. K. Jain, New Age International Publisher, Ed. Fourth.
3. Introductory Methods of Numerical Analysis by S. S. Sastry

ECE 251

ELECTRONIC DEVICES LAB

L	T	P	CR
0	0	2	1.0

List of Experiments

1. Study of h-Parameters of CE transistor.
2. Study of h-Parameters of CB transistor.
3. Study of V-I characteristics of Photodiode.
4. Study of V-I characteristics of photo transistor.
5. Study of V-I characteristics of JFET.
6. Study of VI characteristics of MOSFET.
7. Study of Clipping & clamping CKT using Diode.
8. Study of V-I characteristics of SCR.
9. Study of Diode as rectifier.
10. Study of different filters.
11. Study of V-I characteristics of DIAC
12. Study of V-I characteristics of TRIAC.

CPE – 256	VISUAL PROGRAMMING using VB.NET	L	T	P	Cr
		0	0	2	1.0

OBJECTIVE:-

The students are required to do following exercises:

1. Write a windows application to demonstrate control structures of VB.NET.
2. Write a windows application to demonstrate various controls of VB.NET.
3. Write a Windows application that functions like a Mathematical Calculator.
4. Write a windows application that functions like a Stopwatch.
5. Write a Windows application demonstrating the use of string functions.
6. Write a Windows application demonstrating the use of Arrays.
7. Write a windows application that functions like a Notepad (using Menu Editor, Common Dialog Control, Textbox's properties).
8. Write a windows application demonstrating the use of ADO.
9. Write a Windows application for building a user control.
10. Write a windows application demonstrating various MDI features supported in VB.NET.
11. Creation of tables, virtual tables and views in SQL
12. Viewing the contents of data dictionary
13. Insert, update, delete of table rows in SQL
14. Changing of schema
15. Practice of simple SQL queries

BAS-251 Numerical Methods & Applications Lab

L	T	P	CR
0	0	2	1.0

List of Experiments:

1. WAP to implement Regular Falsi Method.
2. WAP to implement Secant Method.
3. WAP to implement Newton-Raphson Method
4. WAP to implement Gauss-Elimination Method
5. WAP to implement Gauss-Siedal Method
6. WAP to implement Trapezoidal Rule
7. WAP to implement Simpson's Rule
8. WAP to implement Euler's Method
9. WAP to implement Runge-Kutta Method
10. WAP to implement Predictor Corrector Method
11. WAP to implement Power Method

All UG Courses - II Year
Environmental and Road Safety Awareness

Time Allowed : 3 hours

Total Marks : 100

Total lectures : 50

Pass marks : 35

Instructions

- a) The paper has been introduced from the session 2013-14.
- b) The paper will be taught in the Second year/fourth Semester of all the U.G. Courses (B.A., B.Com., B.Sc., Law, Engineering, Commerce, Agriculture etc.) except LL.B. three year course and will be a qualifying paper only. The marks of this paper will not be counted towards final score of the under graduate degree.
- c) This will cover only preliminary and basics of the subject and the paper will be set accordingly.
- d) The written paper will have two parts. Each part of the paper will be of 50 marks and will contain ten questions. The candidates will attempt five questions out of each part. The answer to each question should not exceed 500 words. Each question will carry ten marks.

Section – I

Unit 1 : The multidisciplinary nature of environmental studies. Definition, scope and importance

- Concept of Biosphere – Lithosphere, Hydrosphere, Atmosphere.
- Need for public awareness (6 lectures)

Unit – 2 Natural Resources – Renewable and non-renewable resources.

- Natural resources and associated problems.
 - a) Forest resources : use and over exploitation, deforestation and its impact.
 - b) Water resources ; use and overutilization of surface and ground water and its impact.
 - c) Mineral resources : use and effects on environment on over exploitation.
 - d) Food resources : Effects modern agriculture, fertilizer-pesticide problem, water logging and salinity.
 - e) Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy resources.
 - f) Role of an individual in conservation of natural resources for sustainable development. (7 lectures)

Unit 3 : Ecosystems

- Ecosystem and its components : Definition, structure and function; producer, consumer and decomposer.
- Types of Ecosystem (Introduction only)
- Food Chains, food web and ecological pyramids (6 lectures)

Unit – 4 : Biodiversity and conservation

- Introduction – Definition : genetic, species and ecosystem diversity, value of biodiversity.
- Hot spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity. (6 lectures)

Section – II

Units 5 : Environmental Pollution

- Definition, causes, effects and control measures of
 - a) Air pollution
 - b) Water pollution
 - c) Soil pollution
 - d) Marine pollution
 - e) Noise pollution
 - f) Thermal pollution
 - g) Nuclear hazard
- Role of an individual in prevention of pollution.
- Solid waste management : vermicomposting.

- Disaster management : Floods, earthquake, cyclone and landslides (7 lectures)

Unit 6 : Social Issues and the Environment

- Urban problems related to energy.
- Water conservation rain water harvesting, water shed management.
- Resettlement and rehabilitation of people : its problems and concerns.
- Climate changes, global warming, acid rain, ozone layer depletion.
- Consumerism and waste products.
- Population explosion – Family welfare programme (6 lectures)

Unit 7 : Introduction to Environmental Protection Laws in India

- Environmental Protection Act.
- Air (Prevention and control of pollution) Act.
- Water (Prevention and Control of pollution) Act.
- Wild life Protection Act.
- Forest Conservation Act.
- Issues involved in the enforcement of environmental legislation. (6 lectures)

Unit 8 : Road safety Awareness

- Concept and significance of Road safety.
- Traffic signs.
- Traffic rules.
- Traffic Offences and penalties.
- How to obtain license.
- Role of first aid in Road Safety. (6 lectures)

FOUR YEAR B. TECH.
(Electronics and Communication Engineering)
Second Year, 4th SEMESTER
Batch 2015
(Session 2016-2017)

SCHEME OF PAPERS

CODE	TITLE OF PAPER	LOAD			
		L	T	P	Cr.
ECE 205	Measurement Science & Techniques	3	1	0	3.5
ECE 206	Circuit Theory	3	1	0	3.5
ECE 207	Signals & Systems	3	1	0	3.5
ECE 208	Antenna & Wave Propagation	3	1	0	3.5
ECE 209	Digital Electronic Circuits	3	1	0	3.5
ECE 210	Analog Electronic Circuits	3	1	0	3.5
ECE 256	Circuit Theory Lab*	0	0	2	1.0
ECE 259	Digital Electronic Circuits Lab*	0	0	2	1.0
ECE 260	Analog Electronic Circuits Lab*	0	0	2	1.0
**	Punjabi	3	0	0	
		21	6	6	24

Total contact hours: 33

- * ECE 256, ECE 259, ECE 260 are practical papers only. There will not be any theory examination for these papers.

* * In addition to above mentioned subjects, there will be an additional course on Punjabi as a qualifying subject.

Faculty of Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters

(Common for B.Tech. in Computer Science Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech./MBA Branches)

Applicable from 2014 Batch

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ECE 205

MEASUREMENT SCIENCE & TECHNIQUES

L	T	P	CR
3	1	0	3.5

Section-A

Introduction: Definition, Significance, modes and applications of measurement systems, Instrument classification, Generalized measurement system and its functional elements, Input-output configuration of measuring instruments, Methods of correction for interfering & modifying inputs, Standards, Calibration, Introduction to Static characteristics and Dynamic characteristics, Selection of instruments, Loading effects.

Error Analysis: Types of errors, Methods of error analysis, Statistical analysis, Gaussian error distribution, Chi-Square test, Significance test, Method of least square, Graphical representation and curve fitting of data.

Section-B

Sensors and Transducers: Definition, classification, Basic principle & applications of Resistive, Inductive, Capacitive, Piezoelectric, Hall-Effect, photo electric transducer, load cell and Digital Transducers, selection of sensors, Recent trends and smart sensors, Instrumentation Amplifiers.

Measurement of Parameters: Measurement of Temperature, Pressure, Flow, Speed, Force, Torque, Level, Concentration (Conductivity and pH) measurement, Voltage (PMMC, Dual slope), Current and Power.

Telemetry, Display devices & Recorders: Telemetry & Remote Sensing, Various display devices & Recorders, CRO (basic block diagram, deflection sensitivity, voltage, current, frequency and phase angle measurement), digital frequency meter.

Recommended Books:

Author	Title	Publisher
Arun k ghosh:	Introduction to measurement and instrumentation	PHI
H.N. Norton	Handbook of Transducers	Prentice Hall Inc
E.O. Doebelin	Measurement Systems, Applications & Design	McGraw Hill
J.P. Holman	Experimental Methods for Engineers	McGraw Hill
B.C. Nakra and K.K. Chaudhri	Instrumentation Measurement and Analysis	TMH
A.K Sawhney	Electrical & Electronic Measurements and Instrumentation	Dhanpat Rai & Sons

ECE 206

CIRCUIT THEORY

L	T	P	CR
3	1	0	3.5

Section-A

Introduction: 3 phase star and delta AC system with balanced and unbalanced star and delta loads, Concept of reactive power, true power & complex power in ac circuits.

Graph Theory & Network Equations: Graph, Connected graph, directed graph, sub-graph, tree and link branches, Network matrices, Incidence matrix, basic loop and cut set matrices, relation between network matrices, Topological equations for loop current and Topological equation for nodal voltages.

Network Theorems And Two Port Network Descriptions: Thevenin's theorem, Norton's theorem as applied to AC circuits, Maximum power transfer theorem as applied to A.C. Circuits, Two port description in terms of open circuits, impedance Parameters, Short circuit admittance parameters, Hybrid parameters and transmission, Inter-connection of two port network, Duality networks.

Inductively Coupled Circuits: Coefficient of coupling, mutual inductance in loop and nodal equations.

Section-B

Time Domain Analysis: Unit functions-step, impulse and ramp functions, Laplace's transform and Inverse, Solution of network problems using Laplace transform, Solution of Transient and Steady state response of RL & RC networks with different types of forcing functions. Solutions of transient and steady state response of series RLC circuit with step input.

Harmonic Analysis: Fourier transform and inverse, Fourier analysis of complex waveforms, Effective value of a complex wave, Fourier analysis of waveforms.

Network Synthesis: Synthesis vs Analysis, Elements of circuit synthesis, Introduction and general considerations in network synthesis, Purpose and scope of network synthesis.

Positive Real Functions: Definition, Necessary and Sufficient conditions for a function to be positive real, testing of driving point functions for positive realness.

Foster & Cauer Forms: Foster and Cauer Forms realization in terms of RC, RL and LC networks.

Recommended Books:

1. Sudhakar & Shyammohan, Circuits & Networks, Tata McGraw Hill.
2. Joseph Administer, Circuit Theory, S. Chand Series
3. Abhijit Chakarbarti, Circuit Theory, Dhanpat Rai & Sons, New Delhi
4. Vanvalkenberg, Network Analysis, Prentice Hall
5. D. Roy Choudhary, Networks & Systems, New Age International, New Delhi.

ECE 207

SIGNALS AND SYSTEMS

L	T	P	CR
3	1	0	3.5

Section-A

Representation of Signal and Systems: Classifications of signals, Linear time invariant systems, Representation of signals in terms of impulses, Discrete time LTI systems, continuous time LTI systems, Properties of LTI systems, Systems described by differential and difference equations.

Fourier analysis: Signal representation using Fourier series, Representation of periodic signals. Continuous and discrete time Fourier series, Exponential Fourier series, Properties of Fourier series, Convergence of Fourier series, Continuous and Discrete time Fourier transform, Properties of Fourier transform, Analysis of discrete time signals and systems, Correlation, Autocorrelation.

Section-B

Random Signals: Probability, Random variables, Gaussian distribution, Transformation of random variables, Random processes, Stationary processes. Correlation and Covariance functions, Regularity and Ergodicity, Gaussian Process, Central limit theorem, Transmission of random signal through a linear filter, Power Spectral density and Energy Spectral density.

Noise: Thermal Noise, Shot Noise, Multiple resistor noise sources, AWGN, Network with reactive elements, Noise Temperature. Noise bandwidth. Effective input noise temperature. Noise figure and equivalent noise temperature of a Cascaded amplifier.

Recommended Books:

1. Oppenheim, Willisky and Nawab, "Signals & Systems", Tata Mcgraw Hill, New Delhi.
2. Simon Haykin, "Communications System", Wiley Eastern, USA
3. B.P.Lathi, "Communication Systems", Oxford Press, USA
4. A. Papouils, "Random Variables & Stochastic Process", Mcgraw Hill, USA

ECE - 208 ANTENNA & WAVE PROPAGATION

L	T	P	CR
3	1	0	3.5

Section-A

Introduction: Review of vector theory, Gradient, Divergence & Curl, Coordinate system, rectangular, cylindrical and spherical and their transformation, Physical concept of Radiation in single wire, two-wire and dipole, Current distribution on a thin wire antenna.

Basic Principles & Definitions: Retarded vector and scalar potential, Radiation and induction fields, Radiation from elementary dipole (Hertzian dipole), short dipole (Linear current distribution), halfwave dipole, Antenna parameters: Radiation resistance, Radiation pattern. Beam width, Gain, Directivity, Effective height, Effective aperture, Polarization, Bandwidth and antenna temperature.

Radiating Wire Structures: Folded dipole, Monopole, Biconical antennas and loop antenna.

Introduction to Antenna Arrays: Linear Uniform Array of Two & Isotropic sources, Principles of pattern multiplication, Broadside arrays, End fire arrays, Array pattern Synthesis, Uniform Array, Binomial Array, Chebyshev Arrays, Scanning Array, Super-directive Array, Antenna for receiving and transmitting TV signals e.g. Yagi-Uda and Turnstile Antennas.

Section-B

Aperture Type Antennas: Aperture Antennas, E & H -plane Horns, Pyramidal Horn, Lens Antenna and Reflector Antennas, Frequency Independent Antennas, Log Periodic Antenna, Antenna Measurements, Micro strip Antennas & their advantages.

Propagation of Radio Waves: Friss Free Space Equation, Different modes of propagation: Ground waves, Space waves, Space wave propagation over flat and curved earth, Optical and radio horizons, Surface waves and Troposphere waves. Ionosphere, Wave propagation in the Ionosphere. Critical frequency, Maximum usable frequency (MUF), Skips distance, Virtual height, Radio noise of terrestrial and extraterrestrial origin.

Recommeconded Books:

1. Antennas Analysis & Design- C.A.Balanis, John Wiley,1997
2. Antannas- Kraus, (3rd Edition),Mcgraw Hill,2002
3. Electromagnectic Waves- E.C . Jordan & K.G. Balmin , 2nd Edition, PHI,1995
4. Antenna & Wave Propagation -Robert E. Collin,Mcgraw Hill ,1995
5. Electronics & Radio Engineering -F.E. Terman , Mcgraw Hill Book Co. 1937
6. Radio Wave Propagation M. Dolukhanov, MIR,1971

ECE 209

DIGITAL ELECTRONIC CIRCUITS

L	T	P	CR
3	1	0	3.5

Section-A

Review of Number Systems and Codes : Binary, Octal and Hexadecimal number systems, Binary to decimal, Decimal to binary, Octal and hexadecimal to binary and binary to octal and hexadecimal conversions, BCD code, Gray code, Alphanumeric codes, Parity method for error detection.

Logic gates and Boolean Algebra: OR, AND and NOT operations and gates, NOR, NAND, XOR and XNOR operations and gates, Evaluating logic circuit outputs, Implementing circuits from Boolean expressions. Boolean theorems, DeMorgan's theorem, universality of NAND and NOR gates, IEEE/ANSI standard logic symbols.

Combinational Logic Circuits: Sum of product form, Product of sum form, Simplification of Boolean functions using algebraic and Karnaugh map methods. Half adder, Full adder, half subtractor, full subtractor circuits, parity generator and checker circuits, comparator circuit.

Combinational digital circuit design: Multiplexer, Demultiplexer, Code converters, Combinational logic circuits. Some examples of Boolean gate ICs.

Section-B

Sequential Circuits: RS, JK, D and T flip-flops circuits and their conversions, Serial and parallel counters and shift registers, Universal shift registers, some examples of counter and shift register ICs.

Logic families and digital ICs: Characteristics of digital ICs, Classification of different logic families.

Memories: Semi-conductor memories, ROM and RAM, ROM using diodes, BJTs, and FETs. RAM cell. Memory organization and expansion. An idea about other types of memories.

Digital to Analog and Analog to Digital Converters: Variable register network, R-2R D/A converters. D/A accuracy and resolution, A/D converters, Simultaneous conversion and counter method.

Recommended Books:

1. R.J Tocci, "Digital Principles Circuit" Prentice Hall of India, New Delhi.
2. M.M. Mano, "Digital Design" Mcgraw Hill, USA
3. Morris M. Mano "Digital logic and Computer design" Prentice Hall of India New Delhi.
4. Malvino Leach, "Digital Principles and Applications" McGraw Hill, USA

ECE 210

ANALOG ELECTRONIC CIRCUITS

L	T	P	CR
3	1	0	3.5

Section-A

High Frequency Transistor: The high frequency T model, CB short circuit current frequency response, Alpha cut-off frequency, CE short circuit current frequency response, Hybrid pi CE transistor model, hybrid pi conductance in terms of low frequency h – parameters, CE short circuit current gain obtained with hybrid pi model, current gain with resistive load.

Feedback Amplifier: Classification of amplifier, Feed back concept, General characteristics of negative feedback amplifiers, Analysis of a feedback amplifier, Various types of feedbacks and their effects on amplifier performance.

Section-B

Power Amplifiers: Class A large signal amplifier, second and higher harmonic distortion, transformer coupled amplifiers, Efficiency of amplifiers, Push-pull amplifiers (class A & class B).

Tuned Amplifiers: Single tuned capacitively coupled amplifier & its steady state response, Determination of Gain, Bandwidth product, Tapped tuned, Inductively coupled single tuned circuit, Double tuned circuits.

Oscillators: Condition for sustained oscillation, R-C phase shift, Hartley, Colpitts, Crystal and Wien Bridge Oscillators.

Wave shaping circuits: Switching characteristics of diodes and transistors including square wave response, Multivibrators- Bistable, Monostable and Astable, Schmitt Trigger.

Books Recommended:

1. Integrated Electronics by Millman & Halkias McGraw Hill Publication.
2. Engineering Electronics by Alley & Attwood.
3. Liner Integrated circuits by Gayekward.
4. Malvino, " Electronic Principles" Prentice Hall of India, New Delhi.
5. Burns and Bond, " Principles of Electronic Circuits" PWS Publishing Company Boston.
6. Millman and Taub, "Pulse, Digital and Switching Waveforms" Mcgraw Hill, USA.
7. Millman and Halkias, " Integrated Electronics" Mcgraw Hill USA.

ECE 256

CIRCUIT THEORY LAB

L	T	P	Cr
0	0	2	1.0

List of Experiments

Exp No.

1. To study and verify Thevenin's Theorem.
2. To study and verify Norton's Theorem.
3. To study and verify Reciprocity Theorem.
4. To study and verify Maximum Power Transfer Theorem.
5. To study and verify Superposition Theorem.
5. To plot step Response of series RLC Circuit.
6. To plot step response of series RC Circuit.
7. To solve mesh equations using Matlab.
8. To solve nodal equations using Matlab.
9. To plot frequency Response of a given transfer function using Matlab.
10. To find laplace transforms of a given sinusoidal signal using Matlab.
11. To study and verify Kirchhoff's Voltage Law.
12. To study and verify Kirchhoff's current Law.
13. To calculate and verify Z-parameters of a T-Network.
14. To calculate and varifyY-parameters of a Pi network.
15. To calculate and verify Transmission parameters of a cascaded network.

ECE 259 DIGITAL ELECTRONIC CIRCUITS LAB

L	T	P	Cr
0	0	2	1.0

List of Experiments

Experiment 1.

- i) Verify the truth table for different Logic Gates.
- ii) Realize AND,OR, NOR, NOT functions using only NAND Gate.
- iii) Realize AND,OR, NAND, NOT functions using only NOR Gate.
- iv) Implement EX-OR, EX-NOR using AND,OR,NOT Gates
- v) Implement EX-OR, EX-NOR using only NAND, NOR Gates

Experiment 2. Boolean Algebra:-

- i) Verify laws of Multiplication.
- ii) Verify laws of Addition.

Experiment 3. Make the circuit of Binary adder theoretically.

- i) Half-Adder.
- ii) Full-Adder and then Verify.

Experiment 4. Make the circuit of binary subtractor theoretically.

- i) Half-Subtractor
- ii) Full-Subtractor and then Verify.

Experiment 5. Construct different types of FF.

- i) RS-FF
- ii) JK-FF
- iii) D-FF
- iv) T-FF

Experiment 6. Verify the Master-Slave J-Kflip flops and construct Master Slave FF from JK-FF.

Experiment 7. Verify the 4-bit magnitude comparator.

Experiment 8. Generate all the 0-9 digits from BCD to 7 segment decoder and then make K-Map.

Experiment 9. Make truth table for 16:1 mux and implement $ACD+BA+ACB$ in it.

Experiment 10. Verify all the shift registers.

- ii) SISO
- iii) SIPO
- iv) PISO
- v) PIPO

Experiment 11. Verify decade Counters:

- i) Verify and Design M-6 Counter:

Experiment 12. To Study & Verify ADC and DAC converter.

ECE 260

ANALOG ELECTRONIC CIRCUITS LAB

L	T	P	Cr
0	0	2	1.0

List of Experiments

1. To plot frequency response characteristics of a RC Single stage RC coupled Amplifier.
2. To determine the voltage gain of a two stage RC coupled amplifiers.
3. To plot frequency response characteristics of Transformer coupled amplifier.
4. To plot frequency response of a tuned voltage amplifier and to calculate its resonant frequency.
5. To find voltage gain of an emitter follower and find its operating point.
6. To study Wein Bridge Qscillator.
7. To study Phase Shift Qscillator.
8. To study OP-Amp as differentiator & Integrator.
9. To study diode as a biased and unbiased clipper.
10. To study Astable Multivibrator using Transistors.
11. To study Bistable Multivibrator using Transistors.
12. To study OP-Amp as an inverting and non-inverting amplifier.
13. To study OP-Amp as summing and Average Amplifier.
14. To study the frequency response of audio amplifier.

ਸਿਲੇਬਸ
ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ)

ਅੰਡਰ ਗ੍ਰੈਜੂਏਟ ਪੱਧਰ ਤੇ ਪ੍ਰੋਫੈਸ਼ਨਲ ਕੋਰਸਾਂ ਲਈ ਕੁਆਲੀਫਾਇੰਗ ਪੰਜਾਬੀ (ਬੈਚ 2014 ਤੋਂ ਲਾਗੂ)

For Other State Students of
B. Tech & 5 Yr. Engineering Management Integrated Program Only

ਕੁੱਲ ਅੰਕ: 100 (ਮੌਖਿਕ ਪ੍ਰੀਖਿਆਂ 40 ਅੰਕ; ਬਾਹਰੀ ਪ੍ਰੀਖਿਆਂ 60 ਅੰਕ) ਪਾਸ ਅੰਕ 35%

ਸਮਾਂ : 3 ਘੰਟੇ

ਪੀਰੀਅਡ: 3 ਪ੍ਰਤੀ ਹਫ਼ਤਾ

ਭਾਗ ਓ

- 1) ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ ਤੇ ਲੇਖਣ ਪ੍ਰਬੰਧ
ੳ) ਅੱਖਰ ਸਿੱਖਿਆ: ਤਰਤੀਬਵਾਰ ਤੇ ਭੁਲਾਵੇਂ ਅੱਖਰ
ਅ) ਅੱਖਰ ਬਣਤਰ: ਅੱਖਰ ਰੂਪ ਤੇ ਲਿਖਣ ਦੇ ਨਿਯਮ
- 2) ਗੁਰਮੁਖੀ ਅੱਖਰ ਤੇ ਪੰਜਾਬੀ ਧੁਨੀਆਂ ਦਾ ਪ੍ਰਬੰਧ
ੳ) ਸਵਰ ਤੇ ਵਿਅੰਜਨ: ਵਰਗੀਕਰਨ ਦੇ ਸਿਧਾਂਤ ਤੇ ਉਚਾਰਨ
ਅ) ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ

ਭਾਗ ਅ

- 1) ਲਿਪੀ ਦੇ ਅੱਖਰਾਂ ਦੀ ਵਰਤੋ ਦੇ ਨਿਯਮ
ੳ) ਪੂਰੇ ਤੇ ਅੱਧੇ ਅੱਖਰ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ
ਅ) ਸਵਰ ਸੂਚਕ ਅੱਖਰਾਂ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ
- 2) ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਜਾਣ-ਪਛਾਣ।
ੳ) ਹਫ਼ਤੇ ਦੇ ਦਿਨ
ਅ) ਮਹੀਨਿਆਂ ਦੇ ਨਾਮ
ੲ) ਰੰਗਾਂ ਦੇ ਨਾਮ
ਸ) ਪੰਜਾਬੀ ਰਿਸਤਾ-ਨਾਤਾ ਪ੍ਰਬੰਧ ਸ਼ਬਦਾਵਲੀ

ਭਾਗ ਏ

- 1) ਸ਼ਬਦ ਪ੍ਰਬੰਧ: ਸ਼ਬਦ ਜੋੜਾ ਦੀ ਵਰਤੋ
ੳ) ਦੋ ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਸ਼ਬਦ-ਜੋੜ
ਅ) ਤਿੰਨ ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਸ਼ਬਦ ਜੋੜ
- 2) ਸ਼ਬਦਾਂ ਦੀਆਂ ਸਰੇਣੀਆਂ ਤੇ ਵਿਆਕਰਨਕ ਵਰਗਾਂ ਦੀ ਪਛਾਣ
ੳ) ਸ਼ਬਦਾਂ ਦੀਆਂ ਸਰੇਣੀਆਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ,
(ਨਾਵ, ਪੜਨਾਵ, ਵਿਸ਼ੇਸਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸਣ ਆਦਿ)

ਭਾਗ ਸ

- 1) ਸ਼ਬਦ ਬਣਤਰਾਂ ਤੇ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦਾ ਸਿਧਾਂਤ ਤੇ ਵਰਤੋ
ੳ) ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰਾਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ
(ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਸਮਾਸ, ਦੁਹਰਕਤੀ)
ਅ) ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ
(ਵਾਕੰਸ਼, ਉਪ-ਵਾਕ ਤੇ ਵਾਕ)

ਅੰਡਰ ਗ੍ਰੈਜੂਏਟ ਪੱਧਰ ਤੇ ਪ੍ਰੋਫੈਸ਼ਨਲ ਕੋਰਸਾਂ ਲਈ ਕੁਆਲੀਫਾਇੰਗ ਪੰਜਾਬੀ
2013, 2014 ਅਤੇ 2015 ਪ੍ਰੀਖਿਆਵਾਂ ਲਈ
ਸਿਲੇਬਸ

ਕੁਲ ਸਮਾਂ:100

ਸਮਾਂ:3 ਘੰਟੇ

ਪੀਰੀਅਡ: 3 ਪ੍ਰਤੀ ਹਫ਼ਤਾ

ਲਿਖਤੀ:60 ਅੰਕ

ਮੌਖਿਕ ਪ੍ਰੀਖਿਆ:40 ਅੰਕ

ਪਾਸ ਅੰਕ:35%

1. ਪੰਜਾਬੀ ਦੀ ਪਾਠ-ਪੁਸਤਕ

(ਮੁੱਖ ਸੰਪਾਦਕ: ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਪ੍ਰਕਾਸ਼ਕ ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ)

ਭਾਗ ਪਹਿਲਾ- ਪੰਜਾਬੀ ਸਾਹਿਤ

(ੳ) ਕਵਿਤਾ

(ਅ) ਕਹਾਣੀ

(ੲ) ਨਾਟਕ

ਭਾਗ ਦੂਜਾ-ਪੰਜਾਬ ਸਭਿਆਚਾਰ ਅਤੇ ਲੋਕਧਾਰਾ

ਭਾਗ ਤੀਜਾ- ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

ਪੁਸਤਕ ਦੇ ਤਿੰਨ ਭਾਗ ਹਨ। ਪ੍ਰੰਤੂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਭਾਗਾਂ ਵਿਚ ਹੋਵੇਗਾ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦਾ ਪਹਿਲਾ ਭਾਗ ਪੁਸਤਕ ਦੇ ਪਹਿਲੇ ਭਾਗ ਉਤੇ ਆਧਾਰਿਤ ਹੋਵੇਗਾ। ਇਸ ਭਾਗ ਦੇ ਕੁਲ 36 ਅੰਕ ਹਨ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦਾ ਦੂਜਾ ਭਾਗ ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਉਤੇ ਆਧਾਰਿਤ ਹੋਵੇਗਾ। ਇਸ ਭਾਗ ਦੇ ਕੁਲ 24 ਅੰਕ ਹੋਣਗੇ ਅਤੇ ਇਸ ਵਿਚ ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਦੇ 12-12 ਅੰਕ ਹੋਣਗੇ।

- (1) ਪੁਸਤਕ ਦੇ ਪਹਿਲੇ ਭਾਗ ਦੇ ਤਿੰਨ ਉਪ-ਭਾਗ ੳ,ਅ ਅਤੇ ੲ ਹਨ। ਇਨ੍ਹਾਂ ਤਿੰਨਾਂ ਉਪ-ਭਾਗਾਂ ਵਿਚੋਂ ਹੇਠ ਅਨੁਸਾਰ ਸੁਆਲ ਹੇਠ ਅਨੁਸਾਰ ਪੁੱਛੇ ਜਾਣ।

(ੳ) ਇਸ ਵਿਚ ਕੁਲ 12 ਪ੍ਰਸ਼ਨ ਔਬਜੈਕਟਿਵ ਟਾਈਪ/ਮਲਟੀਪਲ ਚੋਣ ਵਾਲੇ ਹੋਣਗੇ। ਹਰ ਉਪ-ਭਾਗ ਵਿਚ 4-4 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਅੰਕ $3 \times 4 = 12$

(ਅ) ਹਰ ਉਪ ਭਾਗ ਵਿਚੋਂ 5-5 ਲਘੂ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ 3-3 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਉਤਰ ਪੰਜ ਲਾਈਨਾਂ ਤੋਂ ਵੱਧ ਨਾ ਹੋਵੇ। ਅੰਕ $9 \times 2 = 18$

(ੲ) ਹਰ ਉਪ ਭਾਗ ਵਿਚੋਂ 1-1 ਪ੍ਰਸ਼ਨ ਪੁਛਿਆ ਜਾਵੇਗਾ। ਇਨ੍ਹਾਂ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ। ਉਤਰ ਇਕ ਸਫੇ ਤੱਕ ਸੀਮਤ ਹੋਵੇ। ਅੰਕ = 06

- (2) ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਵਿਚੋਂ ਪ੍ਰਸ਼ਨ ਇਸ ਪ੍ਰਕਾਰ ਪੁੱਛੇ ਜਾਣਗੇ।

(ੳ) ਹਰ ਭਾਗ ਵਿਚੋਂ 4-4 ਪ੍ਰਸ਼ਨ ਔਬਜੈਕਟਿਵ ਟਾਈਪ/ਮਲਟੀਪਲ ਚੋਣ ਵਾਲੇ ਹੋਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਅੰਕ $4 \times 4 = 16$

(ਅ) ਹਰ ਇਕ ਭਾਗ ਵਿਚ 4-4 ਸੰਖੇਪ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਕੁਲ 5 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚੋਂ 2 ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ। ਅੰਕ $5 \times 2 = 10$

(ੲ) ਹਰ ਇਕ ਭਾਗ ਵਿਚੋਂ 1-1 ਪ੍ਰਸ਼ਨ ਪੁਛਿਆ ਜਾਵੇਗਾ। ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ ਹੋਵੇਗਾ। ਉਤਰ ਇਕ ਸਫੇ ਤੱਕ ਸੀਮਤ ਹੋਵੇ। ਅੰਕ = 06

ਨੋਟ:- ਮੌਖਿਕ ਪ੍ਰੀਖਿਆ ਪਾਠ-ਪੁਸਤਕ ਤੇ ਹੀ ਆਧਾਰਿਤ ਹੋਵੇਗੀ। ਇਸ ਦੀ ਵਿਧੀ ਪ੍ਰੈਕਟੀਕਲ ਵਾਲੀ ਹੋਵੇਗੀ।

ਸਿਲੇਬਸ
ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ)

ਅੰਡਰ ਗ੍ਰੈਜੂਏਟ ਪੱਧਰ ਤੇ ਪ੍ਰੋਫੈਸ਼ਨਲ ਕੋਰਸਾਂ ਲਈ ਕੁਆਲੀਫਾਇੰਗ ਪੰਜਾਬੀ (ਬੈਚ 2014 ਤੋਂ ਲਾਗੂ)

For Other State Students of
B. Tech & 5 Yr. Engineering Management Integrated Program Only

ਕੁੱਲ ਅੰਕ: 100 (ਮੌਖਿਕ ਪ੍ਰੀਖਿਆਂ 40 ਅੰਕ; ਬਾਹਰੀ ਪ੍ਰੀਖਿਆਂ 60 ਅੰਕ) ਪਾਸ ਅੰਕ 35%

ਸਮਾਂ : 3 ਘੰਟੇ

ਪੀਰੀਅਡ: 3 ਪ੍ਰਤੀ ਹਫ਼ਤਾ

ਭਾਗ ਓ

- 1) ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ ਤੇ ਲੇਖਣ ਪ੍ਰਬੰਧ
ਓ) ਅੱਖਰ ਸਿੱਖਿਆ: ਤਰਤੀਬਵਾਰ ਤੇ ਭੁਲਾਵੇਂ ਅੱਖਰ
ਅ) ਅੱਖਰ ਬਣਤਰ: ਅੱਖਰ ਰੂਪ ਤੇ ਲਿਖਣ ਦੇ ਨਿਯਮ
- 2) ਗੁਰਮੁਖੀ ਅੱਖਰ ਤੇ ਪੰਜਾਬੀ ਧੁਨੀਆਂ ਦਾ ਪ੍ਰਬੰਧ
ਓ) ਸਵਰ ਤੇ ਵਿਅੰਜਨ: ਵਰਗੀਕਰਨ ਦੇ ਸਿਧਾਂਤ ਤੇ ਉਚਾਰਨ
ਅ) ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ

ਭਾਗ ਅ

- 1) ਲਿਪੀ ਦੇ ਅੱਖਰਾਂ ਦੀ ਵਰਤੋ ਦੇ ਨਿਯਮ
ਓ) ਪੂਰੇ ਤੇ ਅੱਧੇ ਅੱਖਰ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ
ਅ) ਸਵਰ ਸੂਚਕ ਅੱਖਰਾਂ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ
- 2) ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਜਾਣ-ਪਛਾਣ।
ਓ) ਹਫ਼ਤੇ ਦੇ ਦਿਨ
ਅ) ਮਹੀਨਿਆਂ ਦੇ ਨਾਮ
ੲ) ਰੰਗਾਂ ਦੇ ਨਾਮ
ਸ) ਪੰਜਾਬੀ ਰਿਸਤਾ-ਨਾਤਾ ਪ੍ਰਬੰਧ ਸ਼ਬਦਾਵਲੀ

ਭਾਗ ਏ

- 1) ਸ਼ਬਦ ਪ੍ਰਬੰਧ: ਸ਼ਬਦ ਜੋੜਾਂ ਦੀ ਵਰਤੋ
ਓ) ਦੋ ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਸ਼ਬਦ-ਜੋੜ
ਅ) ਤਿੰਨ ਅੱਖਰੀ ਸ਼ਬਦਾਂ ਦੇ ਸ਼ਬਦ ਜੋੜ
- 2) ਸ਼ਬਦਾਂ ਦੀਆਂ ਸਰੋਣੀਆਂ ਤੇ ਵਿਆਕਰਨਕ ਵਰਗਾਂ ਦੀ ਪਛਾਣ
ਓ) ਸ਼ਬਦਾਂ ਦੀਆਂ ਸਰੋਣੀਆਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ,
(ਨਾਵ, ਪੜਨਾਵ, ਵਿਸ਼ੇਸਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸਣ ਆਦਿ)

ਭਾਗ ਸ

- 1) ਸ਼ਬਦ ਬਣਤਰਾਂ ਤੇ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦਾ ਸਿਧਾਂਤ ਤੇ ਵਰਤੋ
ਓ) ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰਾਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ
(ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਸਮਾਸ, ਦੁਹਰਕਤੀ)
ਅ) ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ
(ਵਾਕੰਸ਼, ਉਪ-ਵਾਕ ਤੇ ਵਾਕ)

Self

ml

12/11/15

FOUR YEAR B. TECH.
(Electronics and Communication Engineering)
Third Year, 5th SEMESTER
Batch 2015
(Session 2017-2018)

SCHEME OF PAPERS

CODE	TITLE OF PAPER	LOAD			
		L	T	P	Cr.
ECE 302	Analog Communication Systems	3	1	0	3.5
ECE 303	Micro Processor & Applications	3	1	0	3.5
ECE 304	Digital System Design	3	1	0	3.5
ECE 305	Linear Integrated Circuits & Applications	3	1	0	3.5
ECE 306	Control Engineering	3	1	0	3.5
ECE 352	Analog Communication Systems lab*	0	0	2	1.0
ECE 353	Micro Processor & Applications lab*	0	0	2	1.0
ECE 354	Digital System Design* Lab	0	0	2	1.0
	Elective-1	3	1	0	3.5
	Open Elective**				
STG 351	Summer Training***				6.0
		18	6	6	30

Total contact hours: 30 (Excluding open elective)

* ECE 352, ECE 353, ECE 354 & ECE 357 are practical papers only. There will not be any theory examination for these papers.

** Student can opt any number of courses from the list of open elective subject.

*** Summer Training will be of 4-6 weeks duration in Industry/ in house.

Elective-1

1. Opto Electronics (ECE 301)
2. HDL BASED DIGITAL DESIGN (ECE 316)

**Open Elective (it is an over and above the basic requirement for B.Tech degree. Student can opt any number of subjects from open elective list)

1. Micro Economic Analysis (M.A. Business Economics)
2. Quantitative Techniques (M.A. Business Economics)

3. Theory and Practice Of War – I (M.A. Defence & Strategic Studies)
4. Professional Photography (B. Tech Tv, Film Production And Media Technology)
5. Early History Of Buddhism (M.A. Buddhist Studies)
6. Origin & Development Of Sikhism (M.A. Buddhist Studies)
7. Philosophical Foundations Of Education (M.A. Education)
8. English Phonetics And Phonology (M.A. English)
9. Art And Cultural History Of India (M.A. Fine Arts)
10. Growth & Development Of Print Media (M.A Journalism And Mass Communication)
11. Guru Nanak Dev : Metaphysics & Epistemology (M.A. Philosophy)
12. Individual And Society (M. A. Social Work)
13. Human Growth And Development (M. A. Social Work)
14. Women's Movement In India (M.A. Women's Studies)
15. Positional Astronomy (M.Sc. Astronomy & Space Physics)

In addition to above open elective subjects, student can opt any subject offered by university departments with the consent of ACD of ECE department.

Faculty of Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters

(Common for B.Tech. in Computer Science Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech./MBA Branches)

Applicable from 2014 Batch

The B. Tech paper structure will be as shown below:

Pattern of Question Paper	
TITLE OF SUBJECT (CODE----)	
Bachelor of Technology (Branch):	
End Semester Exam	
TIME ALLOWED: 3 Hour	
Roll. No.....	
Maximum Marks: 50	
Note:- Section C is compulsory. Attempt any six questions by selecting three questions from section A & three questions from section B.	
Section-A (From Section A of the syllabus)	
Q1.	
Q2.	
Q3.	
Q4.	
Q5.	
3x5	
Section-B (From Section B of the syllabus)	
Q6.	
Q7.	
Q8.	
Q9.	
Q10.	
3x5	
Section-C (From whole syllabus)	
Q11	
a).....	
b).....	
c).....	
d).....	
e).....	
f).....	
g).....	
h).....	
i).....	
j).....	
10x2=20	

Note for the paper setter:

1. Total numbers of questions to be set are nine (11) as per the above format.
2. There will be FIVE questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts.
3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.
4. The maximum limit on numerical problems to be set in the paper is 35% while minimum limit is 20%.
5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
8. Use of Scientific calculator should be clearly specified.

ECE 302

ANALOG COMMUNICATION SYSTEMS

L	T	P	Cr
3	1	0	3.5

Section-A

Amplitude Modulation (AM): Introduction. Basic elements of communications. Noise. Modulation and frequency translation. Need for modulation. Expression for AM, modulation index for AM, amplitude waveform and bandwidth of amplitude modulated signal, power distribution in amplitude modulated signal. Double sideband suppressed carrier (DSB-SC), single sideband (SSB), and vestigial sideband (VSB) AMs. Frequency division multiplexing (FDM).

AM Modulators: Introduction. Circuit diagrams and operational principles of square law modulator, switching modulator, balanced modulator, ring modulator. Block diagram explanations of filtering method and phasing method for generation of SSB.

AM Demodulators: Introduction. Circuit diagrams and explanations of envelope detector and square law detector.

Angle Modulation: Introduction to Phase modulation (PM) and frequency modulation (FM). Relationship between PM and FM. Phase and frequency deviation. Power distribution in angle modulated signal. Spectral characteristics of angle modulated signals. Effect of noise on angle modulation, role of limiter, pre-emphasis and de-emphasis in FM. Comparison of FM with AM in communication systems.

FM Modulators: Introduction. Block diagram explanations of direct method and indirect method (Armstrong system) of FM. Frequency multiplication circuit, its explanation and application in FM.

Section-B

FM Demodulators: Introduction. Circuit diagrams and explanations of slope detector, balanced slope detector, quadrature detector. Block diagram explanation of phase locked loop demodulator.

Pulse Modulation: Introduction. Sampling theorem and its applications. Pulse amplitude modulation(PAM). Natural sampling (Gating) and instantaneous sampling (flat-top PAM). Bandwidth of PAM. Quantization, companders, pulse code modulation (PCM).

AM Transmitters and Receivers: Introduction. Block diagram explanations of AM radio transmitter using modulation at high carrier power level and AM radio transmitter low carrier power level. Working principles and block diagram explanations of superheterodyne receiver, Specifications of receiver, sensitivity, selectivity, fidelity, signal to noise ratio, image rejection and double spotting, Concept of automatic gain control(AGC).

FM Transmitters and Receivers: Introduction. Block diagram explanations of Armstrong type phase modulated FM transmitter and FM stereo transmitter. Block diagram explanations of FM stereo receiver & superheterodyne FM radio receiver.

Recommended Books:

J G Proakis & M Salehi, Communication Systems Engineering, Pearson Education

B P Lathi, Modern Digital & Analog Communication Systems, Oxford University Press.

Taub & Schilling, Principles of Communications, Tata McGraw Hill

Couch, Digital & Analog Communication System, Pearson education

G. K. Mithal ,Radio Engineering.

ECE 303 MICRO PROCESSOR & APPLICATIONS

L	T	P	Cr
3	1	0	3.5

Section-A

Introduction: Overview of architecture and instruction set of 8085, introduction to interfacing and input/output (I/O) techniques. Introduction to timing and control, interrupts and programming of 8085.Bus Contention & solution

Interfacing Chips: Block diagram and modes of operation of interfacing devices, 8155/8156 and 8355/8755 multipurpose programmable devices, 8279 programmable keyboard/display interface, 8255A programmable peripheral interface, 8253 programmable interval timer, 8259A programmable interrupt controller, 8257 direct memory access(DMA) controller and 8251 USART.

Section-B

Microprocessor Applications: Interfacing of single and multiple digit seven-segment LED output display. Interfacing of DAC (AD 558, AD 7522 & DAC0800) and ADC (AD570, AD7574 and ADC0800). Applications like Temperature measurement and control, water level indicator, measurement and display of motor speed and traffic light control system.

8086 Microprocessor: Architecture, memory segmentation, parallel processing, addressing modes, instruction set and simple programming examples.

Recommended Books:

Author	Title	Publisher
Mathur, A.	Introduction to Microprocessor	Tata-McGraw Hill
Gaonkar	Microprocessor 8085/8080A	Wiley Eastern
Ltd.		
D. Hall	Microprocessors and Digital Systems	Tata-McGraw Hill
B. Ram	Fundamentals of microprocessors and Microcomputers	Dhanpat Rai & Sons
Gibson	Microprocessor 8086	PHI

ECE 304

DIGITAL SYSTEM DESIGN

L	T	P	Cr
3	1	0	3.5

Section-A

Review Of Digital Electronics Concept: MSI and LSI Circuits and Their Applications: Arithmetic Circuits, Comparators, Multiplexers, Code Converters, XOR And AND-OR INVERTER Gates, Wired Logic, Bus Oriented Structures, Tri-State Bus System, Propagation Delay.

Sequential Machines: The Concept of Memory, The Binary Cell, The Cell And The Bouncing Switch, Set / Reset, D, Clocked T, Clocked JK Flip Flop, Design Of Clock F/F, State Diagram, Synchronous Analysis Process, Design Steps For Traditional Synchronous Sequential Circuits, State Reduction, Design Steps For Next State Decoders, Design Of Out Put Decoders.

Section-B

Multi Input System Controller Design: System Controllers, Design Phases And System Documentation, Defining The System, Timing And Frequency Considerations, MDS Diagram, State Assignment, Next State Decoders And Its Maps, Output Decoders, ROM, PLA And PAL Based Design.

Asynchronous Finite State Machines: Scope, Asynchronous Analysis, Design Of Asynchronous Machines, Cycle And Races, Plotting And Reading The Excitation Map, Hazards, Essential Hazards Map Entered Variable, MEV Approaches To Asynchronous Design, Hazards In Circuit Developed By MEV Method.

RECOMMECONDED BOOKS:

1. An Engineering Approach to Digital Design - Fletcher PHI 1990
2. Designing with TTL Circuits - Texas Instruments.

ECE – 305 LINEAR INTEGRATED CIRCUITS & APPLICATIONS

L	T	P	Cr
3	1	0	3.5

Section-A

Operational Amplifiers: Differential Amplifier – Transfer characteristics, CMRR, PSRR, current mirror, voltage references, internal structure of Op-amp, Ideal Op-amp. Characteristics, Inverting and non-inverting Op-amp; offset error voltages and currents, slew rate, characterization of Op-amp parameters. Op-amp internal design starting from basic differential amplifier.

Negative Feedback In Op-Amps: Block diagram representation of feedback configurations, Voltage-series feedback Amplifier, Voltage shunt feedback amplifier, Differential amplifiers with one op-amp, two op-amps and three op-amps.

FREQUENCY RESPONSE OF AN OP-AMP: Frequency response, Compensating Networks, Frequency response of internally compensated Op-Amps, Frequency response of Non compensated Op-amps, Closed loop frequency response, Slew rate, causes of slew rate and its effect on applications

Section-B

Analog Systems With Operational Amplifier As A Building Block: Basic applications – Inverter, scale changer, adder, voltage to current / current to voltage converter, voltage follower, Bridge amplifier; Instrumentation amplifier; Analog Integrator and Differentiator, Logarithmic amplifier, anti-log amplifier.

Comparator & other applications: Comparator, comparator characteristics, limitation of Op-amp as comparator, voltage limiters, zero crossing detector, timing mark generator, precision rectifier, average detector, peak detector, window detector, voltage to frequency & frequency to voltage converters.

Specialized IC Applications: Active filters, First order low pass Butterworth Filter, Second order low pass Butterworth Filter, First order high pass Butterworth Filter, Second Order High pass Butterworth Filter, higher order filters. Design of active filters, Band Pass filters – wide band & narrow band; Band reject filters – wide band & narrow band, all pass filters. 555 timer and its use as bistable, monostable & astable multivibrator, Schmitt trigger. Phase locked loop 565 applications, frequency synthesizers, and current differencing (Norton) amplifier.

RECOMMECONDED BOOKS:

1. Op-Amp & Linear Integrated Circuits- R. A Gayakwad, 4th Edition Pearson, 2002.
2. Operational Amplifier & Linear integrated circuits- R. F. Coughlin & F.F. Driscoll,- 6th Edition, and Pearson 2001.
3. Design with Op-Amps & Analog ICs -Sergio France, 3rd Edition, McGraw Hill Hirher Education.
4. Linear Integrated Circuits- D. Roy Choudhry, New Age International Limited Publication.

ECE 306

CONTROL ENGINEERING

L	T	P	Cr
3	1	0	3.5

Section-A

Basic Concepts: Classification: Open loop control system, closed loop systems, linear and non-linear systems, time variant & invariant systems, Relative merits and demerits of open and closed loop systems, Servomechanism.

Mathematical Modeling: Transfer function, Mathematical modeling of electrical, mechanical systems, Analogies, Block diagrams and signal flow graphs and their use in determining transfer function.

Analysis: Time and frequency domain analysis, Transient and frequency response of first and second order systems, Correlation ship between time and frequency domain specifications, Steady-state errors and error constants, Concepts and applications of P, PD, PI and PID types of control.

Section-B

Stability: Definition, pole and Zero concept, Routh-Hurwitz criterion, Root locus techniques, Nyquist criterion, Bode plots, Relative stability, Gain margin and phase margins.

State Space Analysis: Concepts of state, State variables and state models, State space equations, Transfer function, Transfer model, State space representation of dynamic systems, State transition matrix, Controllability and observability.

Compensation: Necessity of compensation series and parallel compensations, compensating networks.

RECOMMECONDED BOOKS:

1. Modern Control Engg. by K. Ogata, Prentice Hall, New Delhi, 1974.
2. Control System Components by J.F. Gibsen, Mcgraw Hill, 1963.
3. Automatic Control System by B.C. Kuo, Prentice Hall, 3rd Ed., 1978.
4. Control System Engineering by I.J. Nagrath & Gopal, Wiley Eastern Ltd., New Delhi.
- 5 D.P.Eckman Automatic process control
6. Liptak "Handbook of process control"

ECE-352 Analog Communication System lab

L	T	P	Cr
0	0	2	1.0

List of Experiments

1. Study of DSB Amplitude Modulation and Demodulation.
2. Study of SSB Amplitude Modulation and Demodulation.
3. Study of VSB Amplitude Modulation and Demodulation.
4. Study of Frequency Division Multiplexing and Demultiplexing.
5. Study of Frequency Modulation and Demodulation using VCO.
6. Study of Phase Modulation and Demodulation.
7. Study of Pulse Width Modulation and Demodulation.
8. Study of Pulse Position Modulation and Demodulation.
9. Study of Pulse Amplitude Modulation and Demodulation.
10. Study of Time Division Multiplexing and Demultiplexing.
11. Study of Delta Modulation and Demodulation.
12. Study of Adaptive Delta Modulation and Demodulation.
13. Study of Signal Sampling and Reconstruction.
14. Study of Pre-emphasis and De-emphasis processes.
15. Study of AM Transmitter.
16. Study of AM Receiver.

ECE-353 Micro Processor & Applications lab

L	T	P	Cr
0	0	2	1.0

List of Experiments

1. To write and test a program for finding the largest and the smallest numbers out of the given list of numbers.
2. To write and test a program for arranging the given list of numbers in ascending order.
3. To write and test a program for arranging the given list of numbers in descending order.
4. Study of microprocessor based temperature recording and monitoring system.
5. Study of microprocessor based Traffic Light Controller.
6. Study of microprocessor based DC Motor Controller.
7. Study of microprocessor based Stepper Motor Interface Card and Controller.
8. Study of interfacing of ADC with microprocessor.
9. Study of interfacing of DAC with microprocessor.
10. To write and test different programs involving the use of interrupts, subroutines, Flags etc.

ECE-354

Digital System Design lab

L	T	P	Cr
0	0	2	1.0

List of Experiments

1. Programming of 8051 with C Language using KEILComplier/ Flash Magic for LCD Display
2. Programming of 8051 with C Language using KEILComplier/ Flash Magic for Real Time clock.
3. Programming of 8051 with C Language using KEILComplier/ Flash Magic for LED Display
4. Programming of 8051 with C Language using KEILComplier/ Flash Magic to activate relay & Buzzer
5. To Program FPGA/CPLD using Xilinx software with VHDL as a basic logic gates.
6. To Program FPGA/CPLD using Xilinx software with VHDL as adder (Half/ Full), subtractor (Half/ Full)
7. To Program FPGA/CPLD using Xilinx software with VHDL as MUX /DEMUX.
8. To Program FPGA/CPLD using Xilinx software with VHDL as a COUNTER.
9. To Program FPGA/CPLD using Xilinx software with VHDL as SHIFT REGISTER.

Elective-1

ECE 301

OPTO-ELECTRONICS

L	T	P	Cr
3	1	0	3.5

Section A

INTRODUCTION: Need of optoelectronics, advantages, applications- Network, Military, Civil, industrial, Sensors etc.

OPTOELECTRONIC SOURCES

Introduction, Basic concepts, Optical emission from semiconductor, Semiconductor injection Laser & its various structures, injection laser characteristics, threshold condition, wavelength tunable Lasers, LED power and efficiency, Heterojunction, LED structure designs, characteristics, Modulation response of an LED, Source-Fiber coupling.

OPTOELECTRONIC DETECTORS

Introduction, Device types, basic principal of optoelectronic detection, Absorption, Quantum efficiency, Responsivity, wavelength cutoff, Types of Photodiodes with and without internal gain, Mid-infrared photodiode, phototransistors, Photoconducting detectors, Noise Considerations.

Section B

PASSIVE NETWORK COMPONENTS & SENSORS

Introduction, Couplers/Splitters, WDM multiplexers, Demultiplexers, Filters, Isolators, Circulators, Attenuators, Electro-optic Modulators, Acousto-optic Modulators and their application areas. Optical Sensors: classification-point, distributed, Intensity, phase & spectral. Smart structures & applications.

OPTICAL AMPLIFIERS AND INTEGRATED OPTICS

Introduction, Semiconductor Optical Amplifiers (SOA), Erbium-Doped Fiber Amplifiers (EDFA), Fiber Raman Amplifiers (FRA), Application areas of optical amplifiers, Some integrated optical devices, OEICs, Optical bistability and digital optics, Optical Computation.

Text Books Recommended:

1. Optical Fiber Communications – John M. Senior, PHI.
2. Fiber-Optic Communications Technology – Djafar K. Mynbev, Lowell L. Scheiner. Pearson Education Asia.
3. Optical Fiber Communications – Gerd Keiser, McGraw-Hill
4. Fiber Optics and Optoelectronics – R. P. Khare, Oxford Publications

Reference Books:

1. Optoelectronics: Fiber optics and Lasers– A Text-Lab Manual by Morris Tischler. McGraw Hill.
2. Related IEEE papers & websites.

Elective-1

ECE 316 – HDL BASED DIGITAL DESIGN

L	T	P	Cr
3	1	0	3.5

SECTION - A

Introduction to HDL: Design Flow, Design Methodologies, HDL History, Capabilities, Hardware Abstraction, Basic Terminology, Model Analysis, Comparison between VHDL and Verilog.

Basic VHDL Elements: Identifiers, Data Objects, Data Types, Operators.

Behavioral Modeling: Entity declaration, architecture body, Various Sequential Statements and Constructs, multiple processes, postponed processes.

Dataflow Modeling: Concurrent Signal Assignment Statements, delta delay model, multiple drivers, block statement, concurrent assertion statement.

Structural Modeling: Component Declaration, component Instantiation, resolving signal values.

SECTION - B

Supporting Constructs: Generics and Configuration, Subprograms and Overloading, Operator overloading, Package declaration, package body.

Advanced Features: Generate statements, qualified expressions, type conversions, guarded signals, attributes, aggregate targets.

Model Simulation: Writing a Test Bench and Simulation for combinational circuits.

Programmable Logic Devices (PLD) and Field Programmable Gate Arrays (FPGA): Basic Concepts, Architecture and Usage.

RECOMMENDED BOOKS:

1. A VHDL Primer – Jayaram Bhasker, Prentice Hall, Englewood Cliffs, New Jersey,
2. VHDL Programming by Examples – Douglas L Perry, Mc Graw Hill, Fourth Edition
3. FPGA based implementation of Signal Processing Systems – RogerWoods, John McAllister, Dr. Ying Yi, Gaye Lightbody, Wiley
4. Advanced FPGA Design – Architecture, Implementation & Optimization, Steve Kilts

FOUR YEAR B. TECH.
(Electronics and Communication Engineering)
Third Year, 6th SEMESTER
Batch 2015
(Session 2017-2018)

SCHEME OF PAPERS

CODE	TITLE OF PAPER	LOAD			
		L	T	P	CR.
ECE 307	Digital Signal Processing	3	1	0	3.5
ECE 308	Digital Communication Systems	3	1	0	3.5
ECE 310	Microelectronics	3	1	0	3.5
ECE 317	Optical Fiber Communication	3	1	0	3.5
ECE 357	Digital Signal Processing lab	0	0	2	1.0
ECE 358	Digital Communication Systems lab	0	0	2	1.0
ECE 367	Optical Fiber Communication Lab	0	0	2	1.0
	Elective-II	3	1	0	3.5
	Elective-III	3	1	0	3.5
		18	6	6	24

Total contact hours: 30

ECE 357, ECE 358 & ECE 367 are practical papers only. There will not be any theory examination for these papers.

Elective-II

1. ECE 311 Micro controller & Applications
2. ECE 312 Information Theory & Coding
3. ECE 313 Reliability Engineering
4. ECE 315 Modern Control System

Elective-III

1. CPE 302 Database Management System
2. CPE 403 System Modeling & Simulation
3. CPE 404 Artificial Intelligence
4. CPE 318 Business Intelligence

Faculty of Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters

(Common for B.Tech. in Computer Science Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech./MBA Branches)

Applicable from 2014 Batch

The B. Tech paper structure will be as shown below:

<div><p>Pattern of Question Paper TITLE OF SUBJECT (CODE----) Bachelor of Technology (Branch): End Semester Exam</p><p>TIME ALLOWED: 3 Hour Roll. No.....</p><p>Maximum Marks: 50</p><p>Note:- Section C is compulsory. Attempt any six questions by selecting three questions from section A & three questions from section B.</p><p>Section-A (From Section A of the syllabus) Q1. Q2. Q3. Q4. Q5. 3x5</p><p>Section-B (From Section B of the syllabus) Q6. Q7. Q8. Q9. Q10. 3x5</p><p>Section-C (From whole syllabus) Q11 a)..... b) c) d) e) f) g) h)..... i)..... j)..... 10x2=20</p></div>

Note for the paper setter:

1. Total numbers of questions to be set are nine (11) as per the above format.
2. There will be FIVE questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts.
3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.
4. The maximum limit on numerical problems to be set in the paper is 35% while minimum limit is 20%.
5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
8. Use of Scientific calculator should be clearly specified.

ECE – 307 DIGITAL SIGNAL PROCESSING

L	T	P	Cr
3	1	0	3.5

Time: 3 Hrs.

Section-A

Z-Transform: Introduction to signals and systems, Z-transform pair, properties of region of convergence (ROC) for the Z-transform, properties of Z-transform, analysis and characterization of LTI systems using Z-transforms. System functions for interconnection of LTI systems. Block diagram representation for causal LTI systems.

Discrete Fourier Transform (DFT): Frequency domain sampling and reconstruction of discrete time signals, DFT, inverse DFT (IDFT), DFT as a linear transformation, relation ship of the DFT to other transforms, properties of DFT, use of DFT in linear filtering, filtering of long sequences, frequency analysis of signals, using DFT.

FAST FOURIER TRANSFORM ALGORITHMS: Direct computation of DFT, divide and conquer approach to computation of the DFT, radix-2 FFT algorithms, use of FFT algorithm for efficient computation of the DFT of two real sequences, and of the DFT of a 2N point real sequence.

Section B

Digital Filter Structures: Introduction, structures for FIR systems: Direct form, cascade form and lattice structure, structures for IIR systems: Direct form, cascade form, parallel form and lattice structures. Fixed point representation of numbers, errors resulting from rounding and truncation.

Design Of Digital Filters: General considerations, causality and its implications, characteristics of practical frequency selective filters, design of symmetric linear phase FIR filters using rectangular, Kaiser and Hamming window. Design of digital IIR filters using impulse invariance transformation method & bilinear transformation method.

RECOMMENDED BOOKS:

1. Digital Signal Processing- Proakis & Manolakis, PHI/Pearson
2. Discrete Time Signal Processing- Oppenheim ,PHI/Pearson
3. Digital Signal Processing- Sanjit K Mitra, TMH

ECE – 308 DIGITAL COMMUNICATION SYSTEMS

L	T	P	Cr
3	1	0	3.5

Section A

Source Coding: Introduction, concept of amount of information, entropy and information rate. Shannon's theorem, channel capacity, capacity of a Gaussian channel, BW-S/N trade off, sampling, quantization, quantization error, quantization noise, companding, PCM, delta modulation, adaptive delta modulation, Huffman Source Coding algorithm and Lempel-Ziv Source-Coding algorithm.

Line Coding Schemes: Introduction, properties, general methods for derivation of power spectral density of a broad class of line coding scheme: ON-OFF signaling, polar signaling, bipolar & split phase (or manchester) signaling and comparison among them. Pulse shaping: Nyquist' first and second criterions for zero ISI, introduction to equalizer and eye diagram. Derivation of error probability for polar signaling in AWGN.

Section B

Modulation Schemes: Introduction, generation, reception, spectrum, and geometrical representation of BPSK, binary differential phase shift keying (BDPSK), QPSK, MPSK, QAM, BFSK, and MSK.

Data Reception: Introduction, base band signal receiver, probability of error, optimum filter, matched filter and its probability of error, coherent system of signal reception (correlation receiver) BPSK: effect of imperfect phase synchronization and imperfect bit synchronization on probability of error in AWGN, use of signal space for calculation of error probability for BPSK, BFSK, QPSK. Relationship between bit error rate (BER) and symbol error rate (SER). Block diagram of digital communication system and function of each block.

RECOMMECONDED BOOKS:

1. Principle of Communications- Taub & Schilling, TMH
2. Modern Digital and analog Communication System - B.P.Lathi, Oxford Press
3. Communication system Engineering- Proakis, Pearson.
Digital & Analog Communication system- Couch, Pearson.

ECE 310 MICRO ELECTRONICS

L

T

P

Cr

3

1

0

3.5

Section-A

Introduction: Classification of integrated circuits (Ics), thick film, thin film & hybrid Ics. Fabrication and component design, resistor, capacitors and inductors, design and fabrication.

Monolithic Techniques: Process on silicon crystals, line growth, refining, substrate slicing, polishing, chemical vapour deposition, thermal oxidation, photolithography, diffusion, impurities, diffusion system, ion implantation, metallization, isolation.

Monolithic Components: Bipolar IC process, MOS IC process, BJT construction, diode instruction, FET and MOS construction and resistors, capacitors and inductors, op-amp and voltage regulators, design and fabrication.

Section-B

LSI Circuits: Brief introduction to LSI circuits, realization of inter connection and realization of integrated elements.

Basic VLSI Design: Basic MOS transistor and working, NMOS and CMOS fabrication, thermal aspects MOS and VLSI, some electrical properties of MOS, design process, circuit components, system design and layout and scaling of MOS circuit, some application of VLSI circuits like PLA.

Recommended Books:

Author	Title	Publisher
Paul R Gray	Analog MOS IC circuit Design	IEEE Press
K R Botkar	Integrated Circuits	Khanna Publishers.
Millman and Halkias	Integrated Circuits	TMH

ECE 317 Optical Fiber Communication

L	T	P	Cr
3	1	0	3.5

Time: 3 Hrs.

Section A

Optical Fiber Waveguides and Transmission Characteristics: Ray theory and Electromagnetic mode theory for optical propagation, cylindrical fibers, single mode fibers, Attenuation, Material absorption losses, Linear scattering losses, Nonlinear scattering losses, fiber bend loss, Dispersion, Intermodal dispersion, Overall fiber dispersion, Dispersion modified single-mode fibers, Polarization. Fiber joints, fiber alignment, splices, connectors.

Optical Sources: Optical emission from semiconductor, Semiconductor injection Laser & its various structures, injection laser characteristics, threshold condition, wavelength tunable Lasers, LED power and efficiency, Heterojunction, LED structure designs, characteristics, Modulation response of an LED,

Section B

Optical Detectors: Source-Fiber coupling. Basic principle of optoelectronic detection, Detector types, Absorption, Quantum efficiency, Responsivity, wavelength cutoff, Types of Photodiodes with and without internal gain, Mid-infrared photodiode, phototransistors, Photo conducting detectors, Noise Considerations.

Optical Fiber Systems & Measurements: Intensity modulation/Direct Detection & Coherent, Optical transmitter circuit, Optical receiver circuits, system design considerations, Digital and Analog systems. Optical Fiber Measurements: attenuation, dispersion, refractive index profile, cutoff wavelength, numerical aperture, diameter, mode field diameter and field measurements.

RECOMMENDED BOOKS:

1. Optical Fiber Communications – John M. Senior, PHI.
2. Fiber-Optic Communications Technology – Djafar K. Mynbev, Lowell L. Scheiner. Pearson Education Asia.
3. Optical Fiber Communications – Gerd Keiser, McGraw-Hill
4. Fiber Optics and Optoelectronics – R. P. Khare, Oxford Publications
5. Optoelectronics: Fiber optics and Lasers a Text-Lab Manual - Morris Tischler. McGraw Hill.
6. Related IEEE papers & websites.

ECE-357

Digital Signal processing lab

L	T	P	Cr
0	0	2	1.0

List of Experiments

1. To study of basic commands of MATLAB.
2. Unit Ramp Unit Step, Exponential and addition of two sinusoidal sequences.
3. Convolution sum of discrete signals.
4. Cross- correlation of two sequences.
5. Frequency response of discrete system.
6. DFT of the given sequence.
7. Poles, zeros and gain of transfer function.
8. Magnitude & phase of DFT.
9. To study the magnitude & Phase response of FIR Filter.
- 10.To study the magnitude & Phase response of IIR Filter.
- 11.Analysis of FIR and IIR Filters using 6713 DSP Kit.
- 12.Analysis of FFT Filters using 6713 DSP Kit.

ECE-358

Digital Communication System lab

L	T	P	Cr
0	0	2	1.0

List of Experiments

1. To study Amplitude Shift Keying Modulation & Demodulation.
2. To study Frequency Shift Keying Modulation & Demodulation.
3. To study Phase Shift Keying Modulation & Demodulation.
4. Signal & to Study its characteristics.
5. To study Delta Modulation & Demodulation & it's characteristic.
6. To study the sampling theorem & reconstruction of signal.
7. To study Delta Modulation & Demodulation.
8. To study Adaptive Delta Modulation & Demodulation.
9. To study Time Division Multiplexing
- 10.To study Frequency Division Multiplexing.

ECE-367 Optical Fiber Communication lab

L	T	P	Cr
0	0	2	1.0

List of Experiments

1. To study the fiber optic cables.
2. To familiarize fiber optic connection parts.
3. To study a 650nm optical fiber analog link.
4. To study a 650nm optical digital link.
5. To study the "frequency modulation" through optical fiber.
6. To study the "Pulse Width Modulation" through the optical fiber.
7. To study bending loss in fiber optic cable.
8. To measure the numerical aperture of the fiber.
9. To plot injection laser diode characteristics.
10. To modulate laser light for analog transmission/digital transmission.
11. Characteristics of Photo conductive Cell.
12. Characteristics of PIN Photodiode.
13. Characteristics of Photo transistor.
14. Simulation on OPTSIM, characteristics of optical fiber communication.
15. Simulation on OPTSIM, optical fiber communication system model.

Elective-II ECE- 311 MICROCONTROLLER & APPLICATIONS

L	T	P	Cr
3	1	0	3.5

Section A

Introduction: 8051 Micro controller, Comparison of Microprocessor and Microcontroller, microcontroller and embedded processors, processor Architecture - Harvard versus Princeton (Von Neumann), CISC versus RISC, overview of 8051 families and other microcontrollers in use PIC, ATMEL. 8051 Pin description, connections, memory organization, memory space of 8051, 8051 flag bits and PSW register, Register banks and stack.

Instruction Familiarization: Addressing modes and accessing memory using various addressing modes, Arithmetic, Logical, Jump loop and call instructions, single bit instructions, time delay generation & calculation, bit manipulation and programming. Development system tools, Data Types and directives, 8051 assembly Language Programming, Assembling an 8051 program.

Section B

Interrupt & Embedded Device Programming: Interrupts, external & internal hardware interrupts, priority, programmable I/O Port, Timer/counter, Serial Communication, connection to RS 232.

Real World Interfacing: Interfacing of external memory RAM & EPROM, LCD, ADC, DAC, sensors, stepper motor, and keyboard. Interfacing to enhance 8051 capabilities with 8255 & Timer chips.

RECOMMECONDED BOOKS:

1. The 8051 Microcontroller and Embedded Systems -Ali Mazidi Pearson Education
2. Programming and customizing the 8051 microcontroller -Myke Predko Tata Mc Graw Hill
3. The 8051 Microcontroller Architecture, Programming and appl. -Kenneth Ayala, Penram International.
4. Microcontrollers theory & applications -Ajay V Deshmukh, Mc Graw Hill.

Elective-II ECE 312 INFORMATION THEORY AND CODING

L	T	P	Cr
3	1	0	3.5

Section A

Discrete messages, Concept of amount of information, Average information and Entropy, Information rate, Coding to increase Average Information per bit, Shannon 's theorem, Channel Capacity, Gaussian channel Capacity, Bandwidth-S/N tradeoff, Use of orthogonal signals to attain Shannon's limit, Efficiency of Orthogonal signal transmission.

Channel Coding, Bounds on communication, Coding for Reliable Communication, Parity check bit coding for Error detection, Coding for Error Detection and Correction, Linear Block Codes, Cyclic Codes, Golay Codes, BCH codes, Examples of algebraic codes, Single Parity check bit code, Repeated codes, Hadaward code, Hamming code.

Section B

Burst error correction: introduction, Blockinterleaving, Convolution Interleaving, Reed-Solo9mon (RS) code, Concatenated codes. Convolution Coding, Decoding of a Convolution Code, Codetree, decoding in the presence of noise, sequential decoding. State and Trellis diagram, Viterbi algorithm.

Probability of Error of Convolution Codes, Comparison of Error rates in Coded and Uncoded transmission, Automatic-Repeat-Request (ARQ), Performance of ARQ Systems, throughput of the stop & wait ARQ, throughput of Go-Back-N ARQ, Selective Repeat ARQ. Trellis decoded modulation.

BOOKS RECOMMENDED:

16. Principles of communication systems by Taub & Schilling, Tata McGraw-Hill Publishing.
17. Communication system engineering by Proakis, TMH.
18. Digital Communications by Proakis, TMH.
19. Introduction to the theory of error correcting codes, Vera press 1992.
20. Information theory & reliable communication by Robert G. Gallanger, McGraw Hill, 1992.

Elective-II

ECE 313

RELIABILITY ENGINEERING

L	T	P	Cr
3	1	0	3.5

Section A

CONCEPT OF RELIABILITY: Failures of systems and its modes. Measure of Reliability, Reliability function, Hazard rate MTBF and their interrelations.

RELIABILITY DATA AND ANALYSIS: Data sources, Data collection, use of Reliability Data, Reliability Analysis, Performance Parameters, calculation of failure rate, Application of Weibull distribution.

SYSTEM RELIABILITY AND MODELING: Series systems, Parallel system, series parallel systems. Time dependence, Reliability Determination, Stand by systems, r out of n, Configurations, Methods of tie set and cut sets of Or reliability evaluation, simulation and Reliability prediction. Monte Carlo method, concepts of network topology. Overall reliability evolution.

Section B

MAINTAINABILITY AND AVAILABILITY: Maintainability and its equation. Factors affecting maintainability. Measures of Maintainability, Mean Down Time, Availability Intrinsic availability equipment availability & Mission availability. Replacement processes and Policies.

LIFE TESTING OF EQUIPMENTS: Non-destructive tests, destruction tests and their Mathematic modeling. Quality and Reliability, Measurement & prediction of Human Reliability, Reliability and safety, safety margins in critical Devices, case studies.

VALUE ENGINEERING: Techniques in value Engineering; Structure of value Engineering. Reliability Management.

RECOMMECONDED BOOKS:

1. Reliability Engg. By Govil.
2. Reliability Engg. By Dr.A.K.Aggarwal, 1992.
3. Related IEEE/IEE publications

Elective-II	ECE 315	MODERN CONTROL SYSTEM			
		L	T	P	CR
		3	1	0	3.5

Section-A

Digital Control : Introduction to digital control, sampling, Data reconstruction principles, Pulse transfer functions, Block diagram & signal flow graph, Digital Control Techniques- PID, Deadbeat.
Time domain analysis, correlation between time response & root location in S & Z transform, effect of pole-zero configuration in Z-plane on maximum overshoot & peak time transient response.
Stability in Z-plane using modified Rouths criteria, Jury's criteria.

State Variable Analysis And Design: Review of state space representation for linear continuous time system, solution of linear time invariant state equations, controllability and observability, solution of state equation for discrete system, state space analysis of discrete time systems, pole placement Techniques.

Section-B

Non Linear Control System: Introduction to non linear feedback control system, special features of linear system; limit cycle, jump response, sub harmonics etc., describing function and phase plane techniques for analysis of non linear system, concept of local, global, asymptotic and total stability of non linear system, Liapunov's stability criterion.

Adaptive And Learning Control Systems: Basic Principles of Adaptive and Learning Control Systems, Model Reference Adaptive Control, Types of Learning-Supervised and Un-Supervised Learning Control Systems, On-line and Off-line Learning Control Systems.

RECOMMECONDED BOOKS:

1. Automatic control system By B.C.Kuo (PHI)
2. Modern control engineering By Ogata (PHI)
3. Control System Engineering By Nagrath & Gopal (Wiley Eastern)
4. Control System Engineering By Phillips and Nagle (PHI Publications)
5. Control System Engineering by Norman S. Nise. Wiley
6. Modern Control System by R.C.Dorf, R.H.Bishop, Addison Wesley
7. Systems, Modeling & Analysis by I.J.Nagrath, M.Gopal, TMH
8. Digital Control & State Variable Methods by M.Gopal, TMH

Elective-III

CPE-302

DATABASE MANAGEMENT SYSTEM

L	T	P	Cr
3	1	0	3.5

Section-A

Introduction to Database Concepts: Difference between Database and non-database system, Data independence, DBMS Architecture, components of a database system, Advantages and disadvantages of Database system, Intended Uses of a DBMS, Schemas, and Instances, Database Languages and Interfaces, Classification of Database Management Systems.

Data Models: Relational Model, Network Model, Hierarchical Model, ER Model: Design, issues, Mapping constraints, keys, ER diagram, weak entity sets, extended ER features, Design of an ER Database schema, Reduction of an ER Schema to tables, Comparison of Models.

Query Processing: in Relation Algebra: Fundamental and Additional Relational Algebra operators. Relational Calculus: Tuple and Domain Relational Calculus.

Relational Query Languages: SQL: Basic SQL Select Statements. Table Creation and Management: Create, Alter, Drop and Rename. Constraints: Primary key, foreign key, Unique, Not null and Check. Data Manipulation: Insert, Update and Delete. Restricting rows in Select using Where clause, Comparison operators, Logical Operators, Order by clause.

Section-B

Database Design: Integrity Constraints: Domain constraints, Referential integrity, entity integrity, specify these constraints in SQL, specification of Additional Constraints as assertions and triggers.

Functional dependencies: Functional dependencies, Decomposition, Normalization using FD's MVD's and JD's Domain key normal form.

Query Optimization: Translating SQL Queries into Relational Algebra, Notation for Query Trees and Query Graphs, Heuristic Optimization of Query Trees, Transformation Rules for Relational Algebra Operations, Heuristic Algebraic Optimization Algorithm, Converting Query Trees into Query Execution Plans. Cost Components in Query Optimization, Using cost estimates in query optimization.

Joining Data from Multiple Tables: Equi, Non-Equal, Self and Outer Joins. Single-row and Group functions. Sub-queries. Introduction to Oracle Server and Data Dictionary. Additional Database Object: Sequences, Synonyms and Views.

Recommended Books:

1. Navathe and Elmasri, Fundamentals of Database Systems, Pearson education
2. Korth and Silberschatz Abraham, Database Concepts, McGraw Hall, 1991.
3. An introduction to database system by C.J.Date (Addison Welsey, Publishing house).
4. Bipin Desai, Database System, TMG
5. Prateek Bhatia, Database Management system, Kalayani Publishers

Elective-III CPE 403 SYSTEM MODELING AND SIMULATION

L	T	P	CR
3	1	0	3.5

SECTION – A

Introduction: Systems, modeling, general systems theory, Concept of simulation, Simulation as a decision making tool, types of simulation. Simulation Terminologies- Application areas – Model Classification –Types of Simulation- Steps in a Simulation study- Concepts in Discrete Event Simulation - Simulation Examples.

Statistical Models – Concepts: – Discrete Distribution- Continuous Distribution – Poisson Process- Empirical Distributions- Queueing Models – Characteristics- Notation – Queueing Systems – Markovian Models- Properties of random numbers- Generation of Pseudo Random numbers- Techniques for generating random numbers-Testing random number generators- Generating Random-Variates- Inverse Transform technique – Acceptance- Rejection technique – Composition & Convolution Method.

SECTION-B

Design of Simulation Experiments: Problem formulation, data collection and reduction, time flow mechanism, key variables, logic flow chart, starting condition, run size, experimental design consideration, output analysis and interpretation validation, input modeling, Data collection, Assessing sample independence, Hypothesizing distribution family with data, Parameter Estimation, Goodness-of-fit tests, Selecting input models in absence of data, Output analysis for a Single system, Terminating Simulations, Steady state simulations.

Development of simulation models using simulation language studied for systems like queuing systems, Production systems, Inventory systems, maintenance and replacement systems and Investment analysis. Simulation Tools – Model Input, High level computer system simulation, CPU –Memory Simulation, Comparison of systems via simulation – Simulation Programming techniques - Development of Simulation models. Simulation programming languages – simulation suitability with characteristics, Comparison and selection of simulation languages, study of any one simulation language.

Recommended Books:

1. Jerry Banks and John Carson, “Discrete Event System Simulation”, Fourth Edition, PHI, 2005.
2. Geoffrey Gordon, “System Simulation”, Second Edition, PHI, 2006.
3. Narsingh Deo, “System Simulation with Digital Computer”, Prentice Hall, India, 2001.
4. Frank L. Severance, “System Modeling and Simulation”, Wiley, 2001.
5. Jerry Banks, “Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice”, Wiley, 1998.

Elective-III

CPE-404

ARTIFICIAL INTELLIGENCE

L	T	P	Cr
3	1	0	3.5

Section A

Artificial Intelligence Techniques, levels of models, understand the importance, functions, advantages, as well as the limitations of artificial intelligence. Use of Artificial Intelligence and intelligent agents

State, space, search, control strategies, heuristic search, problem characteristics, production system characteristics. Mapping between facts and representations, approaches to knowledge representation, semantic sets, frame, conceptual depending, scripts, predictive logic, resolution in predicate logic

Section B

Procedural Vs declarative knowledge, matching, conflict resolution, Non-monotonic reasoning, default reasoning, statistical reasoning, knowledge extraction. Investigate the roles and development methods of artificial intelligence in decision making processes. Neural network resources, cognitive science, role of neural network in computer science.

Characteristics of AI language, LISP-symbol manipulation- basic lisp function, predicated, condition, recursion, iteration, Array-lambda functions, input-output statements. AI problems : pattern recognition, voice recognition, Feature Extraction

BOOKS RECOMMENDED:

1. Artificial Intelligence by Rich and Knight, TMH
2. Introduction to Artificial Intelligence by Charniak and Mcdermott. Addison-Wesley, 1985.
3. Essentials of Artificial Intelligence by Ginsburg. Morgan Kaufmann, 1993.
4. Artificial Intelligence by Winston 3rd Edition, Addison Wesley, 1992.
5. Artificial Intelligence by Padhy, Oxford Press

Elective-III CPE - 318

Business Intelligence

L	T	P	Cr
3	1	0	3.5

SECTION A

Introduction to Business Intelligence

Introduction to digital data and its types – structured, semi-structured and unstructured, Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLAP), BI Definitions & Concepts, BI Framework, Data Warehousing concepts and its role in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI, BI best practices.

Basics of Data Integration (Extraction Transformation Loading)

Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data - types and sources, Introduction to data quality, data profiling concepts and applications, introduction to ETL using Kettle.

SECTION B

Introduction to Multi-Dimensional Data Modeling

Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using Microsoft Excel.

Basics of Enterprise Reporting

A typical enterprise, Malcolm Baldrige - quality performance framework, balanced scorecard, enterprise dashboard, balanced scorecard vs. enterprise dashboard, enterprise reporting using MS Access / MS Excel, best practices in the design of enterprise dashboards.

RECOMMENDED BOOKS:

- 1 R.N. Prasad and Seema Acharya, Fundamentals of Business Analytics, Wiley India Ltd.
- 2 Mike Biere, Business Intelligence for the Enterprise, Prentice Hall Professional.
- 3 Teo Lachev, Applied Microsoft Analysis Services 2005: And Microsoft Business Intelligence Platform, Prologika Press.
- 4 David Taniar, Progressive methods in data warehousing and business intelligence: concepts and competitive analytics, Idea Group Inc (IGI).
- 5 Data warehousing: the ultimate guide to building corporate business intelligence, Birkhäuser.
- 6 Mark Humphries, Michael W. Hawkins, Michelle C. Dy, Data warehousing: architecture and implementation, Prentice Hall Professional.

FOUR YEAR B. TECH.
(Electronics and Communication Engineering)
4th year, 7th SEMESTER
Batch 2015
(Session 2018-2019)

SCHEME OF PAPERS

CODE	TITLE OF PAPER	LOAD			
		L	T	P	Cr.
ECE 401	Microwave Engineering	3	1	0	3.5
ECE 402	Power Electronics	3	1	0	3.5
ECE 403	Wireless & Mobile Communications	3	1	0	3.5
ECE 404	Radar and TV Engineering	3	1	0	3.5
ECE 451	Microwave Engineering lab	0	0	2	1.0
ECE 452	Power Electronics lab	0	0	2	1.0
ECE 453	Wireless & Mobile Communications lab	0	0	2	1.0
	Elective-IV	3	1	0	3.5
	Elective-V	3	1	0	3.5
		18	6	6	24

Total Contact Hours: 30

ECE 451, ECE 452 & ECE 453 are practical papers only. There will not be any theory examination for these papers.

Elective-IV

- | | |
|------------|--------------------------------|
| 1. CPE 207 | Computer Networks |
| 2. CPE 308 | Computer Graphics |
| 3. CPE 409 | Advanced Computer Architecture |
| 4. CPE 319 | JAVA Programming |

Elective V

- | | |
|------------|---------------------------------|
| 1. ECE 406 | Satellite Communications |
| 2. ECE 407 | Nano Electronics |
| 3. ECE 408 | Biomedical Instrumentation |
| 4. ECE 409 | Optical Networks |
| 5. ECE 410 | Digital VLSI Design |
| 6. ECE 412 | Neural Networks and Fuzzy Logic |

Faculty of Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters

(Common for B.Tech. in Computer Science Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated B.Tech./MBA Branches)

Applicable from 2014 Batch

The B. Tech paper structure will be as shown below:

<div><p>Pattern of Question Paper TITLE OF SUBJECT (CODE----) Bachelor of Technology (Branch): End Semester Exam</p><p>TIME ALLOWED: 3 Hour Roll. No.....</p><p>Maximum Marks: 50</p><p>Note:- Section C is compulsory. Attempt any six questions by selecting three questions from section A & three questions from section B.</p><p>Section-A (From Section A of the syllabus) Q1. Q2. Q3. Q4. Q5 3x5</p><p>Section-B (From Section B of the syllabus) Q6. Q7. Q8. Q9. Q10. 3x5</p><p>Section-C (From whole syllabus) Q11 a)..... b) c) d) e) f) g) h)..... i)..... j)..... 10x2=20</p></div>

- Note for the paper setter:**
1. Total numbers of questions to be set are nine (11) as per the above format.
 2. There will be FIVE questions in each of the Sections A and B. Each question will be of five (05) marks. However, a question may be segregated into subparts.
 3. Section C is compulsory and contains ten (10) sub-parts each of two (2) marks.
 4. The maximum limit on numerical problems to be set in the paper is 35% while minimum limit is 20%.
 5. The paper setter shall provide detailed marking instructions and solutions to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
 6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
 7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
 8. Use of Scientific calculator should be clearly specified.

ECE 401 MICROWAVE ENGINEERING

L	T	P	CR
3	1	0	3.5

Section-A

Microwave Tubes And Circuits: High frequency limitations of conventional tubes, klystrons – two cavity klystron, multicavity klystron, Reflex klystron, Travelling wave magnetron - operation and characteristics, Helix TWT construction, operation and applications.

Microwave Solid State Devices & Their Applications: Classification of Microwave Devices, Diodes-PIN diode, Tunnel Diode, varactor and step recovery diodes, Transferred Electron Devices- GUNN Diode, Avalanche transit time effect- IMPATT, Microwave Transistors and high electron mobility transistor-characteristics and performance.

Section-B

Microwave Components: Waveguide Microwave Junctions, Scattering matrix and their properties, Microwave T junctions – H Plane Tee, E Plane Tee, Magic Tee, Rat Race Junction, Directional coupler –scattering matrix of a directional coupler, Waveguide joints, bends, corners, re-entrant cavities, Ferrite devices – faraday rotation in devices, circulator & isolator, phase shifters and microwave attenuators.

Microwave Measurements: General measurement setup, Microwave bench, power measurement – low, medium & high, Attenuation measurement, Measurement of VSWR, Smith Charts, Measurement of Impedance, Impedance matching-single and double stub tuners.

RECOMMECONDED BOOKS:

1. Microwave devices and circuits: Samuel Liao;PHI
2. Microwave devices and radar Engg: M.Kulkarni;Umesh Publications
3. Foundation of Microwave Engg : R.E.Collin;McGraw Hill
4. Microwave Engg: K.C Gupta

ECE 402 POWER ELECTRONICS

L	T	P	CR
3	1	0	3.5

Section-A

Thyristors: Thyristor family, SCR-static and dynamic characteristics, Thyristor commutated Techniques, Two transistor analogy, Triggering circuits, Protection of SCRs: over current & over voltage protection circuits, series and parallel operations, power transistors as power devices. Introduction to power MOSFETS.

Phase Controlled AC to DC Converters: classification, principle of phase control, Single phase half wave converter with Resistive load, inductive load, Semiconverter, three phase half controlled bridge converter, semiconverter operation of full converter, Dual converter, speed control of D.C. motor, power factor improvement using forced and natural commutation.

Section-B

Inverters: principle of operation Single phase inverters using thyristors, voltage source inverter, current source inverter, resonant inverters, parallel and series inverter, voltage and frequency controlling methods, effect of load inductance. Three phase voltage source bridge inverter and PWM inverter. AC Voltage controllers:

Choppers: Basic principle of choppers, control strategies, classification of choppers, class A, B, C, D, E choppers, step down and step up choppers, voltage commutated and current commutated choppers. Chopper applications.

Cyclo Converters: Working principle of cyclo converters and their classifications. Step up and step down cyclo converters, single phase and three phase cyclo converters and their applications.

Recommended Books:

Author	Title	Publisher
P C Sen	Power Electronics	Tata McGraw Hill
P S Bimbra	Power Electronics	Khanna Publishers
Datta	Power Electronics & Controls	Prentice Hall
Ramamoorthy	Thyristor and its application	EW Press
G K Mithal	Industrial Electronics	Khanna Publishers

ECE 403 WIRELESS & MOBILE COMMUNICATIONS

L	T	P	CR
3	1	0	3.5

Section-A

Introduction: History of wireless communication. Future trends in cellular radio and personal communications. Second generation (2G) cellular networks, evolution to 2.5G wireless networks (HSCSD, GPRS and EDGE for 2.5G GSM and IS-136, IS-95B for 2.5G CDMA). **3g Wireless Networks:** 3G W-CDMA (UMTS), 3G CDMA 2000, 3G TD-SCDMA. Wireless local loop (WLL) and LMDS, WLANs, Bluetooth and PANs.

Cellular Concepts: Introduction, frequency reuse, channel alignment strategies, hand off strategies, interference and system capacity, Trunking and grade of service, improving coverage and capacity in cellular systems using cell splitting, sectoring, cellular system design considerations.

Mobile Radio Propagation: Large scale path loss: Introduction to radio wave propagation, Free space propagation model, Three basic propagation mechanism, reflection, ground reflection (two-ray) model. Diffraction, scattering, shadow fading, combined path loss and shadowing.

Section-B

Small Scale Fading And Mutipath: Introduction, small scale multipath propagation, Impulse response of a multipath channel. Factors influencing small scale fading, parameters of mobile multipath channels (time dispersion, coherence bandwidth, doppler spread and coherence time). Types of smaal scale fading, Rayleigh, Rician and Nakagami fading distributions.

Multiple Access Techniques: Introduction, FDMA, TDMA, SSMA, CDMA, SDMA, pure ALOHA & slotted ALOHA.

Functional block diagram of modulation and demodulation for GSM.

Spread Spectrum Modulation Techniques: Pseudo- noise (PN) sequences, DS-SS, FH-SS. Block diagram of IS-95 forward link, block diagram of IS-95 reverse link. Functional block diagram of modulator & demodulator for GSM.

Wireless Signal Detection and Estimation: Diversity Techniques, Combiner analysis, Detection and estimation algorithms.

Current and upcoming Wireless Systems: 3G, 4G, 802.11a/b/g, 802.16, Adhoc networks.

RECOMMECONDED BOOKS:

1. Wireless Communications- Andrea Goldsmith, Cambridge University Press.
2. Wireless Communications: Principles & Practice – Theodore S. Rappaport, Pearson Education.
3. Digital Communications- John G. Proakis, Mcgraw Hill

ECE 404 RADAR & TV ENGINEERING

L	T	P	CR
3	1	0	3.5

Section –A

Introduction To Radar: Basic Radar, Radar equation, Radar Block diagram, Radar frequencies, applications of Radar, detection of signals in noise, receiver noise and Signal to Noise ratio, Probability of detection and false Alarm, integration of Radar pulses, Radar cross section targets, Radar cross section of Fluctuations, Antenna parameters, system losses.

MTI and Doppler Radar: Introduction to Doppler and MTI Radar, Delay line cancellers, Staggered Pulse repetition Frequencies, Moving Target Detector, Limitations of moving platform, Pulse Doppler Radar, tracking with Radar, Monopulse Tracking, Conical Scan and sequential Lobing, Limitation to tracking accuracy, Tracking in Range.

Section - B

Elements of TV Systems: Sound and picture transmission & reception, synchronization, composite video signal, Frame and field frequencies, Scanning process, Interlaced scanning, Resolution, Vertical resolution, Horizontal resolution.

Signal Transmission and Reception: Vestigial side-band transmission & reception AM & BW transmission efficiency, Complete channel BW, FM & BW, Channel BW for colour transmission.

Television Camera Tubes: Basic principle, Image Orthicon, Vidicon, Plumbicon. Block diagram of TV receiver and transmitter function of each block in brief.

Colour Television: Introduction, Colour perception, Three colour theory, luminance, hue and saturation, Colour television camera, The luminance signal, Values of luminance(Y) and colour difference signals on colours, Polarity of the colour Difference signals, Colour television Display Tubes, Precision-in-Line colour picture tube, Trinitron colour picture Tube brief introduction, colour signal transmission and reception., PAL coder and PAL-D Colour receiver, Merits and Demerits of the PAL system.

RECOMMECONDED BOOKS:

- 1 Introduction to Radar system by Merrill .I .Skolnik 3rd Edition Mcgraw Hill, 2003.
- 2 Monochrome and Colour by R. R .Gulati (Willy Eastern)
- 3 Television Engineering By Dhake Arvind (T.M.H)
- 4 Basic Television Principles and Serving by D. Bernard (T.M.H.)
- 5 Principles of Television Engineering by Fink (T.M.H)

ECE – 451 MICROWAVE ENGINEERING LAB.

L	T	P	CREDITS
0	0	2	1.0

Note : Do any Eight Experiments

I. On Satellite Trainer -kit

1. To study the microwave bench & microwave components.
2. Study of the characteristics of Klystron Tube and to determine its electronic tuning range (for MT9000)
3. To determine the frequency & wavelength in a rectangular wave-guide working on TE₁₀ mode.
4. To determine the Standing Wave-Ratio and Reflection Coefficient.
5. To measure an unknown impedance with smith chart.
6. To study V-I characteristics of Gunn Diode (for MT9001).
7. To study the following characteristic of Gunn Diode (for MT9001).
 - a. Output power and frequency as a function of voltage.
 - b. Square wave modulation through PIN diode.
8. To measure the polar pattern and the gain of a wave-guide horn Antenna. (for MT9002).
9. Study the function of multi-hole directional coupler by measuring the following parameters.
 - a. Main line and Auxiliary line VSWR.
 - b. Coupling factor and directivity.
 - a. Main line and Auxiliary line VSWR.
 - b. Coupling factor and directivity.
10. To study Magic Tee.
11. To study Magic/Isolator.
12. To study attenuator (Fixed and Variable type).
13. Measurement of phase shift.
14. Measurement of Dielectric Constant.
15. To study the square law behavior of a microwave crystal detector.
16. To study the resonant cavity.

ECE-452

POWER ELECTRONICS LAB

L	T	P	CR
0	0	2	1.0

List of Experiments

Exp No.

1. Study of SCR V-I Characteristics.
2. Study of SCR based single phase full wave fully controlled bridge rectifier.
3. Study of UJT characteristics and use as relaxation oscillator.
4. Study of SCR based chopper circuit.
5. Study of Series commutated SCR inverter.
6. Study of SCR based parallel inverter.
7. Study of SCR based lamp flasher.
8. Study of Triggering circuits for SCR.
9. Study of Single phase half wave controlled converter.
10. Study of AC phase control using TRIAC, (half & full wave).
11. Study of SCR based illumination controller.
12. Study of Current commutated thyristorised chopper.
13. Study of Voltage commutated thyristorised chopper.
14. Study of Fan regulator using DIAC and TRIAC.
15. Study of DC to AC inverter.
16. Study of Thyristor circuit breaker with current limiting.
17. Study of SCR commutation methods class A-E.
18. Study of DC to DC converter.
19. Study of DC Motor speed control using SCR's.
20. Study of DC step down MOSFET chopper.
21. Study of Single phase cyclo-converter.

ECE - 453 WIRELESS & MOBILE COMMUNICATION LAB

List of experiments

L	T	P	CREDITS
0	0	2	1.0

Note: Do any Eight Experiments

I. On Satellite Trainer -kit

1. Understanding the Basic concepts of satellite Communication.
2. To Establish a Direct Communication link between Uplink Transmitter and down link receiver using tone signal.
3. To Setup an active Satellite link and Demonstrate link fail Operations.
4. To Establish an Audio-Video Satellite link between Transmitter and Receiver.
5. To Communicate Voice Signal Through Satellite Link.
6. To Change Different Combination of Uplink and Downlink Frequencies and to check the Communication Link.
7. To Transmit and Receive three Separate Signals (Audio, Video, Tone) Simultaneously through Satellite Link.
8. To Transmit and Receive Function Generator Waveforms Through Satellite Link.
9. To Transmit and Receive PC Data Through Satellite Link.

II. On Mobile Phone Trainer -kit

1. To study the Tx IQ/Rx IQ Signals
2. To Observe signal constellation of GMSK signal
3. To Study the Working of Audio IC
4. To Study the Working of a SIM card in a GSM handset
5. To Study SIM CARD Detection

III. On Antenna Trainer -kit

1. To study Antenna Trainer Kit
2. To Draw the Directional Pattern of Sample $\lambda/2$ Dipole
3. To Draw the Directional Pattern of Sample $\lambda/4$ Dipole
4. To Draw the Directional Pattern of Sample $\lambda/2$ Folded Dipole
5. To Draw the Directional Pattern of Sample other Antennas

Elective-IV CPE -207 COMPUTER NETWORKS

L	T	P	Cr
3	1	0	3.5

Section-A

Introduction, history and development of computer networks, Types of computer networks: LAN, MAN, WAN, broadcast and point to point networks, Network topologies,

Layered Architecture: concept of layers, protocols, interfaces and services, The OSI Reference Model, The TCP/IP Reference Model, Comparison of OSI and TCP/IP Models

Physical Layer: Concept of Analog & Digital Signal, Bandwidth, Transmission Impairments: Attenuation, Distortion, Noise, Data rate limits: Nyquist formula, Shannon Formula, Switching: Circuit Switching, Message Switching and Packet Switching

Guided Transmission media: Twisted Pair, Co-axial Cables, Fiber Optics, Wireless Transmission: Radio and Microwave and Infrared Transmission, Comparison of Repeaters, Hubs, Switches

Section-B

Data Link Layer: Data link layer Design Issues, Error Detection and Correction, Elementary data link protocols: An Unrestricted Simplex Protocol, A Simplex Stop and Wait Protocol, A Simplex Protocol for a Noisy Channel. Sliding window protocols: A One Bit Sliding Window Protocol, A Protocol Using go back N, A Protocol using Selective Repeat

MAC Sub layer: The Channel Allocation Problem: Static and Dynamic Channel Allocation in LANs and MANs, Carrier Sense Multiple Access Protocols: Persistent and Non Persistent CSMA, CSMA/CD protocols

Network layer: IP Addressing, Routing algorithms:-Shortest Path Routing, Flooding, Distance Vector Routing and Link State Routing, Introduction to Congestion , General Principles of Congestion Control, Comparison of bridges, routers and Gateways.

Transport layer: Introduction to Elements of Transport Protocols UDP, TCP, Electronic-mail, WWW, Domain Name System

Case Study: Design & Implementation of Local Area Network

Recommended Books:

1. A. S. Tannenbaum. Computer Networks, 3rd Edition, Prentice-Hall.
2. D. E. Comer. Internetworking with TCP-IP: Principles, Protocols and Architecture, Vol I, 2nd Edition, Prentice Hall, 1991.
3. D. E. Comer and D. L. Stevens. Internetworking with TCP-IP: Design, Implementation, and Internals, Vol II, Prentice Hall, 1990.

Elective-IV CPE-308 COMPUTER GRAPHICS

L	T	P	Cr
3	1	0	3.5

Section-A

GRAPHICS HARDWARE: Raster CRTs, Raster and Random Scan Displays, Display Controllers and Processors, Graphics Input Devices, Applications of Computer Graphics.

RASTER SCAN CONVERSION ALGORITHMS: Line Drawing Algorithms (DDA & Bresenham's), Circle Drawing Algorithms (Mid Point and Bresenham's).

TWO-DIMENSIONAL GEOMETRIC TRANSFORMATIONS: Basic Transformations, (Translation, Rotation and Scaling) Matrix Representation and Homogenous Coordinates, Shear and Reflection Transformations, Composite Transformations.

FILLING: Region filling Algorithms (Boundary Fill and Flood Fill).

Section-B

WINDOWING AND CLIPPING: Viewing pipeline, viewing transformations. 2-D Clipping algorithms- Line clipping algorithms (Cohen Sutherland, Liang Barsky algorithm) Polygon clipping (Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping).

THREE-DIMENSIONAL GEOMETRIC TRANSFORMATIONS: Basic Transformations: (Translation, Scaling, Rotation) Composite transformations.

PROJECTIONS: Parallel and Perspective.

VISIBLE SURFACE DETECTION METHODS: Depth Buffer Method, A-Buffer Method, Scan Line Method, Area Subdivision Method.

Shading: Gouraud and Phong Shading Algorithms, Properties of Bezier and B-Spline Curves.

Recommended Books:

1. Computer Graphics: By Donald Hearn, M. Pauline Baker
2. Computer Graphics (Schaum Series) by Lipschutz (MC Graw Hill)
3. Principles of Interactive Computer graphics: By W.M. Newman, R.Sproull
4. Fundamentals of Interactive Computer Graphics: By J.D. Foley, A. Van Dam
5. Computer Graphics Using OPEN GL: By F.S. Hill Jr.
6. Computer Graphics: Roy A. Plastock, Gordon Kalley.

Elective-IV CPE-409 ADVANCED COMPUTER ARCHITECTURE

L	T	P	CR
3	1	0	3.5

SECTION A

Introduction to Parallel Processing: Evolution of Computer Architecture, Parallelism in Uniprocessor System, Parallel Computer Structures, Architectural Classifications Schemes, Multiprocessors and Multicomputers, Multivector and SIMD Computers, Parallel processing application.

Memory and input output subsystems: Hierarchical Memory structure, Virtual memory system, Memory Allocation and Management, Cache Memories and Management, Input-Output Subsystem.

Pipelining and Vector Processing: Pipelining, Instruction and Arithmetic Pipelines, Principles of Designing Pipelined Processors, Vector Processing Requirements , Vector Super Computers, Pipeline Chaining and Vector Loops, Vectorization and Optimization Methods.

SECTION B

Structures and Algorithms for Array Processors: SIMD Array Processors, SIMD Interconnection Networks: Static & Dynamic Networks, Mesh Connected Network, Cube interconnection Networks, Parallel Algorithms for array processors, Associative Array Processing.

Multiprocessor Architecture and Programming: Functional Structures, Interconnection Networks: Multi stage networks For multiprocessors, Parallel Memory Organization, Multiprocessor Operating System, Exploiting Concurrency for Multiprocessing.

Recommended Books :

1. Hawang kai, Briggs F.A., Computer Architectures and Parallel Processing, McGraw-Hill
2. Kain Richard Y., Advanced Computer Architecture, PHI
3. Hwang Kai, Advanced Computer Architecture, McGraw-Hill
4. Mano M., Computer System Architecture, PHI

Elective-IV CPE 319

JAVA PROGRAMMING

L	T	P	CR
3	1	0	3.5

Section A

Introduction to Java : Features of Java, difference between Java and C++, JVM, Bytecode, data types, Wrapper types, variables, arrays, operators- arithmetic, bit-wise, relational, Boolean, various control statements.

Introduction to Classes: Class fundamentals, declaring objects, methods, constructors, garbage collection, passing parameters to methods, recursion.

Inheritance: types of inheritance, Access Modifiers (Private, Public, Protected, Default), Polymorphism (Overloading, Overriding, Super & This Keyword), Final Variable, Final Classes & Methods, Static variable Static method, Abstract methods and classes, Packages and interfaces, importing packages.

Exception Handling: Exception types, try, catch, finally, throw and throws, creating exception subclasses.

Section B

Multithreading: Multithread programming, thread priorities, synchronisation, interthread communication, Thread class methods, runnable interface,

I/O: Input/Output, streams, reading and writing console input/output, reading and writing files,

Applets and Graphics: Applet fundamentals; Applet class; Applet initialization and termination; event handling; keyboard and mouse events; AWT class; Layout managers; panels; canvases; Frame windows; drawing lines, rectangles, ellipses.

JDBC programming: Commonly used classes and interfaces of java.sql package, connecting java application to a database, prepared statements.

Advance Concepts: Introduction to Java Beans, Java Swings, Java Server Pages.

Recommended Books :

1. Dietel and Dietal, Java: How to Program, 6th Edition, Pearson Education
2. Herbert Schildt The Complete Reference Java2, TMH
3. James Edward Keogh, Jim Keogh J2EE: The complete Reference, McGraw-Hill

ELECTIVE-V

ECE 406 SATELLITE COMMUNICATIONS

L	T	P	CR
3	1	0	3.5

Section-A

Introduction: Origin of satellite communication, Current state of satellite communication, Orbital aspects of satellite communication and orbital effects in satellite communication system performance.

Earth Station Technology: Earth station design including antenna, tracking small earth station antennas, equipments for earth stations, Video receive-only stations and frequency Co-ordination.

Section-B

Satellite Link Design: Basic transmission theory, System noise temperature and G/T rate, Design of downlinks domestic satellite systems using small earth stations, up line design, design of satellite link for specified (C/N).

Propation Of Satellite- Earth Paths And Its Influence On Link Design: Quantifying attenuation and depolarisation, interference effects, rain and ice effects, monitoring propagation effects,

Advanced Topics: Forbid VSAT technology, Mobile Satellite N/W’s Applications of satellite communication.

Recommended Books:

1. Satellite Communication, By T. Pratt & C.W. Bostain, Wiely eastern, 2002, 2nd edition.
2. Satellite Communication, By Tri .T. Ha, Tata Mcgraw Hill, 2nd Edition 1990.

ELECTIVE-V

ECE 407 NANO ELECTRONICS

L	T	P	CR
3	1	0	3.5

Section-A

Introduction: Introduction to Nano-scale Science and Nano-scale Technology. Why nano science and nano technology? Length, energy, and time scales. Nano structure types and properties, electronic and optical properties of materials, sensors.

Quantum wires and dots, single electron effects and single electron transistors, coulomb blockade effects in ultra small metallic tunnel junctions, Quantum confinement of electrons in semiconductor nanostructures: two dimensional confinement(quantum wells), Band gap engineering, Epitaxy.

Fabrication: Nanomagnets and spintronics, non-ideal interfaces and defects, nano fabrication(Lithography, Self assembly, Contact imprinting), molecular electronics, Organic Electronics(Carbon Fullness and nanotubes, polymers) .

Bio Electronics: Introduction, Binding of Organic semiconductors, DNA computing.

Section-B

Nano-Photonics: Emitters, Wave Guides, Detectors, Photonic Crystals.

Surface Analytical Instrumentation Techniques For Nanotechnology: Atomic scale characterization techniques: scanning tunneling microscopy, atomic force microscopy. Low Energy Electron Diffraction (LEED), Scanning Probe Microscopy, UV Photo electron spectroscopy (UPS).

Mems And Nems: MicroElectro mechanical systems (MEMS) and Nano electro mechanical systems(NEMS), size dependent electronic, magnetic and optical behavior of nano materials .

Application: Introduction to quantum methods of information processing, Nano Particles and Environmental Hazardness , Industrial applications of Nano Sized materials.

RECOMMECONDED BOOKS:

1. Transport in Nanostructures- David Ferry, Cambridge University Press,2000
2. Introduction to Mesoscopic Physics -Y.Imry, Oxford University Press,1997
3. Electron Transport in Mesoscopic Systems ,S.Datta, Cambridge University Press,1995
4. Single Charge Tunneling, H.Grabert and M.Devoret, Plenum Press,1992
5. Handbook of Microlithography, Micromachining and Microfabrication - P.Rai Choudhary, ,SPIE,1997

Elective-V ECE 408 BIOMEDICAL INSTRUMENTATION

L	T	P	CR
3	1	0	3.5

Section-A

Human Body Subsystems: Brief description of neuronal, Muscular, Cardiovascular and respiratory systems; their electrical, Mechanical and chemical activities.

TRANSDUCERS AND ELECTRODES: Principles and classification of transducers for bio-medical applications; Electrode theory, Different types of electrodes; Selection criteria for transducers and electrodes.

Cardiovascular System Measurements: Measurement of blood pressure, Blood flow, Measurement of pH value of blood, Cardiac rate, Heart sounds; Electrocardiograph, Plethysmograph.

Respiratory System Measurements: Measurement of gas volume, Flow rate, Carbon-dioxide and oxygen concentration in exhaled air.

Measurement Of Electrical Activity In Neuromuscular System And Brain: Neuron potential, Muscle potential, Electromyograph, Brain potentials, Electroencephalograph.

Section-B

Medical Imaging: Diagnostic X-rays, CAT, MRI, Ultrasonography, Medical use of isotopes, Endoscopy.

Patient Care, Monitoring And Safety Measures: Elements of intensive care monitoring; Basic hospital systems and components; Physiological effect of electric currents, Shock hazards from electrical equipment, Safety measures.

Assisting And Therapeutic Devices: Introduction to cardiac pacemakers, Defibrillators, Ventilators, Diathermy.

Bio-Telemetry And Lasers: Physiological parameters adaptable to Bio-telemetry, components of a bio telemetry system, Application of telemetry in patient care, *Application* of lasers to biomedical sciences.

RECOMMECONDED BOOKS:

1. L. Biomedical Instrumentation and Measurement -Chromwell, F.J.Weibell, E.A.Pfeiffer Prentice Hall of India, New Delhi.
2. Introduction to biomedical Equipment technology- Carr JJ and Brown JM, Pearson Publishers, Delhi.
3. Medical Instrumentation applications and design -J.G Webster, John Wiley Sons, New York.
4. Handbook of Biomedical Instrumentation- R.S Khandpur, Tata Mc Graw Hill, New Delhi
5. Principles of applied Biomedical Instrumentation -L.G.Geddes, L.E. Baker, John Wiley Sons, New York.

Elective-V

ECE 409 OPTICAL NETWORKS

L	T	P	CR
3	1	0	3.5

Section-A

Generation of Transport networks, WDM, TDM, wireless optical systems, key optical nodes, evolution of optical systems, key attributes of optical fiber. Telecommunication Infrastructure, digital multiplexing techniques, digital signaling hierarchy, T1, DS1, T3 or DS3, layered protocol model. Timing & Synchronization in digital networks, Timing error, clocking signal, Timing types, variation, clock exchange methods, SONET and DS1 timing, Downstream devices timing, BITS, SSMs.

SONET & SDH evolution, multiplexing structure, frame structure, envelopes, functional components, problem detection, payload, pointers, VTs overhead bytes, SONET & SDH concatenation. Architecture of optical transport networks, Digital wrappers, O/O/O, hierarchy, OTN layer models. WDM DWDM, operation, its components.

Section -B

Network topologies, protection schemes, robustness, diversity, 1:N protection, optical channel, types BLSR, passive optical networks and Metro. MPLS and optical networks, Label switching, Lambda switching, traffic engineering, Link management protocol (LMP), Link up, LMP messages, connectivity, Fault management. Optical Routers switching, preferences, OSP, LSP, load increasing, technologies, MEMS, Thermo, bubble, Granularity of Labels.

ATM vs. IP in optical internets: IP over ATM & SONET, OSI internet layered model, Encapsulation & its methods, PPP packet, ATM vs. IP debate, Optical Internets Evolution to 3G architecture, Migration to IP networking, IP subnets, non-optical nodes, routing tables, stack alternatives, digital wrapper, internetworking, internet service providers.

RECOMMECONDED BOOKS:

1. Optical Networks-Third Generation Transport Systems – Uyles Black, Pearson Education.
2. Optical Network Design and Implementation - Vivek Alwayn, Pearson Education
3. Understanding SONET/SDH and ATM-communications networks for the next millennium by Stamatiou V. Kartalopoulos, Prentice - Hall India.

Elective-V ECE - 410 DIGITAL VLSI DESIGN

L	T	P	CR
3	1	0	3.5

Section-A

MOS Transistor Theory: Evolution of ICs. Masking sequence of NMOS and CMOS Structures. Electrical Design Rules, Stick Diagram, Layout Design. Introduction to MOS Physics. MOSFET Work Function MOS Models. MOSFET Structure and Operation: Accumulation, Depletion and Inversion region; Weak and Strong Inversion. Threshold voltage. Current-Voltage characteristics. Body effect. MOSFET Scaling theory, Limits of miniaturization, small geometry effects. Sub threshold conduction.

Circuit Characterization: Resistive Load & Active Load MOS Inverters, NMOS Inverters, CMOS Inverters: Static Characteristics, Switching Characteristics, Interconnect Parasitics, Propagation Delay, Static and Dynamic Power Dissipation, Noise Margin, Logic Threshold Voltage.

Section-B

Combinational & Sequential Circuits: MOS Logic Circuits with Depletion NMOS loads, CMOS Logic Circuits, Complex logic circuits, Pass Gate, Transmission Gate, Double Gate Transistor. Behavior of Bistable elements. SR Latch Circuit, Clocked Latch and Flip-Flop Circuits, CMOS D-Latch and Edge-triggered Flip-flop. Subsystem Design- Adders, shifters, ALU, High Performance Dynamic CMOS Circuits, ROM Circuits, Static and Dynamic RAM Circuits.

VLSI Design Methodologies: Semi-custom and Full-Custom Design including Cell Library and Gate Array Based Design, FPGA, BiCMOS Logic Circuits, Design for Testability.

RECOMMECONDED BOOKS:

1. Basic VLSI design, systems and circuits- Pucknell DA and Eshraghian K. , PHI
2. VLSI design techniques for analog and digital circuits –Geiger Rr, Allen PE, Strader NR,

Elective-V ECE 412 NEURAL NETWORKS AND FUZZY LOGIC

L	T	P	Cr
3	1	0	3.5

Section A

Introduction: History of neural networks, biological neurons, Artificial Neural Net terminology, Model of a neuron, topology, Types of activation functions, learning, types of learning-supervised, unsupervised, reinforcement learning.

Neural Learning: Perceptrons, linear separability, Basic learning laws: Hebb's rule, Delta rule, Widrow & Hoff LMS learning rule, correlation learning rule, instar and outstar learning rules. Supervised learning- Multilayer networks, back propagation algorithm and its variations, unsupervised learning- competitive learning, K-means clustering algorithm, Self organizing maps, Basic Hopfield model.

Section B

Radial Basis Functions: RBF neural networks, Introduction to counter Propagation networks, CMAC networks, ART networks. Broad application areas of neural networks- classification, clustering, pattern association function approximation.

Fuzzy Logic: Basic concepts of Fuzzy Logic, Fuzziness vs. probability, Crisp logic vs. fuzzy logic, Fuzzy sets and systems, operations on sets, fuzzy relations, membership functions, fuzzy rule generation, variable inference techniques, defuzzification techniques, Fuzzy applications in consumer products.

RECOMMECONDED BOOKS:

1. Artificial Neural Networks -Yegna Narayanan
2. Neural Networks - - Simon Haykin
3. Fuzzy logic with engineering application - - ROSS J.T (Tata Mc)
4. Neural Networks & Fuzzy Logic - - Bart Kosko
5. Neural computing theory & practice - - P.D. wasserman (ANZA PUB).
6. Introduction to applied Fuzzy Electronics-Ahmad M.Ibrahim (PHI)
7. Introduction to artificial neural systems - -J.M. Zurada.(Jaico Pub)
8. An introduction to Fuzzy control -- D. Driankor, H. Hellendorn, M. Reinfrank (Narosa Pub.)

FOUR YEAR B. TECH.
(ELECTRONICS AND COMMUNICATION ENGINEERING)
FOURTH YEAR,
EIGHTH SEMESTER
(Batch 2015)
(Session 2018-2019)

SCHEME OF PAPERS

Course No.	Title	Credits
PRJ 451	Project Semester (One Semester Training in Industry)	20

Breakup of Marks :-

INDUSTIAL VISIT BY FACULTY COORDINATOR (150 MARKS)

(within 10-12 weeks of commencement of Training)

Presentation	:	60 Marks	150
Viva-voce	:	60 Marks	Marks
Report (Hard Copy)	:	30 Marks	

Evaluation by Faculty Coordinator in consultation with Industrial Coordinator during industrial visit

EVALUATION BY A TEAM OF FACULTY MEMBERS IN THE INSTITUTE (250 MARKS)

(Within one week of completion of the training)

Presentation	:	100 Marks	250
Viva-voce	:	100 Marks	Marks
Final Report (Hard Copy)	:	50 Marks	

The final presentation and viva-voce will be conducted jointly by the faculty coordinator, nominee of the Head to be appointed by the Head of the Department.

The letter grade will be awarded to the students according to marks obtained by him/her out of total 400 marks.

PRJ 451 PROJECT SEMESTER

L	T	P	Credits
--	--	--	20

Project Semester spans over a period of One Semester.

The students shall undertake project (s) in Industry / R&D or service organizations under the joint supervision of a faculty member and an executive from the organization. The emphasis of the work undertaken is on problem identification and its techno-economic solution for the benefit of the host industry.

The project must normally include identification of problem, data collection, analysis and generating solutions with cost and benefits and recommendations for their implementation. If a single project is not available in the industry, more than one projects might be undertaken.

The evaluation of the project semester should be carried out on a continuous basis and must include the evaluation by faculty coordinator during his visit(s) to the concerned industries, evaluation by faculty coordinator towards the completion of the semester and the final evaluation in the Institute by a committee of faculty members.