### Bachelor of Technology (Electronics & Communication, Electronics, Electronics & Instrumentation)

**Common for (ECE, EC, E&I)**

**Scheme of studies / Examination**

(Semester- 3)

<table>
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<th>Sl. No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Schedule</th>
<th>Examination Schedule (Marks)</th>
<th>Duration of Exam (Hours)</th>
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**Note:** Students are advised to verify scheme and syllabus from Kurukshetra University.
Bachelor of Technology (Electronics & Communication, Electronics, Electronics & Instrumentation)  
Common for (ECE, EC, E&I)  
Scheme of studies / Examination  
(Semester- 4)

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Note: Students are advised to verify scheme and syllabus from Kurukshetra University
# Bachelor of Technology (Electronics and Communication Engg.)
## Scheme of Courses/Examination
### (5th Semester)

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Note: Students are advised to verify scheme and syllabus from Kurukshetra University
### Bachelor of Technology (Electronics and Communication Engg.)

**Scheme of Courses/Examination**

**6th Semester**

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**NOTE:** Students will undergo a practical training of 6 weeks duration after the 6th Semester exam.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University.
# Bachelor of Technology (Electronics and Communication Engg.)
## Scheme of Courses/Examination
### (7th Semester)

<table>
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### DEPARTMENTAL ELECTIVES-I
- ECE-415E  Micro-controllers
- ECE-417E  Bio-medical Signal Processing
- ECE-419E  Reliability
- ECE-421E  Nanotechnology

### DEPARTMENTAL ELECTIVES-II
- ECE-423E  Advanced Microprocessors
- ECE-425E  Artificial Intelligence and Expert Systems
- ECE-427E  Power Electronics

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
# Bachelor of Technology (Electronics and Communication Engg.)
## Scheme of Courses/Examination
### (8th Semester)

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<td>General Fitness &amp; Professional Aptitude</td>
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**Total** | 17 | 8 | 10 | 35 | 500 | 475 | 200 | 1175 |

### DEPARTMENTAL ELECTIVES-III
- ECE-420E Image Processing
- ECE-422E Advanced Control Systems
- ECE-424E Embedded System Design

### DEPARTMENTAL ELECTIVES-IV
1. ECE-426E Neuro Fuzzy Systems
2. ECE-428E Electronic Switching System
3. ECE-430E Transducers and their Applications

*Note: Students are advised to verify scheme and syllabus from Kurukshetra University*
UNIT-I

Meaning of social change, nature of social change, theories of social change. The direction of social change, the causes of social change, the process of social change. Factors of social change – the technological factors, the cultural factors, effects of technology on major social institutions, social need of status system, social relations in industry.

UNIT-II


Fixed & variable costs in short run & long run, opportunity costs, relation between AC & MC, U-shaped short run AC Curve.


UNIT – III


Training – Objectives & Types of Training, Various Methods of Training. Labour Legislation in India – Main provisions of Industrial disputes Act 1947;

UNIT – IV


Purchasing Management – Meaning & Objectives, Purchase Procedure, Inventory Control Techniques.


Note: Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit. Each question will be of equal marks.

TEXT BOOKS:

“Modern Economic Theory” Dewett, K.K., S. Chand & Co.
“Economic Analysis” K.P. Sundharam & E.N. Sundharam (Sultan Chand & Sons).
“Micro Economic Theory” M.L. Jhingan (Konark Publishers Pvt. Ltd.).
“An Introduction to Sociology”, D.R. Sachdeva & Vidya Bhusan.
“Principles and Practices of Management : R.S. Gupta; B.D. Sharma; N.S. Bhalla; Kalyani.

REFERENCE BOOKS

2. Business Organization and Management : M.C. Shukla

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B-Tech 3rd Sem  
MATHEMATICS - III  
MATH-201 E

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UNIT – I
Fourier Series: Euler’s Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.


UNIT-II
Functions of a Complex Variables: Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity.

Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification & rotation, inversion & reflection, Bilinear).

UNIT-III
Probability Distributions: Probability, Baye’s theorem, Discrete & Continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

UNIT-IV
Linear Programming: Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Text Book
Higher Engg. Mathematics : B.S. Grewal  
Advanced Engg. Mathematics : E. Kreyzig

Reference Book
3. Operation Research : H.A. Taha  
4. Probability and statistics for Engineer : Johnson. PHI.

Note: Examiner will set eight questions, taking two from each unit. Students will be required to attempt five questions in all taking at least one from each unit. Each question will be of equal marks.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B-Tech 3rd Sem
NETWORK ANALYSIS & SYNTHESIS
EE-203-E

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UNIT I
TOPOLOGY:
Principles of network topology, graph matrices, network analysis using graph theory.

TRANSIENT RESPONSE:
Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using laplace transform.

UNIT 2
NETWORK FUNCTIONS:
Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behavior from the pole-zero plot.

UNIT 3
CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS:
Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance, parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 4
TYPES OF FILTERS AND THEIR CHARACTERISTICS:
Filter fundamentals, high-pass, low-pass, band-pass, and band-reject Filters.

NETWORK SYNTHESIS:
Positive real functions, synthesis of one port and two port networks, elementary ideas of Active networks.

TEXT BOOKS:

REFERENCE BOOKS:
1. Introduction to modern Network Synthesis : Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory:Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.

NOTE:
Eight questions are to be set in total covering entire course selecting two questions from each unit. Each question will be of equal marks. Students will be required to attempt five questions in all, selecting at least one question from each unit.
UNIT – I
MAGNETIC CIRCUITS AND INDUCTION
Magnetic Circuits, Magnetic Materials and their properties, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses, frictional & copper losses.

TRANSFORMERS:
Basic theory, construction, operation at no-load and full-load, equivalent circuit, phasor diagram, O.C. tests for parameters determination, efficiency and regulation, auto-transformer, introduction to three-phase transformer; Scott connection, parallel operation of transformer.

UNIT – II
PRINCIPLES OF ELECTROMECHANICAL ENERGY CONVERSIONS
Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, forces and torques is system with permanent magnets, dynamic equation.

DC MACHINES
Basic theory of DC generator, brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, Types of DC generator & motors Armature reaction, communication, characteristics of DC machines.

UNIT – III
INDUCTION MOTOR
Basic theory, construction, Phasor diagram, advantage of IM over other conventional machines Equivalent circuit, Torque equation, Load characteristics, starting speed control of induction motor, Introduction to single phase Induction motor double field revolving theory, types of single phase IM and its applications, open circuit & block rotor test.

UNIT-IV
SYNCHRONOUS MACHINES

Text Book:
Electrical Machines : P.S. Bimbhra; Khanna

Reference:
Electrical Machines : Nagarath and Kothari; TMH
Electrical Machines : Mukherjee and Chakravorti; Dhanpat Rai & Sons.
Electrical Technology (Vol-II) : B.L. Theraja; S. Chand.

NOTE: Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.
B.TECH IIIRD SEMESTER
DATA STRUCTURES
CSE-203 E

L T P THEORY : 100 Marks
3 1 - SESSIONAL : 50 Marks
TOTAL : 150 Marks
TIME : 3 Hrs.

Unit-1: Introduction: Introduction to Data Structures: Definition & abstract data types, Static and Dynamic implementations, Examples and real life applications; built in and user defined data structures, Ordered list and Operations on it.

Arrays: Definition, implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multi-dimensional arrays. Implementation of Data Structures like structure/ Record, Union, Sparse matrices : implementation of transpose.

Stacks: Sequential implementation of stacks, operations, Polish-notations, Evaluation of postfix expression, Converting Infix expression to Prefix and Postfix expression, Applications.


Introduction to Binary Search Trees, B trees, B+ trees, AVL Trees, threaded trees, balanced multi way search trees.

Unit- 4 : Graphs: Definition of undirected & Directed Graphs & Networks, Basic terminology, Representation of graphs., Graph traversals and spanning forests, minimum-spanning trees, computer representation of graphs.

Tables: Definition, Hash Functions, Implementation & Applications.

Sorting & Searching: Basic Searching techniques (Linear & binary), Introduction to Sorting. Sorting using selection, insertion, bubble, merge, quick, heap, heap sort.

Text Book:

Reference Books:
- Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- Data Structures and Program Design in C By Robert Kruse, PHI,
- Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum’s outline by TMH

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University.
B.TECH IIIRD SEMESTER
SEMICONDUCTOR DEVICES AND CIRCUITS
(ECE-201E)

L     T   P          THEORY :  100 Marks
3     1   -        SESSIONAL :  50 Marks
TOTAL          :  150 Marks
TIME          :  3 Hrs.

UNIT-I
P-N JUNCTION DIODE: - P-N junction and its V-I characteristics, P-N junction as rectifier, diode as a circuit element, the load line concept, half-wave and full-wave rectifiers, filter circuits. Photoelectric devices & their applications.
REGULATED POWER SUPPLIES: - Series and shunt voltage regulators, power supply parameters, three terminal IC regulators, SMPS.

UNIT-II
TRANSISTORS: - Review of BJT and its Hybrid model, analysis of a transistor amplifier circuit using h-parameters, Emitter follower, Miller’s theorem, Frequency response of R-C coupled amplifier, Multistage amplifier, classification of amplifiers, Transistor Biasing; Operating point, Bias stability, Collector to Base bias, Self-bias, emitter bias, bias compensation, Thermistor and sensitor compensation, High frequency limitations on BJT’S

UNIT-III
FEEDBACK OSCILLATORS AND POWER AMPLIFIERS: - Feedback in amplifiers: Basic feedback topologies. Oscillators: Barkhausen’s criterion, sinusoidal oscillators, Phase shift oscillators, Resonant circuit oscillator, a general form of oscillator, the Wein Bridge oscillator, Crystal oscillator. Introduction to power amplifiers and its various types with applications.

UNIT-IV
FIELD EFFECT TRANSISTORS: - JFET, pinch-off voltage, Volt-ampere characteristics, small signal model, MOSFET-Enhancement & Depletion mode, V-MOSFET, JFET & MOSFET amplifiers, Biasing of JFETS and MOSFETS.

TEXT BOOKS:
Integrated Electronics: Millman & Halkias; Mc Graw Hill.
Electronic circuit analysis and design (Second Edition): D.A. Neamen; TMH

REFERENCE BOOKS:
Electronics Principles: Malvino; Mc Graw Hill.
Electronics Devices & Circuits: Boylestad & Nashelsky; Pearson Education.

NOTE
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH IIIRD SEMESTER
ANALOG COMMUNICATION
(ECE-203E)

L    T    P    THEORY : 100 Marks
3    1    -    SESSIONAL : 50 Marks
TOTAL     : 150 Marks
TIME      : 3 Hrs.

UNIT – I
NOISE: Classification of Noise, Various sources of Noise, Methods of Noise Calculation in networks and inter connected networks. Addition of noise due to several sources; noise in amplifiers in cascade, noise in reactive circuits, Noise figure, its calculation and measurement. Noise temperature, Mathematical representation of random noise, narrow band noise and its representation. Transmission of noise through linear systems, signal to noise ratio, noise bandwidth.

UNIT-II

UNIT-III
ANGLE MODULATION: frequency and phase modulation, spectrum of FM Wave, modulation index and Bandwidth of FM Signal, NBFM and WBFM, Comparison between FM and PM Signals, FM and AM signals, AM and NBFM Signals, FM generation methods, Demodulation methods; slope detector, ratio detector, Foster-Seeley discriminator. Pre-emphasis & De-emphasis, effect of noise on carrier; noise triangle.

UNIT-IV

REFERENCE BOOKS:
Taub & Schilling, Principles of Communication Systems, TMH.
Dungan F.R., Electronics Communication System, Thomson-Delmar
Electronics Communication System: Kennedy; TMH

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
LIST OF EXPERIMENTS

To perform open and short circuit tests on 1-phase transformer and to calculate efficiency.

To perform Sumpner’s back to back test on-phase transformer.

Parallel operation of two 1-phase transformers.

Study of construction of a DC machine.

To plot magnetizing of a DC SE Generator and find its critical resistance & critical speed.

Speed Control of a DC motor by armature control & field control methods.

Open circuit & Block test of 1-phase induction motor.

Light running & block rotor test of 3-phase I.M. with starting.

To plot V curve of a synchronous motor.

To study scott connection of transformer.

To study starting running & reversal of direction of 3-phase I.M.

To perform load test on a 3-phase I.M. D.C. generator set & to determine the efficiency of I.M.

**NOTE**: Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.
B.TECH IIIRD SEMESTER
SEMICONDUCTOR DEVICES & CIRCUITS LAB
(ECE-205E)

L T P         Sessional : 25          Marks
- - 3         Viva         : 25          Marks
                    Total : 50          Marks
                    Time : 3hrs.

LIST OF EXPERIMENTS: -

2. Study of Half-wave and Full-wave rectifier.
4. Study of Active filters.
5. Study of diode as Clipper and Clamper.
6. Study of Zener diode as Voltage Regulator.
7. Measurement and study of Input and Output characteristics of a BJT.
9. To study the frequency response of RC coupled amplifier.
10. Measurement and study of Output characteristics of JFET.
11. Measurement and study of Output characteristics of MOSFET.
12. Study of SCR/Thyristor characteristics.
13. Study of UJT characteristics.

NOTE:
At least ten experiments are to be performed from above list.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH IIIRD SEMESTER
ANALOG COMMUNICATION LAB
(ECE-207E)

L T P                  Sessional : 25 Marks
- - 2                Viva      : 25 Marks
Total : 50 Marks
Time : 3hrs.

LIST OF EXPERIMENTS:

1. i) To study Double Sideband Amplitude Modulation and determine its modulation factor and power in sidebands.
   ii) To study amplitude demodulation by linear diode detector.
2. i) To study Frequency Modulation and determine its modulation factor.
   ii) To study PLL 565 as frequency demodulator
3. To study Sampling and reconstruction of pulse amplitude modulation system.
4. To study the Sensitivity characteristics of superhetrodyne receiver.
5. To study the Selectivity characteristics of superhetrodyne receiver.
6. To study the Fidelity characteristics of superhetrodyne receiver.
7. i) To study Pulse Amplitude Modulation
   a) Using switching method
   b) By sample and hold circuit.
   ii) To demodulate the obtained PAM signal by IIInd order Low pass filter.
8. To study Pulse Width Modulation / Demodulation.
10. To study active filters (Low-pass, High-pass, Band-pass, Notch filter).

NOTE:
At least seven experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining three.
B.TECH IIIRD SEMESTER
DATA STRUCTURES LAB
(CSE-211E)

L      T      P
-      -      3

Sessional : 50 Marks
Exam    : 25 Marks
Total   : 75 Marks
Duration of Exam: 3 Hrs.

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using functions only
   a) Addition b) Subtraction c) Multiplication d) Transpose
4. Write a program to implement Queue.
5. Write a program to implement Stack.
6. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
7. Write a program for swapping of two numbers using ‘call by value’ and ‘call by reference strategies.
8. Write a program to implement binary search tree.
   (Insertion and Deletion in Binary search Tree)
9. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
10. Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
11. Create a linked list and perform the following operations on it
    a) add a node b) Delete a node
12. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
13. Write a program to simulate the various graph traversing algorithms.
Write a program which simulates the various tree traversal algorithms.
Write a program to implement various Searching Techniques.
Write a program to implement Sorting Techniques.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.
**B.TECH IVTH SEMESTER**  
**COMPUTATIONAL TECHNIQUES**  
(MAT-204E)

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**PART – A**

1. **Matrix Inversion:**

2. **Operational Research:**
   - Linear Programming Problems formulation, Solving linear programming problems using Graphical Method, Simplex Method, Dual Simplex Method.

**PART – B**

**Numerical Methods with Programming in Language ‘C’**

3. **Numerical Solution of Algebraic & Transcendental equation:**

4. **Solution of Simultaneous Equations:**

5. **Numerical Solution of Ordinary Differential Equation:**

**PART – C**

6. **Finite Differences:**

7. **Difference Equations:**
   - Formation of Difference Equation, Solution of Linear Difference Equations.

**NOTE:**

Question paper is to be set in three parts taking at least two questions from each part of the syllabus. There will be a total of eight questions in all. Students will be required to attempt five questions selecting at least one question from each part. Each question will be of equal marks.

**Books Recommended:**

2. Numerical Analysis By Goel & Mittal, Pragati Prakashan.
4. Mathematical Analysis in Engg. By Cang C. Mai

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT-I:
MEASUREMENT OF RESISTANCE: Wheatstone bridge, Carey-Foster Bridge, Kelvin double bridge, Measurement of Insulation resistance.

UNIT-II:
A-C BRIDGES: Maxwell Inductance bridge, Maxwell Inductance Capacitance Bridge, Anderson’s Bridge, Hay’s Bridge, De-Sauty’s Bridge, Schering’s bridge and Wein’s bridge.

UNIT-III:
DIGITAL INSTRUMENTS: Digital Indicating Instruments, Comparison with analog type, digital display methods, digital methods of time and frequency measurements, digital voltmeters.

UNIT-IV:
TRANSDUCERS: Classification of Transducers, Strain Gauge, Displacement Transducers - Capacitive Transducers, LVDT, Piezo-electric Transducers, Temperature Transducers - resistance thermometer, Thermocouples and Thermistors, Liquid level measurement Low pressure (vacuum) measurement.
DATA ACQUISITION SYSTEMS: A to D and D to A converters, Analog and Digital Data Acquisition Systems, Multiplexing, Spatial Encoders, Telemetry.

TEXT BOOK:
A Course in Electrical and Electronics Measurements and Instrumentation: A.K. Sawhney; Dhanpat Rai & Sons.

REFERENCE BOOKS:

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.
UNIT 1
FUNDAMENTALS OF DIGITAL TECHNIQUES:
Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra.

UNIT 2
COMBINATIONAL DESIGN USING GATES:
Design using gates. Karnaugh map and Quine Mckuskey methods of simplification.

UNIT 2
COMBINATIONAL DESIGN USING MST DEVICES

UNIT 3
SEQUENTIAL CIRCUITS:

UNIT 3
DIGITAL LOGIC FAMILIES:
Switching mode operation of p-n junction, bipolar and MOS-devices. Bipolar logic families: RTL, DTL, DCTL. Bipolar, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic. Interfacing of CMOS and TTL families.

UNIT 4
A/D AND D/A CONVERTERS:

PROGRAMMABLE LOGIC DEVICES:
ROM, PLA, PAL, Introduction to FPGA and CPLDs.

TEXT BOOK:

REFERENCE BOOKS:
1. Digital Integrated Electronics: Taub & Schilling; MGH
3. Digital Design: Morris Mano: PHI,

NOTE: Eight questions are to be set in all by the examiner taking at least two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.
SIGNAL AND SYSTEMS.
EE-208-E

L    T
3    1

Theory: 100 Marks
Sessional : 50 Marks
Total : 150 Marks
Time: 3 Hrs.

UNIT-I
SIGNAL

UNIT-II

UNIT-III
SYSTEM
Classification linear and non-linear, time invariant and time varying, Lumped and distributed. Deterministic and Stochastic. Casual and non causal, Analog and Discrete/Digital memory and memory less, 1 port and N – port, SISO, SIMO, MISO, MIMO.

UNIT-IV
System modeling in terms of differential, equations, state variables, difference equations and transfer functions. Linear time invariant system properties, elementary idea of response determination to deterministic and stochastic signals. Concept of impulse response.

REF. BOOKS :
Fred J Taylor –“Principles of Signals and System”, MGH.
A Papoulis – “Circuit and System” Modern Approach HRW

NOTE: Eight questions are to be set in total covering entire course selecting two questions from each unit. Each question will be of equal marks. Students will be required to attempt five questions in all, selecting at least one question from each unit.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT-1
ELECTRIC FIELD AND CURRENT
Coulomb's law. Electric field intensity, field due to a continuous volume charge distribution, field of a line charge, field of a sheet of charge, electric flux density, Gauss's law and applications, electric potential, the dipole, current density, continuity of current, metallic conductors, conductor properties and boundary conditions, the method of images, the nature of dielectric materials, boundary conditions for perfect dielectric materials, capacitance of two wire line, Poisson's and Laplace’s equations, uniqueness theorem.

UNIT-II
MAGNETIC FIELD AND MAXWELLI EQUATION
Biot - Savart law. Ampere's law, magnetic vector potentials, force on a moving charge, differential current element, force and torque on a closed circuit, the boundary conditions, the magnetic circuit, potential energy and forces on magnetic materials.

Faraday's law, Maxwell's equations in point form and integral form Maxwell's equations for sinusoidal variations, retarded potentials.

UNIT-III
THE UNIFORM PLANE WAVE
Wave motion in free space and perfect dielectrics, plane waves in lossy dielectrics. The Poynting vector and power considerations, propagation in good conductors, skin effect, reflection of uniform plane waves, SWR.

UNIT-IV
TRANSMISSION LINES AND WAVEGUIDES
The Transmission line equations, graphical methods, Smith chart, time-domain and frequency-domain analysis. TE, TM, TEM waves, TE and TM modes in rectangular and circular waveguides, cut-off and guide wavelength, wave impedance and characteristic impedance, dominant modes, power flow in waveguides, excitation of waveguides, dielectric waveguides.

REFERENCES:
1 Jordan E C & Balmain K G, Electromagnetic Waves and Radiating Systems, PHI.
2 David K. Chang, Field and Waves Electromagnetics, Addison Wesley.

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.
B.TECH IVTH SEMESTER
ELECTRONICS MEASUREMENTS LAB
(ECE-208E)

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Sessional : 50 Marks
Practical : 50 Marks
Total : 100 Marks
Time : 3hrs.

LIST OF EXPERIMENTS:

To measure the unknown Inductance in terms of capacitance and resistance by using Maxwell’s Inductance bridge.
To measure unknown Inductance using Hay’s bridge.
To measure unknown capacitance of small capacitors by using Schering’s bridge.
To measure 3-phase power with 2-Wattmeter method for balanced and unbalanced bridge.
To measure unknown capacitance using De-Sauty’s bridge.
To measure unknown frequency using Wein’s frequency bridge.
To measure unknown low resistance by Kelvin’s Double bridge.
To test the soil resistance using Meggar (Ohm meter).
To calibrate Energy meter using standard Energy meter.
To plot the B-H curve of different magnetic materials.
To calibrate the Voltmeter using Crompton Potentiometer.
To convert the Voltmeter into Ammeter using Potentiometer.
Insulation testing of cables using Digital Insulation Tester.

NOTE:
At least eight experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining two.
LIST OF EXPERIMENTS:

1. Familiarization with Digital Trainer Kit and associated equipment.
2. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
4. To verify the operation of Multiplexer and Demultiplexer.
5. To verify the operation of Comparator.
7. To verify the operation of Bi-directional shift register.
8. To design and verify the operation of 3-bit asynchronous counter.
9. To design and verify the operation of asynchronous Up/down counter using J-K FFs.
10. To design and verify the operation of asynchronous Decade counter.
11. Study of TTL logic family characteristics.
13. Study of BCD to 7 segment Decoder.

NOTE:
At least eight experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining two.
B.TECH IVTH SEMESTER
COMPUTATIONAL TECHNIQUES LAB
(MAT-206E)

L T P                Sessional :  50  Marks
-  -      3               Viva :  25  Marks
Total         :  75  Marks
Time         :  3hrs.

List of Experiments

The Source codes for the following problems are to develop by the students & results should be verified.
1. Solution of Non-Linear Equation in single variable using the method of successive Bisection.
2. Solution to non-linear equation in single variable using the Newton-Raphons method.
3. Solution to non linear equation in single variable using the Secant method.
4. Solution to a system of simultaneous algebraic equations using the Gaussian elimination procedure.
5. Solution to a system of simultaneous algebraic equations using the Gauss-Seidel iterative method.
10. Solution to system of simultaneous equations using Gauss-Seidal iterative method employing the technique of successive relaxation.

NOTE:
At least eight experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining two.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH Vth SEMESTER
ANTENNA AND WAVE PROPAGATION
(ECE-301E)

L    T    P
3    2    -

Theory : 100
Sessional: 50
Time : 3Hrs

UNIT – I
BASIC PRINCIPLES AND DEFINITIONS: Retarded vector and scalar potentials. Radiation and induction fields. Radiation from elementary dipole (Hertzian dipole, short dipole, Linear current distribution), half wave dipole, Antenna parameters: Radiation resistance, Radiation pattern, Beam width, Gain, Directivity, Effective height, Effective aperture, Bandwidth and Antenna Temperature.

UNIT – II
RADIATING WIRE STRUCTURES AND ANTENNA ARRAYS: Folded dipole, Monopole, Biconical Antenna, Loop Antenna, Helical Antenna. Principle of pattern multiplication, Broadside arrays, Endfire arrays, Array pattern synthesis, Uniform Array, Binomial Array, Chebyshev Array, Antennas for receiving and transmitting TV Signals e.g. Yagi-Uda and Turnstile Antennas.

UNIT – III
APERTURE TYPE ANTENNAS: Radiation from rectangular aperture, E-plane Horns, H-plane Horns, Pyramidal Horn, Lens Antenna, Reflector Antennas.
BROADBAND AND FREQUENCY INDEPENDENT ANTENNAS: Broadband Antennas. The frequency independent concept: Rumsey’s principle, Frequency independent planar log spiral antenna, Frequency independent conical spiral antenna and Log periodic antenna.

UNIT – IV
PROPAGATION OF RADIO WAVES: Different modes of propagation, Ground waves, Space waves, Surface waves and Tropospheric waves, Ionosphere, Wave propagation in the ionosphere, critical frequency, Maximum Usable Frequency (MUF), Skip distance, Virtual height, Radio noise of terrestrial and extra terrestrial origin. Multipath fading of radio waves.

NOTE

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

John D. Kraus, Antennas, McGraw Hill.
E.C. Jordan and K.G. Balmain, Electromagnetic Waves and Radiating Systems, PHI

Note: Students are advised to verify scheme and syllabus from Kurukshetra University.
B.TECH Vth SEMESTER
COMPUTER HARDWARE DESIGN
(ECE-303E)

L    T    P
3    1    -

Theory   :  100
Sessional :  50
Time      :  3Hrs

UNIT-I
BASIC STRUCTURE OF COMPUTER HARDWARE AND SOFTWARE:
Functional Units, historical Perspective, Register transfer and micro-operations. Information representation, Instruction format, Instruction types, Addressing modes, Machine and Assembly Language programming, Macros and Subroutines.

UNIT-II
PROCESSOR DESIGN: Fixed – point and floating-point arithmetic addition, subtraction, Multiplication and division, Decimal arithmetic unit – BCD adder, BCD subtraction, decimal arithmetic operations, ALU design, Forms of Parallel processing classification of Parallel structures, Array Processors, Structure of general purpose Multiprocessors.

CONTROL DESIGN:
Hardwired Control: design methods, Multiplier Control Unit, CPU Control unit, Microprogrammed Control: basic concepts, Multiplier Control Unit, Microprogrammed Computers, CPU Control unit.

UNIT-III
MEMORY ORGANIZATION: Memory device characteristics, Random access memories: semiconductor RAMS, Serial – access Memories – Memory organization, Magnetic disk memories, Magnetic tape memories, Optical memories, Virtual memory, Main Memory Allocation, Interleaved memory, Cache Memory, Associative Memory.

UNIT-IV

NOTE
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
M.M. Mano , Computer System Architecture, PHI.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT – I

UNIT – II
ELEMENTS OF INFORMATION THEORY AND SOURCE CODING: Introduction, information as a measure of uncertainty, Entropy, its properties, Discrete memoryless channels, Mutual information, its properties, BSC, BEC. Channel capacity, Shannon’s theorem on coding for memoryless noisy channels. Separable binary codes, Shannon–Fano encoding, Noiseless coding, Theorem of decodability, Average length of encoded message, Shannon’s binary encoding, Fundamental theorem of discrete noiseless coding, Huffman’s minimum redundancy codes.

UNIT – III
LINEAR BLOCK CODES: Introduction to error control coding, Types of codes, Maximum Likelihood decoding, Types of errors and error control strategies, Galois fields, Linear block codes, Error detecting and correcting capabilities of a block code, Hamming code, cyclic code, B.C.H. codes.

UNIT – IV
CONVOLUTIONAL CODES AND ARQ: Transfer function of a convolutional code, Syndrom decoding, Majority logic decodable codes, Viterbi decoding, distance properties of binary convolutional codes, Burst error correcting convolutional codes, general description of basic ARQ strategies, Hybrid ARQ schemes.

NOTE
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Papoulis, A. Probability, Random Variables and Stochastic Processes, MGH.
F. M. Reza, Information Theory, McGraw Hill.
Das, Mullick and Chatterjee, Digital Communication, Wiley Eastern Ltd.
Shu Lin and J. Costello, Error Control Coding, Prentice Hall.
B. R. Bhat, Modern Probability Theory, New Age International Ltd.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH Vth SEMESTER
LINEAR IC APPLICATIONS
(ECE-307E)

L     T     P                         Theory     :  100
3      2  -                             Sessional :  50
Time     :  3Hrs

UNIT-I

UNIT-II
OP-AMP WITH NEGATIVE FEEDBACK AND FREQUENCY RESPONSE: Block diagram representation of feedback amplifier, voltage series feedback, voltage shunt feedback differential amplifiers, frequency response compensating network, frequency response of internally compensative op-amp and non compensating op-amp. High frequency op-amp equivalent circuit, open loop gain V/s frequency, closed loop frequency response, circuit stability, slew rate.

UNIT-III
OP-AMP APPLICATION: DC, AC amplifiers, peaking amplifier, summing, scaling, averaging and instrumentation amplifier, differential input output amplifier, voltage to current converter, current to voltage converter, very high input impedance circuit, integration and differential circuit, wave shaping circuit, active filters, oscillators

UNIT-IV
SPECIALIZED LINER IC APPLICATIONS: 555 timer IC (monostable & astable operation) & its applications , Universal active filter, PLL, power amplifier, 8038 IC.

NOTE
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

R.A. Gayakwaed , OP-amps and Linear Integrated circuits.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH Vth SEMESTER
MICRO-ELECTRONICS
(ECE-309E)

L T P Theory : 100
4 1 - Sessional : 50
Time : 3Hrs

UNIT-I:
Crystal Growth: MGS, EGS, Czochralspi crystal Puller, Silicon shaping, Wafer Preparation.

UNIT-II:
LithoGraphy, Photolithography, E-beam lithography, X-ray Lithography, reactive Plasma Etching, Plasma Properties, Feature Size control and anisotropic etching, Plasma etching techniques and equipment.

UNIT-III:

UNIT-IV:

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

S.M.Sze, VLSI Technology, Mc Graw Hill.
S.K.Ghandhi, VLSI Fabrication Principles.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH Vth SEMESTER
MICROPROCESSORS & INTERFACING
(ECE-311E)

L T P                         Theory : 100
4 1 -                      Sessional : 50
                         Time : 3Hrs

UNIT-I:
INTRODUCTION : Evolution of microprocessors, technological trends in microprocessor
development. The Intel family tree. CISC Versus RISC. Applications of Microprocessors.
8086 CPU ARCHITECTURE : 8086 Block diagram; description of data registers, address
registers; pointer and index registers, PSW, Queue, BIU and EU. 8086 Pin diagram descriptions.
Generating 8086 CLK and reset signals using 8284. WAIT state generation. Microprocessor
BUS types and buffering techniques, 8086 minimum mode and maximum mode CPU module.

UNIT-II:
8086 INSTRUCTION SET : Instruction formats, addressing modes, Data transfer instructions,
string instructions, logical instructions, arithmetic instructions, transfer of control instructions;
process control instructions; Assembler directives.
8086 PROGRAMMING TECHNIQUES : Writing assembly Language programs for logical
processing, arithmetic processing, timing delays; loops, data conversions. Writing procedures;
Data tables, modular programming. Macros.

UNIT-III:
MAIN MEMORY SYSTEM DESIGN : Memory devices, 8086 CPU Read/Write timing
diagrams in minimum mode and maximum mode. Address decoding techniques. Interfacing
SRAMS; ROMS/PROMS. Interfacing and refreshing DRAMS. DRAM Controller –
TMS4500.

UNIT-IV:
BASIC I/O INTERFACE : Parallel and Serial I/O Port design and address decoding. Memory
mapped I/O Vs Isolated I/O Intel’s 8255 and 8251- description and interfacing with 8086.
ADCs and DACs, - types, operation and interfacing with 8086. Interfacing Keyboards,
alphanumeric displays, multiplexed displays, and high power devices with 8086.
INTERRUPTS AND DMA : Interrupt driven I/O. 8086 Interrupt mechanism; interrupt types
and interrupt vector table. Intel’s 8259. DMA operation. Intel’s 8237. Microcomputer video
displays.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section
having two questions from each of the four units. The candidate shall have to attempt five
questions in all, selecting at least one question from each unit. Each question will be of equal
marks.

Suggested Books:

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
To study OP-AMP as adder and subtractor circuits (IC-741).
To study clipping circuits using OP-AMP (IC-741).
To study clamping circuits using OP-AMP (IC-741).
To study OP-AMP as Schmitt trigger (IC-741).
To study an instrumentation amplifier using OP-AMP (IC-741).
Study of current to voltage and voltage to current convertor using OP-AMP (IC-741).
To study Astable multivibrator circuit using timer IC-555.
To study monostable multivibrator circuit using timer IC-555.
To study Voltage Controlled Oscillator using timer IC-555.
To study Frequency divider using IC-555.
To design 2nd order low pass butterworth filter.
To design 2nd order high pass butterworth filter.

**NOTE:** At least 10 experiments are to be performed with at least 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.
Before starting with the experiments, teacher should make the students conversant with the following essential theoretical concepts.

A.  
   i) Programming Model of Intel’s 8086.  
   ii) Addressing Modes of Intel’s 8086.  
   iii) Instruction formats of Intel’s 8086  
   Instruction set of Intel’s 8086.
   Assembler , and Debugger.

LIST OF EXPERIMENTS:

I  
   a) Familiarization with 8086 Trainer Kit.
   b) Familiarization with Digital I/O, ADC and DAC Cards.
   c) Familiarization with Turbo Assembler and Debugger S/Ws.

II  
   Write a program to arrange block of data in
   i) ascending and (ii) descending order.

III  
   Write a program to find out any power of a number such that \( Z = X^N \).
   Where N is programmable and X is unsigned number.

IV  
   Write a program to generate.
   i) Sine Waveform  (ii) Ramp Waveform  (iii) Triangular Waveform Using DAC Card.

V  
   Write a program to measure frequency/Time period of the following functions.
   (i) Sine Waveform (ii) Square Waveform (iii) Triangular Waveform using ADC Card.

VI  
   Write a program to increase, decrease the speed of a stepper motor and reverse its
direction of rotation using stepper motor controller card.

VII  
   Write a program to increase, decrease the speed of a stepper motor and reverse its
direction of rotation using stepper motor controller card.

VIII  
   a) Use DOS interrupt to read keyboard string/character.
   b) Use BIOS interrupt to send a string/character to printer.

IX  
   Write a program to:
   Create disk file.
   Open, write to and close- a disk file.
   Open, read from and close a disk file.
   Reading data stamp of a file using BIOS interrupt.

X  
   i) Erasing UVROMs and EEPROMs
   Reprogramming PROMs using computer compatible EPROM Programmer.

XI  
   Studying and Using 8086 In-Circuit Emulator.

**NOTE:** At least 10 experiments are to be performed with atleast 7 from above list, remaining 3
may either be performed from the above list or designed & set by concerned institution as per the
scope of syllabus.
B.Tech. (Common for all branches 5th/6th Semesters)

FUNDAMENTALS OF MANAGEMENT

HUT-302E

L T
3 1
Theory : 100 Marks
Sessionals : 50 Marks
Total : 150 Marks
Time : 3 hours

UNIT-I Financial Management

UNIT-II Personnel Management

UNIT-III Production Management
Production Management : Definition and Objectives
Plant location: Ideal plant location. Factors affecting plant location.
Plant Layout : Ideal plant layout, factors affecting plant layout.
Production Control : Meaning and importance of production control and steps involved in production control.

UNIT-IV Marketing Management

NOTE :
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
Suggested Books:

Management – Harold, Koontz and Cyrilo’ Donell (Mc Graw Hill)
Basic Marketing – Cundiff and Still ( PHI, India )
Marketing Management – S.A. Sherlekar (Himalaya Publishing House Bombay)
Principles and Practice of Management – L.M. Prasad
Financial Management – I.M. Pandey ( Vikas Publishing House, New Delhi)
International Marketing – Vorn terpestre and Ravi Sasathy.
Personnel Management – C.B. Mamoria, (Himalaya Publishing House)

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH VI SEMESTER
CONTROL SYSTEM ENGINEERING
(ECE-302E)

L T P Theory : 100
4 1 -

Sessional : 50

Time : 3Hrs

UNIT-I :
INTRODUCTION: The control system-open loop & closed loop, servomechanism, stepper motor.
MATHEMATICAL MODELS OF PHYSICAL SYSTEMS: Differential equation of physical systems, transfer function, block diagram algebra, signal flow-graphs, Mason’s formula & its application.
FEEDBACK CHARACTERISTICS OF CONTROL SYSTEMS: Feedback and non-feedback systems, Effects of feedback on sensitivity (to parameter variations), stability, overall gain etc.

UNIT-II:
TIME RESPONSE ANALYSIS: Standard test signals, time response of first order and second order systems, steady-state errors and error constants, design specification of second-order systems.
STABILITY: The concept of stability, necessary conditions for stability, Hurwitz stability criterion, Routh stability criterion, Relative stability analysis.

UNIT-III:
FREQUENCY RESPONSE & STABILITY ANALYSIS: Correlation between time and frequency response, Polar Plots, Nyquist plots, Bode Plots, Nyquist stability criterion, Gain margin & Phase margin, relative stability using Nyquist Criterion, frequency response specifications.

UNIT-IV:
COMPENSATION OF CONTROL SYSTEMS: Necessity of compensation, Phase lag compensation, phase lead compensation, phase lag lead compensation, feedback compensation.
STATE VARIABLE ANALYSIS: Concept of state, state variable and state model, state models for linear continuous time systems, diagonalization solution of state equations, concept of controllability and observability.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

TEXT BOOK:

Reference Books:
1. Automatic Control Systems: B.C.Kuo; PHI.
2. Modern Control Engg: K.Ogata; PHI.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT I:
INTRODUCTION: History. Why use VHDL? Hardware design construction, design levels, HDLs Hardware simulation and synthesis. Using VHDL for design synthesis, terminology.
PROGRAMMABLE LOGIC DEVICES: Why use programmable logic? What is a programmable logic device? Block diagram, macrocell structures and characteristics of PLDs and CPLDs. Architecture and features of FPGAs. Future direction of programmable logic.

UNIT II:
BEHAVIORAL MODELING: Entity declaration, architecture body, process statement, variable assignment, signal assignment. Wait, If, Case, Null, Loop, Exit, Next and Assertion statements. Inertial and transport delays, Simulation deltas, Signal drivers.
DATA FLOW AND STRUCTURAL MODELLING: Concurrent signal assignment, sequential signal assignment, Multiple drivers, conditional signal assignment, selected signal assignment, block statements, concurrent assertion statement, component declaration, component instantiation.

UNIT III:

UNIT IV:
ADVANCED TOPICS: Generate Statements, Aliases, Qualified expressions, Type conversions, Guarded signals, User defined attributes, Predefined attributes., VHDL synthesis.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
D. Perry, VHDL, 3rd Ed.- TMH.
J.Bhasker, A.VHDL- Primer, PHI.
Skahil, VHDL for Programmable logic- 2nd Ed – Wiley.
UNIT – I:
Frequency domain sampling and DFT; properties of DFT, Linear filtering using DFT, Frequency analysis of signals using DFT, radix 2, radix-4, goertzel algorithm, Chirp Z-transform, applications of FFT algorithm, computation of DFT of real sequences. Quantization effects in computation of DFT.

UNIT – II:
IMPLEMENTATION OF DISCRETE TIME SYSTEMS: Direct form, cascade form, frequency sampling and lattice structures for FIR systems. Direct forms, transposed form, cascade form parallel form. Lattice and lattice ladder structures for IIR systems. State space structures. Quantization of filter co-efficient structures for all pass filters.

UNIT – III:

UNIT – IV:
DESIGN OF IIR FILTERS: Design of IIR filters from analog filters, Design by approximation of derivatives, Impulse invariance method bilinear transformation method characteristics of Butterworth, Chebyshev, and Elliptical analog filters and design of IIR filters, Frequency transformation, least square methods, design of IIR filters in frequency domain.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
John G. Proakis, Digital Signal Processing, PHI
S. K. Mitra, Digital Signal Processing, TMH
Rabiner and Gold, Digital Signal Processing, PHI
Salivahan, Digital Signal Processing, TMH
Digital Signal Processing: Alon V. Oppenheim; PHI

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT – I:
PULSE MODULATION: sampling process, PAM and TDM; aperture effect. PPM noise in PPM, channel Bandwidth, Recovery of PAM and PPM signals Quantization process, quantization noise, PCM, $\mu$ Law and A- law compressors. Encoding, Noise in PCM, DM, delta sigma modulator, DPCM, ADM.

UNIT – II:
BASE BAND PULSE TRANSMISSION: Matched filter and its properties average probability of symbol error in binary enclosed PCM receiver, Intersymbol interference, Nyquist criterion for distortionless base band binary transmission, ideal Nyquist channel raised cosine spectrum, correlative level coding Duo binary signalling, tapped delay line equalization, adaptive equalization, LMS algorithm, Eye pattern.

UNIT – III:
DIGITAL PASS BAND TRANSMISSION: Pass band transmission model; gram Schmidt orthogonalization procedure, geometric Interpretation of signals, Response of bank of correlaters to noise input, detection of known signal in noise, Hierarchy of digital modulation techniques, BPSK, DPSK, DEPSK, QPSK, systems; ASK, FSK, QASK, Many FSK, MSK, Many QAM, Signal space diagram and spectra of the above systems, effect of intersymbol interference, bit symbol error probabilities, synchronization.

UNIT – IV:
SPREAD SPECTRUM MODULATION: Pseudonoise sequence, A notion of spread spectrum, direct sequence spread spectrum with coherent BPSK, signal space dimensionality & processing gain, probability of error, frequency spread spectrum, CDM.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

John G. Proakis, Digital Communication, PHI
Taub & Schilling, Principles of Communication, TMH
Simon Haykin, Communication systems, John Wiley & Sons

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT – I:
INTRODUCTION: Uses of Computer Networks, Network Hardware, Network Software, Reference models, Examples of Networks & Data communication Services, Network Standardization.

UNIT – II:

UNIT – III:
NETWORK LAYER: Design issues, routing algorithms, congestion control Algorithms, internetworking.
TRANSPORT & SESSION LAYER: Protocol design issues, connection Management, remote procedure calls.

UNIT – IV:
PRESENTATION LAYER: Design issues, abstract Syntax notation, data compression technique, cryptograph.
APPLICATION LAYER: Design issues, file transfer, access and management, electronic mail, virtual terminals, applications and examples.

Suggested Books:
Tanenbaum A.S, Computer Networks, PHI.
Forouzan B.A, Data Communications and Networking, Tata-Mc-Graw Hill.
Stallings W, Data and Computer Communications, PHI.
Davies D. W. Barber, Computer Networks and their Protocols, John Wiley.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH VI SEMESTER
DIGITAL COMMUNICATION PRACTICAL
(ECE-312E)

L    T     P                          Sessional :  50
-     -      3                                   Viva         :  25
Time        : 3Hrs

LIST OF EXPERIMENTS:

To Study PSK
To Study FSK
To Study IF Amplifier
To Study Balanced Modulator & Demodulator
To Study PCM
Setting up a Fiber Optic Analog Link
Setting up a Fiber Optic Digital Link
Losses in Optical Fiber
Measurement of Numerical Aperture
Time Division multiplexing of signals.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.
LIST OF EXPERIMENTS:

Design a single stage R C Coupled amplifier and plot its gain frequency response.
Design a two stage R C Coupled amplifier and plot its gain frequency response.
Design a R C Phase shift oscillator using IC 741.
Design a wein bridge oscillator.
Design a square wave generator using IC 555.
Design a 4 : 1 multiplexer and 1 : 4 demultiplexer using logic gates.
Design a parallel parity bit generator using ICs.
Design a digital to analog converter using ICs.
Design a digital frequency meter (0-999HZ) using IC 555 for monoshot, IC-7404,7408,7490,7447.
Design a controller such that LEDs glow in pairs sequentially using IC 7490 and LEDs.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.
B.TECH V1th SEMESTER
VHDL PRACTICAL
(ECE-316E)

L    T    P
-   -    3

Exam   :   50
Sessional   :   50
Time : 3Hrs

LIST OF EXPERIMENTS:

Write a VHDL Program to implement a 3:8 decoder.
Write a VHDL Program to implement a 8:1 multiplexer using behavioral modeling.
Write a VHDL Program to implement a 1:8 demultiplexer using behavioral modeling.
Write a VHDL Program to implement 4 bit addition/subtraction.
Write a VHDL Program to implement 4 bit comparator.
Write a VHDL Program to generate Mod-10 up counter.
Write a VHDL Program to generate the 1010 sequence detector. The overlapping patterns are allowed.
Write a program to perform serial to parallel transfer of 4 bit binary number.
Write a program to perform parallel to serial transfer of 4 bit binary number.
Write a program to design a 2 bit ALU containing 4 arithmetic & 4 logic operations.

NOTE: At least 10 experiments are to be performed with at least 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.
B.TECH VIIth SEMESTER
VLSI DESIGN
(ECE-401E)

L     T     P                         Theory : 100
3      2  -                      Sessional : 50
Time : 3Hrs

UNIT 1:
NMOS & CMOS Fabrication Process Sequence, Basic electrical properties of NMOs & CMOS

UNIT 2:
Delay in MOS Circuits, Scaling of MOS Circuits, Some design examples, inverter, NAND
gates, Multiplexer, Logic Function Block.
Introduction to physical design of IC’s Layout rules & circuit abstractor, Cell generation, Layout
environments, Layout methodologies, Packaging, Computational Complexity, Algorithmic
Paradigms.

UNIT 3:
Placement : Partitioning, Floorplanning, Placement.
Routing : Fundamentals, Global Routing, Detailed Routing, Routing in FPGA’s.

UNIT-4:
Performance issues in Circuit Layout : Delay models, Timing Driven
placement, Timing Driven Routing, Via Minimization, Power Minimization, other issues.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section
having two questions from each of the four units. The candidate shall have to attempt five
questions in all, selecting at least one question from each unit. Each question will be of equal
marks.

Suggested Books:

Pucknell DA & Eshraghian K, Basic VLSI Design, PHI.
John P. Uyemura, Introduction to VLSI circuits and systems, John Wiley.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT – I:
ELEMENTS OF A TELEVISION SYSTEM:
Picture transmission, sound transmission, picture reception, sound reception synchronization, receiver controls. Analysis and Synthesis of Television Pictures: Gross structure, image continuity, no. of scanning lines, flicker, fine structure, tonal gradation. Composite Video signal, channel B.W. Vestigial side band transmission and reception, TV standards.

UNIT – II:
MONOCHROME SIGNAL TRANSMISSION AND RECEPTION : Block diagram of Monochrome Signal Transmitter and Receiver, Explanation of different sections, Transmitting and receiving antennas.

UNIT-III
Color signal transmission, bandwidth for color signal transmission.

UNIT – III:
ADVANCED TOPICS IN TV. ENGINEERING: Introduction, & working and block diagram of the Projector TV, 3D-TV, HDTV, Digital TV, Camcorders.
TELEVISION APPLICATIONS: Cable television, CCTV, picture phone & facsimile, television via satellite, Remote Control (Electronic control system), Introduction to Digital TV Technology and their merits.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

AM Dhake, Monochrome and Colour TV, TMH.
SP Bali, Colour TV theory & practice, TMH
Merrill I. Skolnik, Introduction to Radar Systems, TMH

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT – I:
INTRODUCTION: Propagation within the fiber, Numerical aperture of fiber, diffraction, step index and graded index fiber, Modes of propagation in the fiber, Single mode and multi mode fibers. Splices and connectors.

UNIT – II:
LOSSES IN OPTICAL FIBER: Rayleigh Scattering Losses, Absorption Losses, Leaky modes, mode coupling losses, Bending Losses, Combined Losses in the fiber.

UNIT – III:

UNIT – IV:
OPTICAL NETWORKS: Optical coupler, space switches, linear divider-combiners, wavelength division multiplexer and demultiplexer, optical amplifier, optical link network-single hop, multi-hop, hybrid and photonic networks.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
John Gowar, Optical communication Systems.
R. Ramaswamy, Optical Networks, Narosa Publication
UNIT – I:
MICROWAVE RESONATORS: Brief description of waveguides, coplanar waveguides, cavity resonators: rectangular, cylindrical, spherical and coaxial, excitation and coupling of cavities, Q factor.
MICROWAVE MEASUREMENTS: Measurement of frequency, impedance (using slotted section) attenuation, power, dielectric constant, measurement of V.S. W. R., insertion loss and permeability

UNIT – II:
MICROWAVE GENERATORS: Construction, characteristics, operating principle and typical applications of Klystron (two cavity, multicavity), Reflex Klystron, magnetron (Cylindrical magnetron and description of II mode applications) and Traveling Wave Tube (TWT).

UNIT – III:
MATRIX DESCRIPTION OF MICROWAVE CIRCUITS: Scattering matrix-its properties, measurement of scattering coefficients, scattering matrices for common microwave systems.
MICROWAVE COMPONENTS: Waveguide tees- E-plane, H-plane, magic tee, rat race, directional coupler, tuning screws and stubs, isolators and circulators-their constructional features and applications. Microwave filters, Phase shifters, attenuators, Wavemeters.

UNIT-IV.
SOLID STATE MICROWAVE DEVICES:
Tranferred electron devices- GUNN EFFECT; negative differential resistance phenomenon, field domain formation, GUNN diode structure.
Avalanche transit time devices: IMPATT, TRAPATT, BARITT diodes, Parametric amplifiers

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
Samuel Y. Liao, Microwave Devices and Circuits, Prentice-Hall of India.
David M. Pozar, Microwave Engineering, John Wiley and sons Inc.
POZAR DM, Microwave Engg, John Wiley & Sons Inc.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH VII SEMESTER
DIGITAL SIGNAL PROCESSING PRACTICAL
(ECE-409E)

L  T  P          Viva-voce :  25
-   -  3                                                 Sessional :  50
                                                                   Time   :  3 hrs.

LIST OF EXPERIMENTS:

Define a function to compute DTFT of a finite length signal. Plot the magnitude and phase plots using subplots. Use this function to obtain DTFT of a 21 point triangular pulse over the domain \(-10 < n < 10\). Plot the results over \(-\pi < \omega < \pi\).

Write a program to plot the following functions: a) impulse function b) unit step c) unit ramp d) exponential e) sinusoidal

Verify the Symmetry, time shifting and modulating properties of DTFT with a rectangular pulse of length 21.

Study the aliasing effect by using a Sinusoidal Signal. Show the plots of continuous time Signal. Sampled Signal and reconstructed signals by using subplot.

Study different window functions available in signal processing toolbox and their controlling parameters.

Write a program to plot real, imaginary phase and magnitude of exponential function.

Verify the properties of Discrete Fourier Transform (DFT).

Write a program to find the convolution of two sequences using in built convolution function

Study of Digital Signal Processing Kit (TMS/ADSP)

Implementations of FIR/digital filter using DSP Kit.

NOTE: At least 10 experiments are to be performed with at least 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
UNIT – I:
Radio Propagation Characteristics, Models for Path loss, Shadowing & Multipath fading-delay spread, Coherence bandwidth, Coherence Time, Doppler Spread Jake’s Channel model.

UNIT – II:
Digital Modulation for Mobile radio, Analysis under fading channel, diversity techniques and Rake demodulator. Introduction to Spread Spectrum Communication Multiple Access Techniques used in Mobile Wireless Communications: FDMA/TDMA/CDMA.

UNIT – III:
The Cellular concept, Frequency Reuse basic theory of hexagonal cell layout, spectrum efficiency, FDM/TDM, Cellular System, channel allocation schemes, Handover Analysis, cellular CDMA, Soft capacity, Erlang capacity comparison.

UNIT – IV:
Wireless standards-GSM, IS-95, UMTS-IMT-2000, Signaling, Call Control, Mobility Management and location Tracing.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
UNIT 1.
RADAR BASICS: Radar Block Diagram & operation, Applications of Radar.
RADAR EQUATION: Simple form of Radar Equation, Minimum detectable signal, Receiver noise, Signal to Noise ratio, Transmitter Power, Pulse repetition frequency & range ambiguities, System losses, Propagation effects.

UNIT 2.
CW & FREQUENCY MODULATED RADAR: The Doppler effect, CW Radar, FM- CW Radar, Multiple Frequency CW Radar.
MTI & PULSE DOPPLER RADAR: Introduction, Delay Line Cancellors, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI Pulse Doppler Radar, MTI from a moving platform.

UNIT 3.
TRACKING RADAR:
Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

UNIT 4.
RECEIVERS, DISPLAYS & DUPLEXERS:
Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

TEXT BOOK:
1. Introduction to Radar Systems: Merrill I. Skolnik, ; MGH

REFERENCE BOOK:
Electronic Communication Systems : Kennedy; TMH

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.
B.TECH. VIIth SEMESTER
MULTIMEDIA COMMUNICATIONS
(ECE-406E)

L T P                                                                                                      Theory : 100
3 1 -                                                                                                       Sessional : 50
Time : 3 Hrs

UNIT-1
Multimedia communications: Introduction, multimedia networks, multimedia applications.
Multimedia information representation: Introduction, digitization principles, representation of
text, images, audio & video.

UNIT-2
Text & Image compression: Various compression principles.
Text compression: Static Huffmann coding, dynamic Huffman coding, arithmetic coding,
Lempel-ziv coding
Image compression: Graphics Interchange format, tagged image file format, digitized document,
digitized pictures, JPEG (Introduction)

UNIT-3
Audio & Video compression:
Audio compression: Differential PCM, Adaptive differential PCM, Code excited LPC, MPEG
audio coders, Dolby audio coders.
Video Compression: Basic principles, Video compression standard H.261, h.263, MPEG(Basic
introduction)

UNIT-4
Internet applications: Domain name system, name structure and administration, DNS resource
records, Electronic mail message structure, content transfer, Basic concept of internet telephony,
World Wide Web.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section
having two questions from each of the four units. The candidate shall have to attempt five
questions in all, selecting at least one question from each unit. Each question will be of equal
marks.

SUGGESTED BOOKS:
Multimedia communications: Fred Halsall; Pearson Education Asia.
2. Multimedia Systems-Design: K. Thakkar; PHI
3. Multimedia: Computing, Communications & Applications: Ralf Stein Metz & Klara
   Nahrstedt; Pearson
4 . Advanced Multimedia Programming: Steve Rimmer; MBI
5. Multimedia: Making it Work IIId edition: Tay Vaughan; TMH

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
B.TECH VIII SEMESTER
MICROWAVE (PRACTICAL)
(ECE-408E)

LIST OF EXPERIMENTS

To study the microwave components.
To study the characteristics of the reflex Klystron tube and to determine its electronic tuning range.
To determine the frequency and wavelength in a rectangular waveguide working in TE 10 mode.
To determine the standing wave ratio and reflection coefficient.
To study the I-V characteristics of Gunn diode.
To study the magic tee.
To study the isolator and attenuator.
To measure the coupling coefficient and directivity of a waveguide directional coupler.
To measure the polar pattern and the gain of a waveguide horn antenna.
To measure the insertion loss and attenuation.

NOTE: At least 10 experiments are to be performed with at least 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

B.TECH VIII SEMESTER

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
LIST OF EXPERIMENTS

1. Familiarization of PCBs and Mechanical Components of Tape recorder/CD Player/VCD Player/Colour TV.
2. Study of tuner section of a Colour T.V.
3. Study of VIF section of a Colour T.V.
4. Study of Sound section of a Colour T.V.
5. Study of Chroma section of a Colour T.V.
6. Study of Mechanical portion of VCD player.
7. Study of Sound processing of VCD player.
8. Study of Camcorder’s mechanical portion.

**NOTE:** At least 09 experiments are to be performed with at least 7 from above list, remaining 2 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.
B.TECH VIIth SEMESTER
MICROCONTROLLERS
(ECE-415E)

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UNIT 1:

UNIT 2:

UNIT 3:

UNIT 4:
8051 APPLICATIONS: Interfacing Keyboards Programs for small keyboards and matrix keyboards. Interfacing multiplexed displays, numeric displays and LCD displays. Measuring frequency and pulse width. Interfacing ADCs & DACs. Hardware circuits for handling multiple interrupts. 8051 Serial data communication modes - Mode 0, Mode 1, Mode 2 and Mode 3.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
Intel’s manual on “Embedded Microcontrollers”

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVE-I

B.TECH VIIth SEMESTER
BIOMEDICAL SIGNAL PROCESSING
(ECE-417E)

L | T | P | Theory : 100
3 | 1 | - | Sessional : 50
|   |   |   | Time : 3Hrs

UNIT-I:
Digital Filters: Z-transform, elements of digital filters, Types of digital filters, Transfer function of a difference equation Z-plane pole-zero plot.
FIR Filters: Characteristics, Smoothing Filters, Notch Filters, Derivatives, Window Design, Frequency Sampling, Minimax Design.
IIR Filters: Generic Equations, One pole and two pole filters Integrators.

UNIT-II:
Adaptive Filters: Principal noise canceller model, GO Hz. Adaptive Canceling, Applications.

UNIT-III:
Signal Averaging: Signal averaging as a digital filter, a typical averager, Software for signal averaging, limitations, Data Reduction Techniques – Turning Point Algorithm, AZTEC Algorithm, Fan Algorithm, Huffman Coding. Fourier Transform, Correlation, convolution, Power Spectrum Estimation.

UNIT-IV:
ECG Analysis System: ECG Interpretation, ST Segment Analyzer, Portable Arrhythmia Monitor.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
WJ. Tompkin, Biomedical Signal Processing edition, PHI
JG Proakis, Digital Signal Processing, PHI
Salivahanan, Digital Signal Processing, Tata Mc-Graw Hill.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVES-I

B.TECH VIIth SEMESTER
RELIABILITY
(ECE-419E)

L T P Theory : 100
3 1 - Sessional : 50
  Time : 3Hrs

UNIT 1:
INTRODUCTION: Definition of reliability, failure data analysis, mean failure ratio, MTTF, MTBF, graphical plot, MTTF in terms of failure density, generalization, reliability in terms of failure density (integral form), reliability in other situation.
HAZARD MODELS: Introduction, constant hazard linearly increasing hazard, Weibull model, on density function and distribution function, and reliability analysis, important distribution and its choice, expected value, standard deviation and variance, theorem concerning expectation and variance.

UNIT 2:
SYSTEM RELIABILITY: Introduction, series system with identical component, reliability bounds-classical approach Bayesian approach application of specification hazard models, an r-out-of-an structure methods for solving complex system, systems not reducible to mixed configuration, mean time to failure system, logic diagrams, Markov model and graph.
RELIABILITY IMPROVEMENT AND FAULT TREE ANALYSIS: Introduction, improvement by component, redundancy, element redundancy, unit redundancy, optimization, stand by redundancy, reliability-cost trade off, fault tree construction, calculation of reliability from fault tree.

UNIT 3:
MAINTAINABILITY, AVAILABILITY AND REPAIRABLE SYSTEM:Introduction, maintainability, availability, system down time, reliability and maintainability trade off, instantaneous repair rate MTTR, reliability and availability function.
BAYESIAN APPROXIMATION AND RELIABILITY ESTIMATION: Introduction, Lindley’s expansion, reliability estimation, normal, Weibull, inverse gaussian and Rayleigh.

UNIT 4:
RELIABILITY ALLOCATION AND APPLICATION: Reliability allocation for a series system, approximation of reliability in a computer system and nuclear power plant, failure models and effects analysis (FMEA)

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
S.K.Sinha, Reliability and life testing, (WEL New Delhi).
L.A.Srinath, Reliability engineering, (EWP New Delhi).
Bal Guru Swami, Quality control and Reliability, (Khanna publisher New Delhi).

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVES-I

B.TECH VII SEMESTER
NANOTECHNOLOGY
(ECE- 421E)

L     T     P                         Theory :  100
3      1  -                      Sessional :  50
Time : 3Hrs

UNIT 1
Introduction to Nanotechnology, review of various techniques and tools, future prospects of nanotechnology, applications.

UNIT 2

UNIT 3
Properties of nanostructured materials:
Magnetic properties, electrical transport properties, non-linear optical properties.

Special nanomaterials
Porous silicon nanostructures – formation, optical properties; Fullernes – synthesis, properties and application.

UNIT 4.
Nano electronics – Nanodevices, nanotransistors, nanoelectro optics, Nano structures in electronics.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVES-II

B.TECH VIIth SEMESTER
ADVANCED MICROPROCESSESORS
(ECE-423E)

L T P                         Theory : 100
3  2  -                      Sessional : 50
                                Time : 3Hrs

UNIT-I
INTEL’S X86 FAMILY: Introduction, Register set, data formats, addressing modes, interrupts, memory hierarchy, pipelining, segmentation, paging, real and virtual mode execution, protection mechanism, task management.

UNIT-II

UNIT-III
ARITHMETIC CO-PROCESSORS: Data formats; 80287 architecture – Pin diagram, internal architecture, status register, control register; tag register. Instruction set – data transfer, arithmetic, comparison, transcendental operations, constant operations and control instructions. Interfacing 80287 with 80286 Programming examples.

UNIT-IV
HIGHER- CO-PROCESSORS: Introduction to 80387,80487.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVES-II

B.TECH VII SEMESTER
ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS
(ECE- 425E)

L     T     P                         Theory    :  100
3      2  -                      Sessional            :  50
Time                  : 3Hrs

UNIT-I
Production System: - Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, Regency, specificity, alternative approach for conflict resolution, Architecture of production system, conclusion.

UNIT-II
Prepositional Logic: - Proposition, tautologies, Theorem proving in prepositional logic, Semantic method of theorem proving, forward chaining, backward chaining, standard theorems in prepositional logic, method of substitution, theorem proving using Wang’s algorithm, conclusion.
Predicate Logic: - Alphabet of First order logic (FOL), predicate, well formed formula, clause form, algorithm for writing sentence into clause form, inflict of predicates, unification algorithm, resolution Robinson’s inference rule, conclusion.

UNIT-III
Logic Programming and Prolog: - Logic program, Horn clause, program for scene interpretation, unification of goals, definite perform clause, SLD resolution, SLD tree, controlling back tracking, common use of cut, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replace cut-fail by not, conclusion.
Default & Non monotonic reasoning: - Axiomatic theory, non-atomic reasoning using NML-I, problems with NML-I, reasoning with NML-II, truth maintenance system with example, conclusion.

UNIT-IV
Intelligent Search Technique: - Heuristic function, AND-OR graph, Heuristic search, A* algorithm and examples.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Book:
1. E.Charniak & D. McDermott, Introduction to Artificial Intelligence, Addison Wesley Longman.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVES-II
B.TECH VIIth SEMESTER
POWER ELECTRONICS
(ECE-427E)

L T P Theory : 100
3 2 - Sessional : 50

Time : 3Hrs

UNIT-1.
INTRODUCTION: Role of power electronics, review of construction and characteristics of
power diode, Schottky diode, power transistor, power MOSFET, SCR, DIAC, Triac, GTO, IGBT
& SIT.
SCR: Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and
other firing circuits based on ICs and microprocessors

UNIT-2.
CONVERTERS: One, two, three, six and twelve pulse converters, fully and half controlled
converters, load voltage waveforms, output voltage equation, continuous and discontinuous
modes of operation, input power factor of converter, reactive power demand, effect of source
inductance, introduction to four quadrant / dual converter, power factor improvement techniques,
forced commutated converter, MOSFET and transistor based converters.

UNIT-3
INVERTERS: Basic circuit, 120 degree mode and 180 degree mode conduction schemes,
modified McMurray half bridge and full bridge inverters, McMurray-Bedford half bridge and
bridge inverters, brief description of parallel and series inverters, current source inverter (CSI),
transistor and MOSFET based inverters.

UNIT-4.
CHOPPERS: Basic scheme, output voltage control techniques, one, two, and four quadrant
choppers, step up chopper, voltage commutated chopper, current commutated chopper, MOSFET
and transistor based choppers.
CYCLOCONVERTERS: Basic principle of frequency conversion, types of cycloconverter, non-
circulating and circulating types of cycloconverters.

TEXT BOOK:
1. Power Electronics: MH Rashid; PHI

REFERENCE BOOKS:
1. Power Electronics: PC Sen; TMH
2. Power Electronics: HC Rai; Galgotia
3. Thyristerised Power Controllers: GK Dubey, PHI
4. Power Electronics and Introduction to Drives: A.K.Gupta and L.P.Singh; Dhanpat Rai

Note:
The question paper shall have eight questions in all organized into four sections, each section
having two questions from each of the four units. The candidate shall have to attempt five
questions in all, selecting at least one question from each unit. Each question will be of equal
marks.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
IMAGE PROCESSING
(ECE – 420E)

L     T     P                         Theory    :  100
3      1  -                      Sessional            :  50
Time                  : 3Hrs

UNIT – I:

UNIT – II:
IMAGE TRANSFORMS: Two Dimensional Orthogonal and Unitary Transforms and their properties. One Dimensional and Two Dimensional DFT Cosine and Sine Transforms. Hadamard, Slant, Harr and KL, Transforms and their properties, Approximation to KI Transforms.
IMAGE REPRESENTATION BY STOCHASTIC MODELS: One Dimensional Causal Models, AR and ARMA models, Non Causal Representation Spectral factorization, Image Decomposition.

UNIT – III:

UNIT – IV:
IMAGE ANALYSIS AND IMAGE COMPRESSION: Spatial feature extraction, Edge detection and boundary extraction Boundary, region and moment representations structures, Texture, Image Segmentation, Reconstruction from Projections, Pixel Coding, Productive Techniques, Transform Coding Theory, Coding of Image, Coding of two-tone image.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Anil Jain, Digital Image Processing, PHI.
Gonzalez and Woods, Image Processing, Addison Wesley & Sons.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
ADVANCED CONTROL SYSTEMS
(ECE- 422E)

L     T     P                         Theory :  100
3      1  -                      Sessional :  50
Time :  3Hrs

UNIT1.
State variable representation of systems by various methods, solution of state equations- state
transition matrix, Transfer function from state variable model. Controllability and observability of
state variable model.

UNIT2.
Phase portrait of linear second systems, Method of isoclines, phase portrait of second order
system with non-linearities, limit cycle, singular points.

UNIT3.
Definition, limitations, use of describing function for stability analysis, describing function of
ideal relay, relay with hysteresis and dead zone, saturation/columb friction and backlash. Linear
approximation of nonlinear systems: Taylor series, Liapunov’s 2nd method.

UNIT4.
Sampling process, impulse modulation, mathematical analysis of sampling process, application of
Laplace transform, Shanno’s theorem, reconstruction of sampled signal order and first order
hold, Z-transform, definition, evaluation of z-transform, inverse Z-transform pulse transfer
function, limitation of Z-transform, state variable formulation of discrete time systems. Solution
of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury’s test
of stability of extension of Routh-hurwitz criterion to discrete time systems.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section
having two questions from each of the four units. The candidate shall have to attempt five
questions in all , selecting at least one question from each unit. Each question will be of equal
marks.

Suggested Books:
1. Gopal M, Digital Control and State Variable Methods, TMH
2. Kuo,BC, Digital Control systems,
3.  Slotine  JE & Li WP, Applied Non-Linear Control , Prentice Hall, USA.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University
DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
EMBEDDED SYSTEMS DESIGN
(ECE-424E)

L  T  P                          Theory  :  100
3  1  -                        Sessional  :  50
                             Time  :  3Hrs

UNIT 1 : INTRODUCTION:
Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/S Princeton, CISC V/S RISC; microcontrollers memory types; microcontrollers features: clocking, i/o pins, interrupts, timers, peripherals.

UNIT 2 : MICROCONTROLLER ARCHITECTURE:
Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.

UNIT 3 : INTERRUPTS AND I/O PORTS:
Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial peripheral device, O/p port Expansion, I/p port expansion, UART.

UNIT 4 : PROGRAMMING WITH MICROCONTROLLERS:
Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, state machines, Oscillators, Timer Interrupts, Memory mapped I/O.

DESIGNING USING MICROCONTROLLERS:
Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

TEXT BOOK:

REFERENCE BOOKS:
1. Programming and Customizing the 8051 Microcontroller : Predko; TMH.
2. Designing Embedded Hardware : John Catsoulis ; SHROFF PUB. & DISTR. ND.
3. Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR. ND.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University.
DEPARTMENTAL ELECTIVES-IV

B.TECH VIIIth SEMESTER
NEURO-FUZZY SYSTEMS
(ECE-426E)

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UNIT-I:
INTRODUCTION TO FUZZY AND NEURO-FUZZY SYSTEMS: Merits of Fuzzy and Neuro Fuzzy systems. Introduction to Architecture of a Fuzzy systems, fuzzification Rule Base, Inference engine, defuzzizication.

FUZZY MATHEMATICS: Fuzzy sets and operations of fuzzy sets, properties of fuzzy sets, fuzzy relations, fuzzy graphs & Fuzzy arithmetic.

UNIT-II:
ANALOG DESIGN OF FUZZY PROCESSORS: Modular design, design of a fuzzifier, knowledge base and inference engine, defuzzifier design.

UNIT-III:
IMPLEMENTATION OF A COMPLETE ANALOG FUZZY SYSTEMS: Design and microprocessor based implementation of Fuzzy systems.
FUZZY MODEL IDENTIFICATION: Structure Specifications, Parameter estimation, model validation.

UNIT-IV:

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
KLIR & YUAN, Fuzzy Sets and Fuzzy Logic.
DEPARTMENTAL ELECTIVES-IV

B.TECH VIII SEMESTER
ELECTRONIC SWITCHING SYSTEMS
(ECE-428E)

L    T    P                         Theory : 100
3     2    -                      Sessional : 50

Time : 3Hrs

UNIT – I:
INTRODUCTION: Statistical Bandwidth Sharing, Switching, network Configurations, Elements of switching systems, Electronic exchange, PBX.
TELEPHONE NETWORKS: Subscriber loop, Switching Hierarchy & Routing Transmission systems, Numbering Plan, Charging plan, Signaling techniques Common Channel Signaling.

UNIT – II:
ELECTRONIC SPACE DIVISION SWITCH: Stored Program Control (SPC): Centralized & Distributed SPC, Software Architecture, and n-stage networks.
TIME DIVISION SWITCHING: Space Switching, Time Switching, Time multiplexed space switching & Time Switching, n-stage combination switching.

UNIT – III:
CELLULAR MOBILE TELEPHONY: Analog Switch System for Cellular Mobile, Cellular digital switching, centralized & remote controlled small switching system.

UNIT – IV:
TELEPHONE NETWORK PROTOCOLS: Protocols stacks, Digital Transmission hierarchy, SONET/SDH Signaling system. Multi Media Communication over global telephone N/W Introduction to Datagram switches, ATM Switches.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
Thiagarajan Viswanathan, Telecommunication Switching Systems & Networks, PHI
Hui, J.Y., Switching & Traffic Theory for integrated broadband networks.
DEPARTMENTAL ELECTIVES-IV

B.TECH. VIIIth SEMESTER
TRANSUDCERS AND THEIR APPLICATIONS
ECE-430E

L T P Theory : 100
3 2 - Sessional : 50

Time : 3Hrs

UNIT-I
Definition of transducer. Advantages of an electrical signal as output. Basic requirements of
transducers, Primary and Secondary Transducer, Analog or digital types of transducers.
Resistive, inductive, capacitive, piezoelectric, photoelectric and hall effect transducers.

UNIT-II
Measurement of pressure – Manometers, Force summing devices and electrical transducers
Measurement of temperature – Metallic resistance thermometers, semiconductor resistance
sensors (Thermistors), thermo-electric sensors, pyrometers.

UNIT-III
Measurement of displacement – Potentiometric resistance type transducers, inductive type
transducers, differential transformer (L.V.D.T), capacitive transducers, Hall effect devices, strain
gage transducers.
Measurement of velocity – variable reluctance pick up, electromagnetic tachometers,
photoelectric tachometer, toothed rotor tachometer generator.

UNIT-IV
Measurement of Force – Strain-gage load cells, pneumatic load cell, LVDT type force transducer.
Measurement of Torque – Torque meter, torsion meter, absorption dynamometers, inductive
torque transducer, digital methods.

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having two questions from each of the four units. The candidate shall have to attempt five
questions in all, selecting at least one question from each unit. Each question will be of equal
marks.

Suggested Books:
2. Thomas G. Beckwith etc. all, “Mechanical Measurements (International Student Edition),
   Dhanpat Rai & Sons, Delhi-6.

Note: Students are advised to verify scheme and syllabus from Kurukshetra University