## B.E-ELECTRONICS AND COMMUNICATION ENGINEERING

### SEMESTER I

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L - Lecture  
P - Practical  
CA - Continuous Assessment  
BS - Basic Science  
EAS - Engg. Arts & Science  
DC - Department Core  
CA - Continuous Assessment  
SEE - Semester End Examination  
HUM - Humanities  
CAT - Category  
DE - Department Elective

# - Continuous Assessment marks are awarded for performance in both semesters I & II with marks for final test to be scheduled by the faculty concerned at the end of semester II covering the entire syllabus;

* - Laboratory classes on alternate weeks for Physics and Chemistry.
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OBJECTIVES

- At the end of this course student should be able
- To mathematically formulate certain practical problems in terms of partial differential equations, solve them and physically interpret the results.
- To gain a well founded knowledge of Fourier series, their different possible forms and the frequently needed practical harmonic analysis that an engineer may have to make from discrete data.
- To have capacity to formulate and identify certain boundary value problems encountered in engineering practices, decide on applicability of the Fourier series method of solution, solve them and interpret the results.
- To know to evaluate the complex integration in terms of residue theorem.
- To understand the basics of Z – transform in its applicability to discretely varying functions, gain the skill to formulate certain problems in terms of difference equations and solve them using the Z – transform technique.

UNIT I PARTIAL DIFFERENTIAL EQUATIONS
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange’s linear equation – Linear partial differential equations of second and higher order with constant coefficients.

UNIT II FOURIER SERIES

UNIT III BOUNDARY VALUE PROBLEMS
Classification of second order quasi linear partial differential equations – Solutions of one dimensional wave equation – One dimensional heat equation – Steady state solution of two-dimensional heat equation (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

UNIT IV FOURIER TRANSFORM

UNIT V Z -TRANSFORM AND DIFFERENCE EQUATIONS

TUTORIAL 15
TOTAL 60

TEXT BOOKS
REFERENCE BOOKS

11UEC3001 DIGITAL ELECTRONICS 3 1 0 4

OBJECTIVES
At the end of the course the students should be able
- To introduce Boolean algebra and shows the correlation between Boolean expressions.
- To introduce combinational and sequential circuits.
- To introduce design of sequential circuits.
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits.
- To introduce the concept of memories and programmable logic devices.
- To introduce hardware description language.

UNIT I BOOLEAN ALGEBRA

UNIT II COMBINATIONAL AND SEQUENTIAL CIRCUITS

UNIT III DESIGN OF SEQUENTIAL CIRCUIT
ASYNCHRONOUS CIRCUITS: Design of fundamental mode and pulse mode circuits – primitive flow table – Minimization of primitive state table –state assignment – Excitation table – Excitation map- Cycles, Races and Hazards–Hazard free design. Design issues like metastability, clock skew and timing considerations
UNIT IV MEMORY DEVICES
TTL and CMOS Logic and their characteristics - Classification of memories – RAM organization – Read and write operations – Memory decoding – Memory expansion – SRAM Cell- DRAM cell – ROM organization- PROM – EPROM – EEPROM- Programmable Logic Devices – PLA, PAL, FPGA.

UNIT V INTRODUCTION TO VHDL
Complete VLSI design flow, Behavioral, Data flow, and Structural Modeling. Functions, Procedures, attribute, Test bench, Packages and configurations.
VHDL implementation of Adder, comparator, MUX, Decoder, parity checker, flip flops, Counters, Shift register.

TUTORIAL 15
TOTAL 60

TEXT BOOKS

REFERENCE BOOKS

11UEC3003 NETWORK ANALYSIS AND SYNTHESIS 3 1 0 4

OBJECTIVES
At the end of the course the student should be able
- To know about the analysis of networks in s domain.
- To know about the various elements of network synthesis.
- To design active and passive filters.

UNIT I ANALYSIS OF NETWORKS IN ‘S’ DOMAIN 9
Network Elements, Transient and Sinusoidal Steady State Analysis, Network analysis using Laplace transformation, Network functions, Two port networks: Parameters and transfer function, Interconnection of two ports.

UNIT II METHODS FOR COMPUTER AIDED NETWORK ANALYSIS 9
State variable method, Analytic and numerical solutions, Graph theoretic analysis for large scale networks, Formulation and solution of network graph of simple networks, State space representation, Analysis using PSPICE.

UNIT III ELEMENTS OF NETWORK SYNTHESIS

UNIT IV PASSIVE FILTER DESIGN
Butter worth and Chebyshev approximations, Normalized specifications, Frequency transformations, Frequency and impedance denormalisation, Types of frequency selective filters, Linear phase filters.

UNIT V ACTIVE FILTER DESIGN

TUTORIAL 15
TOTAL: 60

TEXT BOOKS
4. D. Roy Choudhary, “Networks and Systems” Wiley Eastern Ltd.

REFERENCE BOOKS

11UEE3012 ELECTRICAL MACHINES 3 0 0 3

OBJECTIVES
At the end of the course the students should be able
- To learn constructional details, principle of operation, performance, starters and testing of D.C. machines.
- To learn constructional details, principle of operation and performance of transformers.
- To learn constructional details, principle of operation and performance of induction motors.
- To learn constructional details and principle of operation of alternators and special machines.
- To learn power system transmission and distribution.

UNIT I D.C. MACHINES
Constructional details – emf equation – Methods of excitation – Self and separately excited generators – Characteristics of series, shunt and compound generators – Principle of operation of D.C. motor – Back emf and torque equation – Characteristics of series, shunt and compound motors - Starting of
D.C. motors – Types of starters - Testing, brake test and Swinburne’s test – Speed control of D.C. shunt motors.

UNIT II TRANSFORMERS

UNIT III INDUCTION MOTORS

UNIT IV SYNCHRONOUS AND SPECIAL MACHINES

UNIT V TRANSMISSION AND DISTRIBUTION

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
OBJECTIVE
At the end of the course the students should be able
- To learn the systematic way of solving problems
- To understand the different methods of organizing large amounts of data
- To learn to program in C
- To efficiently implement the different data structures
- To efficiently implement solutions for specific problems

UNIT I PROBLEM SOLVING

UNIT II LISTS, STACKS AND QUEUES
Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT

UNIT III TREES

UNIT IV SORTING

UNIT V GRAPHS

TOTAL: 45

TEXT BOOKS

REFERENCE BOOKS

11UEC3004 ENGINEERING ELECTROMAGNETICS 3104

OBJECTIVES
At the end of the course the students should be able
- To analyze fields potentials due to static changes.
- To evaluate static magnetic fields.
- To understand how materials affect electric and magnetic fields.
- To understand the relation between the fields under time varying situations.
- To understand principles of propagation of uniform plane waves.

UNIT I  STATIC ELECTRIC FIELDS 9
Introduction to Co-ordinate System – Rectangular – Cylindrical and Spherical Co-ordinate System –
Introduction to line, Surface and Volume Integrals – Definition of Curl, Divergence and Gradient –
Meaning of Strokes theorem and Divergence theorem
Coulomb’s Law in Vector Form – Definition of Electric Field Intensity – Principle of Superposition –
Electric Field due to discrete charges – Electric field due to continuous charge distribution - Electric
Field due to charges distributed uniformly on an infinite and finite line – Electric Field on the axis of a
uniformly charged circular disc – Electric Field due to an infinite uniformly charged sheet.
Electric Scalar Potential – Relationship between potential and electric field - Potential due to infinite
uniformly charged line – Potential due to electrical dipole - Electric Flux Density – Gauss Law – Proof of
Gauss Law – Applications.

UNIT II  STATIC MAGNETIC FIELD 9
Biot-Savart’s Law in vector form – Magnetic Field intensity due to a finite and infinite wire carrying a
current I – Magnetic field intensity on the axis of a circular and rectangular loop carrying a current I –
Ampere’s circuital law and simple applications.
Magnetic flux density – The Lorentz force equation for a moving charge and applications – Force on a
wire carrying a current I placed in a magnetic field – Torque on a loop carrying a current I – Magnetic
moment – Magnetic Vector Potential.

UNIT III  ELECTRIC AND MAGNETIC FIELDS IN MATERIALS 9
Poisson’s and Laplace’s equation – Electric Polarization-Nature of dielectric materials- Definition of
Capacitance – Capacitance of various geometries using Laplace’s equation – Electrostatic energy and
energy density – Boundary conditions for electric fields – Electric current – Current density – point form
of ohm’s law – continuity equation for current.
Definition of Inductance – Inductance of loops and solenoids – Definition of mutual inductance – simple
examples. Energy density in magnetic fields – Nature of magnetic materials – magnetization and
permeability - magnetic boundary conditions.

UNIT IV  TIME VARYING ELECTRIC AND MAGNETIC FIELDS 9
Faraday’s law – Maxwell’s Second Equation in integral form from Faraday’s Law – Equation expressed
in point form.
Displacement current – Ampere’s circuital law in integral form – Modified form of Ampere’s circuital law as Maxwell’s first equation in integral form – Equation expressed in point form. Maxwell’s four equations in integral form and differential form.
Poynting Vector and the flow of power – Power flow in a co-axial cable – Instantaneous Average and Complex Poynting Vector.

UNIT V ELECTROMAGNETIC WAVES
Derivation of Wave Equation – Uniform Plane Waves – Maxwell’s equation in Phasor form – Wave equation in Phasor form – Plane waves in free space and in a homogenous material.
Wave equation for a conducting medium – Plane waves in lossy dielectrics – Propagation in good conductors – Skin effect.

TUTORIAL 15
TOTAL 60

TEXTBOOKS

REFERENCE BOOKS

WEBSITE INFORMATION

11UEE3013 ELECTRICAL MACHINES LABORATORY 0 0 3 1

OBJECTIVES
At the end of the course the students should be able
- To study the characteristics of DC Motors.
- To study the characteristics of AC Motors.
- To learn performance of motors.
- Various test analysis of A.C and D.C motors.

LIST OF EXPERIMENTS
1. Open circuit and load characteristics of separately excited and self excited D.C. generator.
2. Load test on D.C. shunt motor.
3. Load test on D.C. series motor.
4. Swinburne’s test and speed control of D.C. shunt motor.
5. Load test on single phase transformer and open circuit and short circuit test on single phase transformer.
6. Regulation of three phase alternator by EMF and MMF methods.
7. Load test on three phase induction motor.
8. No load and blocked rotor tests on three phase induction motor (Determination of equivalent circuit parameters).

TOTAL 45

11UEC3005 ELECTRONIC DEVICES LAB 0 0 3 1

OBJECTIVES
- To learn about cathode ray oscilloscope
- To understand the characteristics of various semiconductor devices

LIST OF EXPERIMENTS
1. Study of CRO
2. Characteristics of PN junction diode
3. Characteristics of Zener diode
4. I/O Characteristics of CB Bipolar junction Transistor
5. I/O Characteristics of CE Bipolar junction Transistor
6. I/O Characteristics Characteristic of FET
7. I/O characteristics of MOSFET
8. Characteristic of UJT
9. Characteristics of SCR
10. Characteristics of DIAC and TRIAC
11. Characteristics of phototransistor

TOTAL 45

11UCS3011 DATA STRUCTURES LAB 0 0 3 1

OBJECTIVE
At the end of the course the students should be able
- To teach the students to write programs in C
- To implement the various data structures as Abstract Data Types
- To write programs to solve problems using the ADTs

Implement the following exercises using C:
1. Array implementation of List Abstract Data Type (ADT).
2. Linked list implementation of List ADT.
3. Cursor implementation of List ADT.
4. Array implementations of Stack ADT
5. **Linked list implementations of Stack ADT**
   The following three exercises are to be done by implementing the following source files
   
   (a) Program for ‘Balanced Parenthesis’
   (b) Array implementation of Stack ADT
   (c) Linked list implementation of Stack ADT
   (d) Program for ‘Evaluating Postfix Expressions’
   
   An appropriate header file for the Stack ADT should be included in (a) and (d)

6. Implement the application for checking ‘Balanced Parenthesis’ using array implementation of Stack ADT (by implementing files (a) and (b) given above)

7. Implement the application for checking ‘Balanced Parenthesis’ using linked list implementation of Stack ADT (by using file (a) from experiment 6 and implementing file (c))

8. Implement the application for ‘Evaluating Postfix Expressions’ using array and linked list implementations of Stack ADT (by implementing file (d) and using file (b), and then by using files (d) and (c))

9. Queue ADT

10. Search Tree ADT - Binary Search Tree

11. Heap Sort

12. Quick Sort

**TOTAL: 45**

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**11UMA4001**

**PROBABILITY THEORY & RANDOM PROCESS**

**OBJECTIVES**

At the end of this course student should be able

- To have a fundamental knowledge of the basic probability concepts.
- To have a well-founded knowledge of standard distributions which can describe real life phenomena.
- To acquire skills in handling situations involving more than one random variable and functions of random variables.
- To know the probabilistic model used for characterizing a random signal and the nature of dependence relationship existing among the members of the family of the random variables.
- To understand the functional relationship between the input and output of the system.

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**UNIT I**

**PROBABILITY AND RANDOM VARIABLE**

Axioms of probability - Conditional probability - Total probability - Bayes theorem - Random variable - Probability mass function - Probability density functions - Properties - Moments - Moment generating functions and their properties.

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**UNIT II**

**STANDARD DISTRIBUTIONS**

Binomial, Poisson, Geometric, Negative Binomial, Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties - Functions of a random variable.

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**UNIT III**

**TWO DIMENSIONAL RANDOM VARIABLES**

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and Regression - Transformation of random variables - Central limit theorem.
UNIT IV CLASSIFICATION OF RANDOM PROCESSES
Definition and examples - first order, second order, strictly stationary, wide – sense stationary and Ergodic processes – Markov chain -Markov process- Poisson processes.

UNIT V CORRELATION AND SPECTRAL DENSITIES

TEXT BOOKS

REFERENCE BOOKS

OBJECTIVES
At the end of the course the students should be able
• To analyze an amplifier using hybrid parameters.
• To understand advantages and method of analysis of feedback amplifiers.
• To analyze and design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrator.

UNIT I SMALL SIGNAL AMPLIFIERS AND AMPLIFIERS WITH COMPOUND CONFIGURATIONS
Two port devices and network parameters, Y parameters, Hybrid parameters, Transistor hybrid model, hybrid model of different configurations. Cascading of amplifiers – RC coupled amplifier, transformer coupled amplifier, Direct Coupled amplifier, Cascode amplifier, Darlington amplifier, Differential amplifier-common mode and differential modes, CMRR calculation.

UNIT II FEEDBACK AMPLIFIERS
Block diagram, Loop gain, Gain with feedback, Effects of negative feedback – Sensitivity and desensitivity of gain, Cut-off frequencies, distortion, noise, input impedance and output impedance with feedback, Four types of negative feedback connections – voltage series feedback, voltage shunt
feedback, current series feedback and current shunt feedback, Method of identifying feedback topology and feedback factor, Nyquist criterion for stability of feedback amplifiers.

UNIT III OSCILLATORS

UNIT IV TUNED AMPLIFIERS
Coil losses, unloaded and loaded Q of tank circuits, small signal tuned amplifiers - Analysis of capacitor coupled single tuned amplifier – effect of cascading single tuned on bandwidth – Stagger tuned amplifiers – large signal tuned amplifiers – Class C tuned amplifier – Efficiency and applications of Class C tuned amplifier.

UNIT V WAVE SHAPING AND MULTIVIBRATOR CIRCUITS

TUTORIAL 15
TOTAL 60

TEXT BOOKS

REFERENCE BOOKS

11UEC4003 SIGNALS AND SYSTEMS 3 1 0 4

OBJECTIVES
At the end of the course the students should be able
- To study the properties and representation of discrete and continuous signals.
- To study the sampling process and analysis of discrete systems using z-transforms.
- To study the analysis and synthesis of discrete time systems.

UNIT I REPRESENTATION OF SIGNALS
Continuous and discrete time signals: Classification of Signals – Periodic, aperiodic even – odd – energy and power signals – Deterministic and random signals – complex exponential and sinusoidal signals – periodicity – properties of discrete time complex exponential unit impulse – unit step impulse
functions – Transformation in independent variable of signals: time scaling, time shifting – Signal representations using simulation software.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS AND SYSTEMS
Continuous time Fourier Transform and Laplace Transform analysis with examples – properties of the Continuous time Fourier Transform and Laplace Transform basic properties, Parseval’s relation, and convolution in time and frequency domains. Basic properties of continuous time systems: Linearity, Causality, time invariance, stability, magnitude and Phase representations of frequency response of LTI systems -Analysis and characterization of LTI systems using Laplace transform: Computation of impulse response and transfer function using Laplace transforms.

UNIT III SAMPLING THEOREM AND z-TRANSFORMS

UNIT IV DISCRETE TIME SYSTEMS

UNIT V SYSTEMS WITH FINITE AND INFINITE DURATION IMPULSE RESPONSE

TUTORIAL 15 TOTAL 60

TEXT BOOKS

REFERENCE BOOKS

WEB SITE INFORMATION
1. www.xilinx.com/univ/dsp_resources.htm
OBJECTIVES
At the end of the course the students should be able
- To introduce the basic building blocks of linear integrated circuits.
- To teach the linear and non-linear applications of operational amplifiers.
- To introduce the theory and applications of analog multipliers and PLL.
- To learn the theory of ADC and DAC.
- To learn a few special functions integrated circuits.

UNIT I CIRCUIT CONFIGURATION FOR LINEAR ICs
Current sources, Analysis of difference amplifiers with active loads, supply and temperature independent biasing, Band gap references, Monolithic IC operational amplifiers, specifications, frequency compensation, slew rate and methods of improving slew rate.

UNIT II APPLICATIONS OF OPERATIONAL AMPLIFIERS
Linear and Nonlinear Circuits using operational amplifiers and their analysis, Inverting and Non inverting Amplifiers, Differentiator, Integrator, Voltage to current converter, Instrumentation amplifier, Sine wave Oscillator, Low-pass and band-pass filters, Comparator, Multivibrators and Schmitt trigger, Triangular wave generator, Precision rectifier, Log and Antilog amplifiers, Non-linear function generator.

UNIT III ANALOG MULTIPLIER AND PLL
Analysis of four quadrant (Gilbert cell) and variable transconductance multipliers, Voltage controlled Oscillator, Closed loop analysis of PLL, AM, PM and FSK modulators and demodulators, Frequency synthesizers, Comander ICs.

UNIT IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS
Analog switches, High speed sample and hold circuits and sample and hold ICs, Types of D/A converter, Current driven DAC, Switches for DAC, A/D converter-Flash, Single slope, Dual slope, Successive approximation, Delta Sigma Modulation, Voltage to Time converters.

UNIT V SPECIAL FUNCTION ICs
Astable and Monostable Multivibrators using 555 Timer, Voltage regulators-linear and switched mode types, Switched capacitor filter, Frequency to Voltage converters, Tuned amplifiers, Power amplifiers and Isolation Amplifiers, Video amplifiers, Fiber optic ICs and Opto-couplers.

TEXT BOOKS
11UEC4005 MEASUREMENTS AND INSTRUMENTATION

OBJECTIVES
At the end of the course the students should be able
- To learn basic measurement concepts.
- To learn concepts of electronic measurements.
- To know the importance of signal generators and signal analyzers in measurements.
- To learn the relevance of digital instruments in measurements.
- To know the need for data acquisition systems.
- To learn the usage in virtual instrumentation for measurements.

UNIT I BASIC MEASUREMENT CONCEPTS

UNIT II OSCILLOSCOPES AND ANALOG RECORDERS

UNIT III SIGNAL GENERATORS AND ANALYZERS

UNIT IV DIGITAL INSTRUMENTS AND DIGITAL RECORDERS
Digital Data Acquisition system- single and multi channel data acquisition system- Comparison of analog and digital techniques – digital voltmeter – digital multimeters – frequency counters –
measurement of frequency and time interval. Instrumentation interface bus: IEEE 488 bus. Digital data recording-PC based recording

UNIT V VIRTUAL INSTRUMENTATION

Advantages over conventional instrumentation. LabVIEW- overview, Data flow programming concepts. LabVIEW Graphical User interface – Block diagram and Front Panel controls. Tutorial programs using LabVIEW.

PRACTICAL 15
TOTAL 60

TEXT BOOKS

REFERENCE BOOKS

BUILT IN LABORATORY COMPONENT
1. Introduction to Lab VIEW Programming (Creating, Editing and debugging a VI )
2. Programming Techniques in LabVIEW.
3. Basic Concepts of Data Acquisition and Terminology.
4. Signal Conditioning
5. Thermocouple Measurement
6. Multiplexed and Parallel Measurement
7. Vibration Measurement
8. Analog Input, Analog Output, and Digital I/O based Data Acquisition

WEB SITE INFORMATION

11UEC4006 TRANSMISSION LINES AND WAVEGUIDES 3 1 0 4

OBJECTIVES
At the end of the course the students should be able
- To become familiar with propagation of signals through lines.
- To understand signal propagation at Radio frequencies.
- To understand radio propagation in guided systems.
- To become familiar with resonators.
UNIT I  TRANSMISSION LINE THEORY 9
Different types of transmission lines – Definition of Characteristic impedance – The transmission line as a cascade of T-Sections - Definition of Propagation Constant. General Solution of the transmission line – The two standard forms for voltage and current of a line terminated by an impedance – physical significance of the equation and the infinite line – The two standard forms for the input impedance of a transmission line terminated by an impedance – meaning of reflection coefficient – wavelength and velocity of propagation. Waveform distortion – distortion less transmission line – The telephone cable – Inductance loading of telephone cables. Input impedance of lossless lines – reflection on a line not terminated by $Z_0$ - Transfer impedance – reflection factor and reflection loss – T and $\Pi$ Section equivalent to lines.

UNIT II  THE LINE AT RADIO FREQUENCIES 9
Standing waves and standing wave ratio on a line – One eighth wave line – The quarter wave line and impedance matching – the half wave line. The circle diagram for the dissipation less line – The Smith Chart – Application of the Smith Chart – Conversion from impedance to reflection coefficient and vice-versa. Impedance to Admittance conversion and vice versa – Input impedance of a lossless line terminated by an impedance – single stub matching and double stub matching.

UNIT III  GUIDED WAVES 9

UNIT IV  RECTANGULAR WAVEGUIDES 9

UNIT V  CIRCULAR WAVE GUIDES AND RESONATORS 9
Bessel functions – Solution of field equations in cylindrical co-ordinates – TM and TE waves in circular guides – wave impedances and characteristic impedance – Dominant mode in circular waveguide – excitation of modes – Microwave cavities, Rectangular cavity resonators, circular cavity resonator, semicircular cavity resonator, Q factor of a cavity resonator for TE101 mode.

TUTORIAL 15
TOTAL 60

TEXT BOOKS

REFERENCE BOOKS

38
11UEC4007 ELECTRONIC CIRCUITS LABORATORY

OBJECTIVES
At the end of the course the students should be able
- To design feedback amplifiers and study its frequency response.
- To design various oscillators.
- To design amplifiers and filters using PSPICE.

IMPLEMENTATION EXPERIMENTS
1. Implementation of Voltage shunt feedback amplifier
2. Implementation of Current series feedback amplifier
3. Implementation of RC phase shift oscillator
4. Implementation of Wein bridge oscillator
5. Implementation of Design Of Hartley Oscillator
6. Implementation of Colpitts Oscillator
7. Implementation of Class C Tuned Amplifier
8. Implementation of Implementation Astable Multivibrator
9. Implementation of Monostable Multivibrator
10. Implementation of Bistable Multivibrator
11. Implementation of Positive and Negative clippers

Simulation Experiments:
1. Simulation of Differential Amplifier
2. Simulation of astable multivibrator
3. Simulation of monostable multivibrator
4. Simulation of Bistable multivibrator
5. simulation or Inverter
6. simulation of High pass filter
7. simulation of low pass filter
8. Simulation of Integrators and Differentiators

TOTAL 45

11UEC4008 LINEAR INTEGRATED CIRCUITS LAB

OBJECTIVES
At the end of the course the students should be able
- To learn the characteristics of operational amplifiers
- To design multivibrators, oscillators and filters using OP-AMP.

LIST OF EXPERIMENTS
Design and testing of:
1. Inverting, Non inverting and differential amplifiers.
2. Integrator and Differentiator.
3. Instrumentation amplifier.
4. Active low pass and band pass filter.
5. Astable, Monostable multivibrators and Schmitt Trigger using op-amp.
6. Phase shift and Wien bridge oscillator using op-amp.
7. Astable and monostable using NE555 Timer.
8. PLL characteristics and Frequency Multiplier using PLL.
9. DC power supply using LM317 and LM723.
10. Study of SMPS control IC SG3524 / SG3525.

TOTAL 45

11UEC4009  DIGITAL ELECTRONICS LAB  0 0 3 1

OBJECTIVES
At the end of the course the students should be able
- To design combinational circuits
- To design sequential circuits
- To simulate circuits using HDL

LIST OF EXPERIMENTS
1. Design and implementation of Adders and Subtractors using logic gates.
2. Design and implementation of code converters using logic gates
   a. BCD to excess-3 code and vice-versa
   b. Binary to gray and vice-versa
3. Design and implementation of 4 bit binary Adder/subtractor and BCD adder using IC 7483.
4. Design and implementation of 2Bit Magnitude Comparator using logic gates 8 Bit Magnitude Comparator using IC 7485.
5. Design and implementation of 16 bit odd/even parity checker generator using IC74180.
6. Design and implementation of Multiplexer and De-multiplexer using logic gates and study of IC74150 and IC 74154.
7. Design and implementation of encoder and decoder using logic gates and study of IC7445 and IC74147.
8. Construction and verification of 4 bit ripple counter and Mod-10 / Mod-12 Ripple counters.
9. Design and implementation of 3-bit synchronous up/down counter.
10. Implementation of SISO, SIPO, PISO and PIPO shift registers using Flip-flops.
11. Simulate all the experiments using VHDL.

TOTAL 45

11UMA0001  NUMERICAL METHODS  3 1 0 4
(Common to all branches)

OBJECTIVES
At the end of this course student should be able
- To find the roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigen value problem of a matrix can be obtained numerically where analytical methods fail to give solution.
- To construct approximate polynomial to represent the given numerical data and to find the intermediate values.
- To know the applications of numerical differentiation and integration when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.

UNIT I  SOLUTIONS OF EQUATIONS  9
UNIT II INTERPOLATION AND APPROXIMATION  
Equal Intervals - Newton’s Forward and Backward difference formulas- Unequal intervals- Newton’s Divided difference formula and Lagrangian polynomials- Interpolating with cubic spline polynomial.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION  
Newton’s Forward and Backward Differences to compute derivatives- Trapezoidal rule – Simpson’s 1/3 rule, Simpson’s 3/8 rule – Two and three point Gaussian quadrature formulas.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS  

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS  
Finite difference solution of second order ordinary differential equations - finite difference solutions of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

TUTORIAL 15  
TOTAL 60

TEXT BOOKS  

REFERENCE BOOKS  

11UEC5002 ANALOG COMMUNICATION  
3 1 0 4

OBJECTIVES  
At the end of this course student should be able  
- To provide various Amplitude modulation and demodulation systems.  
- To provide various Angle modulation and demodulation systems.  
- To provide some depth analysis in noise performance of various receiver.  
- To study some basic information theory with some channel coding theorem.

UNIT I AMPLITUDE MODULATIONS  
Generation and demodulation of AM, DSB-SC, SSB-SC, VSB Signals, Filtering of sidebands, Comparison of Amplitude modulation systems, Frequency translation, Frequency Division Multiplexing, AM transmitters – Superhetrodyne receiver, AM receiver.
UNIT II  ANGLE MODULATION  9

UNIT III  NOISE PERFORMANCE OF DSB, SSB RECEIVERS  9
Noise – Shot noise, thermal noise, White noise, Noise equivalent Bandwidth, Narrowband noise, Representation of Narrowband noise in terms of envelope and phase components, Sinewave plus Narrowband Noise, Receiver model, Noise in DSB-SC receiver, Noise in SSB receiver

UNIT IV  NOISE PERFORMANCE OF AM AND FM RECEIVERS  9
Noise in AM receivers threshold effect, Noise in FM receivers capture effect, FM threshold effect, FM threshold reduction, Pre-emphasis and de-emphasis in FM, Comparison of performance of AM and FM systems.

UNIT V  INFORMATION THEORY  9
Uncertainty, Information and entropy, Source coding theorem, Data compaction, Discrete memory less channels, mutual information, channel capacity, channel coding theorem, Differential entropy, and mutual information for continuous ensembles, information capacity theorem, implication of the information capacity theorem, rate distortion theory, Compression of information.

TUTORIAL 15
TOTAL 60

TEXT BOOK

REFERENCES
4. B.P.Lathi,Modern digital &Analog communication systems, 3rd Edition

WEB REFERENCES
1. www.nptel.com

11UEC5003  DIGITAL SIGNAL PROCESSING  3 1 0 4

OBJECTIVES
At the end of the course the student should be able
• To study DFT and its computation
• To study the design techniques for digital filters
• To study the finite word length effects in signal processing
• To study the non-parametric methods of power spectrum estimations
• To study the fundamentals of digital signal processors.
UNIT I  FFT  

UNIT II  DIGITAL FILTERS DESIGN  

UNIT III  FINITE WORD LENGTH EFFECTS  
Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representation – comparison – over flow error – truncation error – co-efficient quantization error - limit cycle oscillation – signal scaling – analytical model of sample and hold operations.

UNIT IV  POWER SPECTRUM ESTIMATION  

UNIT V  MULTIRATE DIGITAL SIGNAL PROCESSING  

TUTORIAL 15
TOTAL 60

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
2. http://cnx.org/content/m12009/latest/
OBJECTIVES
At the end of the course the student should be able
- To introduce the architecture and programming of 8085 – 8 Bit microprocessor.
- To introduce the architecture and programming of 8086 - 16 Bit microprocessor.
- To introduce the architecture, programming of 8051 – 8 Bit microcontroller.
- To introduce interfacing peripherals with microprocessors and microcontrollers.
- To introduce the architecture, programming and interfacing of PIC microcontroller.

UNIT I 8085 - 8 BIT MICROPROCESSOR 9

UNIT II 8086 - 16 BIT MICROPROCESSOR 9

UNIT III 8051 – 8 BIT MICROCONTROLLER 9

UNIT IV PERIPHERAL INTERFACING 9
Memory Interfacing – I/O devices Interfacing - Serial I/O (8251) – Parallel Peripheral Interfacing (8255) – Keyboard and Display Controller (8279) – ADC/DAC Interfacing – Inter Integrated Circuits interfacing (I²C Standard) - Bus: RS232C - RS485 - GPIB.

UNIT V PIC MICROCONTROLLER 9

TOTAL: 45

TEXT BOOKS
2. Douglas V. Hall, Microprocessors and Interfacing: Programming and Hardware, McGraw-Hill Inc., US (June 1, 1986)
REFERENCES

WEB REFERENCES
1. http://www.nptel.iitm.ac.in

11UIC5010 CONTROL SYSTEMS 3 1 0 4

OBJECTIVES
At the end of the course the student should be able
- To understand the open loop and closed loop (feedback) systems.
- To understand time domain and frequency domain analysis of control systems required for stability analysis.
- To understand the compensation technique that can be used to stabilize control systems.

UNIT I CONTROL SYSTEM MODELLING
System concept, differential equations and transfer functions. Modeling of electric systems, translational and rotational mechanical systems, and Simple electromechanical systems. Block diagram representation of systems – Block diagram reduction methods – Closed loop transfer function, determination of signal flow graph, Mason’s gain formula – Examples.

UNIT II TIME DOMAIN ANALYSIS

UNIT III FREQUENCY DOMAIN ANALYSIS

UNIT IV COMPENSATORS
Realization of basic compensators – cascade compensation in time domain and frequency domain and feedback compensation – design of lag, lead, lag-lead compensator using Bode plot and Root locus. Introduction to P, PI and PID controllers.

UNIT V CONTROL SYSTEM COMPONENTS AND APPLICATIONS
TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. http://www.cds.caltech.edu/~murray/courses/cds101/fa02/L2.1_modeling.shtml
2. en.wikipedia.org/wiki/Lead-lag_compensator

OBJECTIVES
At the end of the course the student should be able
- To have a thorough understanding of the basic structure and operation of a digital computer.
- To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study in detail the different types of control and the concept of pipelining.
- To study the hierarchical memory system including cache memories and virtual memory.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I  BASIC STRUCTURE OF COMPUTERS

UNIT II  ARITHMETIC
Addition and subtraction of signed numbers – Design of fast adders – multiplication of positive numbers- signed operand multiplication and fast multiplication – Integer division – floating point numbers and operations.

UNIT III  BASIC PROCESSING UNIT

UNIT IV  MEMORY SYSTEM
Basic concepts – semiconductor RAMs, ROMs – Speed, size and cost – cache memories - Performance
consideration – Virtual memory - Memory Management requirements – Secondary storage.

UNIT V  I/O ORGANIZATION  9

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.psut.edu.jo/.../chapter%201%20-Basic%20Structure%20of%20Computers.ppt

11UEC5006  DIGITAL SIGNAL PROCESSING LAB  0 0 3 1

OBJECTIVES
At the end of the course the student should be able
• To implement the digital signal processing techniques using the instructions of TMS320C5X.
• To implement the IIR and FIR filter using MATLAB.

LIST OF EXPERIMENTS
USING TMS320C5X
1. Study of various addressing modes of DSP using simple programming examples.
2. Sampling of input signal and display.
3. Implementation of FIR filters.
4. Calculation of FFT.

USING MATLAB
2. Linear and circular convolution of two sequences.
4. Design of FIR filters.
5. Design of IIR filters.
6. Calculation of FFT of a signal.
OBJECTIVES
- To acquaint the students with the following skills in Assembly Language Programming (ALP) based on the microprocessors 8085 and 8086.
- Assembly language programming based on the microcontroller 8051.
- Programming and Interfacing with 8085/8086 and 8051.

LIST OF EXPERIMENTS
- Assembly language programming based on 8085/8086/8051 Kit
  1. Array Programming – Arranging in Largest Number and Smallest Number
  2. Sorting of an array – in Ascending and Descending order
  3. Code conversion – BCD to Binary, Binary to BCD
  4. Square Root - Factorial
  5. Average of n Numbers

- Interfacing Programs based on 8085/8086/8051 Kits.
  1. ADC and DAC.
  2. Stepper Motor Interfacing - Forward and Reverse Rotation.
  3. Hex key pad Interfacing.
  4. Seven Segment Display Interfacing.
  5. 8251 USART Interfacing

TOTAL 45
OBJECTIVES
At the end of the course the student should be able

- To understand the Management concepts and principles
- To know about nature and purpose of planning
- To learn about various motivation theories in management.

UNIT I OVERVIEW OF MANAGEMENT

UNIT II PLANNING

UNIT III ORGANIZING

UNIT IV DIRECTING
Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective communication - Organization Culture - Elements and types of culture – Managing cultural diversity.

UNIT V CONTROLLING
Process of controlling - Types of control - Budgetary and non-budgetary control techniques - Managing Productivity - Cost Control - Purchase Control – Maintenance Control - Quality Control - Planning operations.

TEXT BOOKS:

REFERENCES:
OBJECTIVES
At the end of the course the student should be able

- To study pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals.
- To learn baseband pulse transmission, which deals with the transmission of pulse-amplitude, modulated signals in their baseband form.
- To learn error control coding which encompasses techniques for the encoding and decoding of digital data streams for their reliable transmission over noisy channels.

UNIT I  PULSE MODULATION

UNIT II  BASEBAND PULSE TRANSMISSION
Matched Filter- Error Rate due to noise – Intersymbol Interference- Nyquist’s criterion for Distortionless Base band Binary Transmission- Correlative level coding – Baseband and M-ary PAM transmission – Adaptive Equalization – Eye patterns

UNIT III  PASSBAND DATA TRANSMISSION

UNIT IV  ERROR CONTROL CODING
Discrete memoryless channels – Linear block codes - Cyclic codes - Convolutional codes – Maximum likelihood decoding of convolutional codes-Viterbi Algorithm, Trellis coded Modulation, Turbo codes.

UNIT V  SPREAD SPECTRUM MODULATION
Pseudo- noise sequences – a notion of spread spectrum – Direct sequence spread spectrum with coherent binary phase shift keying – Signal space Dimensionality and processing gain – Probability of error – Frequency hop spread spectrum – Maximum length and Gold codes, OFDMA.

TUTORIAL 15
TOTAL 60

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
OBJECTIVES
At the end of the course the student should be able
- To introduce the students the functions of different layers.
- To introduce IEEE standard employed in computer networking.
- To make students to get familiarized with different protocols and network components.

UNIT I DATA COMMUNICATIONS

UNIT II DATA LINK LAYER

UNIT III NETWORK LAYER

UNIT IV TRANSPORT LAYER

UNIT V APPLICATION LAYER
Domain Name Space (DNS) – SMTP, FDP, HTTP, WWW – Security – Cryptography.

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
2. Larry L.Peterson & Peter S. Davie, “COMPUTER NETWORKS”, Harcourt Asia Pvt. Ltd.,

WEBSITE INFORMATION
1. www.nptel.com
OBJECTIVES

- To study radiation from a current element.
- To study antenna fundamentals and antenna arrays.
- To study wideband antennas.
- To learn special antennas - frequency independent and broad band antennas.
- To study types of radio wave propagation.

UNIT I RADIATION FIELDS OF WIRE ANTENNAS

Concept of vector potential - Modification for time varying retarded case - Fields associated with Hertzian dipole - Power radiated and radiation resistance of current element - Radiation resistance of elementary dipole with linear current distribution - Radiation from half-wave dipole and quarter wave monopole - Assumed current distribution for wire antennas - Use of capacity hat and loading coil for short antennas.

UNIT II ANTENNA FUNDAMENTALS AND ANTENNA ARRAYS

Radiation intensity - Directive gain - Directivity - Power gain - Beam Width - Band Width - Gain and radiation resistance of current element - Half-wave dipole and folded dipole - Reciprocity principle - Effective length and Effective area - Relationship between gain - effective length and radiation resistance - Radiation from small loop and its radiation resistance - Radiation from a loop with circumference equal to a wavelength - resultant circular polarization - Helical antenna - Normal mode and axial mode operation - Expression for electric field from two and three element arrays - Uniform linear array - Method of pattern multiplication - Binomial array - Use of method of images for antennas above the ground.

UNIT III TRAVELLING WAVE (WIDEBAND) ANTENNAS

Radiation from a traveling wave on a wire - Analysis of Rhombic antenna - Design of Rhombic antennas - Coupled Antennas - Self and mutual impedance of antennas - Two and three element Yagi antennas - Log periodic antenna - Reason for feeding from end with shorter dipoles and need for transposing the lines - Effects of decreasing ☐.

UNIT IV APERTURE AND LENS ANTENNAS

Radiation from an elemental area of a plane wave (Huygen’s Source) - Radiation from the open end of a coaxial line - Radiation from a rectangular aperture treated as an array of Huygen’s sources - Equivalence of fields of a slot and complementary dipole - Relationship between dipole and slot impedances - Method of feeding slot antennas - Thin slot in an infinite cylinder - Field on the axis of an E-Plane sectoral horn - Radiation from circular aperture - Beam Width and Effective area - Reflector type of antennas (dish antennas) - Dielectric lens and metal plane lens antennas - Luneberg lens - Spherical waves and Biconical antenna.

UNIT V WAVE PROPAGATION

Sky wave propagation - Structure of the ionosphere - Effective dielectric constant of ionized region - Mechanism of refraction - Refractive index - Critical frequency - Skip distance - Effect of earth’s magnetic field - Energy loss in the ionosphere due to collisions - Maximum usable frequency - Fading and Diversity reception - Space wave propagation - Reflection from ground for vertically and horizontally polarized waves - Reflection characteristics of earth - Resultant of direct and reflected ray at the receiver - Duct propagation - Ground wave propagation - Attenuation characteristics for ground wave propagation - Calculation of field strength at a distance.
TEXTBOOK

REFERENCES
4. (April 4, 2005).

WEB REFERENCES
1. http://www.nptel.iitm.ac.in

11UEC6005 INFORMATION THEORY AND CODING 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To understand the concepts of entropy, mutual information and channel capacity.
- To know about the different types of communication channels.
- To learn about different types of source coding techniques.

UNIT I PROBABILITY THEORY AND RANDOM PROCESS 9
Review of fundamental concepts of probability-Random variables-functions of random variable-
covariance and correlation coefficient-concept of stationarity-Ergodicity-first order markov process-
correlation-Auto and cross correlation functions-power spectral density

UNIT II OPTIMUM FILTERING 9
I/O relations of linear systems subjected to random inputs-transmission of Gaussian process through
linear system-Linear mean square filtering-Physically realizable optical system

UNIT III DISCRETE CHANNELS 9
Uncertainty principle-measure of information-self information-Entropy- Definitions and property-
Channel capacity-Calculation of channel capacity for different channels

UNIT IV CONTINUOUS CHANNELS 9
Continuous channels-channel capacity-Entropy maximization problems(AWGN channels)-Hartley
Shannon's law- Trade-off between bandwidth and SNR-comparison of different modulation methods

UNIT V ELEMENTS OF ENCODING 9
Typical noiseless coding schemes—Shannon’s binary coding—Shannon Fano coding – Gilbert Moore coding – Huffman’s coding

**TOTAL 45**

**TEXT BOOKS:**

**REFERENCE BOOKS:**

**WEBSITE INFORMATION**
1. www.nptel.com
2. www.ocw.mit.edu

**11UEC6007** COMMUNICATION LAB 0 0 3 1

**OBJECTIVES**
At the end of the course the student should be able
- To know about the antenna radiation pattern.
- To obtain the output waveforms of various types of analog and digital modulation techniques.

**LIST OF EXPERIMENTS**
1. Amplitude modulation and demodulation
2. Frequency modulation and demodulation
3. Sampling & time division multiplexing
4. Pulse modulation- PAM / PWM / PPM
5. Pulse code modulation
6. Line coding & decoding
7. Delta modulation / Differential pulse code modulation
8. Digital modulation – ASK, PSK, QPSK, FSK
9. Error control code generation using MATLAB
10. Linear block code generation Using MATLAB.
11. Convolution code generation using MATLAB
12. Frequency hopping and direct sequence spread spectrum using MATLAB

Total 45

**11UEC6008** NETWORKS LAB 0 0 3 1
OBJECTIVES
At the end of the course the student should be able

- To study the basic programming concepts of Netsim
- To learn about the performance of protocols and routing algorithms.

LIST OF EXPERIMENTS
1. PC to PC Communication
2. Parallel Communication using 8 bit parallel cable
3. Serial communication using RS 232C
4. Ethernet LAN protocol
   - To create scenario and study the performance of CSMA/CD protocol Ethernet simulation
5. Token bus and token ring protocols
   - To create scenario and study the performance of token bus and token ring protocols through simulation
6. Wireless LAN protocols
   - To create scenario and study the performance of network with CSMA / CA protocol and compare with CSMA/CD protocols.
7. Implementation and study of stop and wait protocol
8. Implementation and study of Go back-N and selective repeat protocols
9. Implementation of distance vector routing algorithm
10. Implementation of Link state routing algorithm
11. Implementation of Data encryption and decryption
12. Transfer of files from PC to PC using Windows / UNIX socket processing

Total 45

11UEC6009 ELECTRONIC SYSTEM DESIGN LAB 0 0 3 1

OBJECTIVES
At the end of the course the student should be able

- To study the programming concepts of microprocessor and microcontroller.
- To design the different types of modulators and demodulators.
- To design the simple voltage regulators.
- To study system identification using MATLAB.

LIST OF EXPERIMENTS
1. Design of high current DC power supply.
2. Design of instrumentation amplifier
3. Design of digital display unit
4. Design of AC voltage regulator using SCR/TRIAC
5. Design of process control timer
6. Design of AM/FM transceiver
7. Microprocessor based system design
8. Microcontroller based system design
9. DSP based system identification
10. PCB layout design using CAD

Total 45

11UGE7001 ETHICAL VALUES AND HUMAN RELATIONS 3 0 0 3

OBJECTIVES:
- To explain the nature, purpose, and importance of human relations and values in an organizational setting.
- To infuse ethics in the workplace that has given new importance to human relations and values.
- To identify the major forces influencing human behavior at work.

UNIT I HUMAN VALUES 9
Meaning and significance of values-formation of values –Human values –Professional Values relevance of values in management –personal values and organizational commitment-Need for values in global change.

UNIT II PERSONAL VALUES INFLUENCE ETHICAL CHOICES 9
Learn to distinguish right and wrong -Make certain your values harmonize with those of your employer -Positive steps toward preventing corporate crime –Provide ethics training –Develop support for whistle blowing.

UNIT II CONCEPTS AND THEORIES OF ETHICS 9

UNIT III INTRODUCTION TO HUMAN RELATIONS 9
The Nature, Purpose, and Importance of Human Relations -Human relations defined -Human Relations in the age of information -The importance of human relations --The challenge of human relations -The influence of the behavioral sciences -Human relations and the "total person".

UNIT IV THE FORCES INFLUENCING BEHAVIOR AT WORK 9
Organizational culture --Supervisory-management influence -Work group influence -Job influence -Personal characteristics of the worker Family influence-cross cultural problems in human relations-Human problems of knowledge organizations.

Unit V MAJOR THEMES IN HUMAN RELATIONS 9

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
2. Glen Shepherd, How to manage problem employees: a step-by-step guide for turning difficult employees into high performers, John Wiley & Sons, 2005

11UECE7002 DIGITAL IMAGE PROCESSING 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To study the image fundamentals and mathematical transforms necessary for image processing.
- To study the image enhancement and image restoration techniques.
- To study the image compression procedures.
- To study the image segmentation and representation techniques.

UNIT I DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS

UNIT II IMAGE ENHANCEMENT TECHNIQUES

UNIT III IMAGE RESTORATION

UNIT IV IMAGE COMPRESSION
Lossless compression: Variable length coding – LZW coding – Bit plane coding- predictive coding-DPCM.

UNIT V IMAGE SEGMENTATION AND REPRESENTATION
TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.markosweb.com/www/imagiris.com
2. www.imageprocessingplace.com
3. www.informaworld.com
4. www.engineeringcrossing.com

11UEC7003 VLSI DESIGN 3 1 0 4

OBJECTIVES
At the end of the course the student should be able
- To learn the basic CMOS circuits.
- To learn the CMOS process technology.
- To learn techniques of chip design using programmable devices.
- To learn the concepts of designing VLSI subsystems.
- To learn the concepts of modeling a digital system using Hardware Description Language.

UNIT I CMOS TECHNOLOGY 9
An overview of Silicon semiconductor technology, Basic CMOS technology: nwell, P well, Twin tub and SOI Process. Interconnects, circuit elements: Resistors, capacitors, Electrically alterable ROMs, bipolar transistors, Latch up and prevention.
Layout design rules, physical design: basic concepts, CAD tool sets, physical design of logic gates: Inverter, NAND, NOR, Design Hierarchies.

UNIT II MOS TRANSISTOR THEORY 9
NMOS, PMOS Enhancement transistor, Threshold voltage, Body effect, MOS DC equations, channel length modulation, Mobility variation, MOS models, small signal AC characteristics, complementary CMOS inverter DC characteristics, Noise Margin, Rise time, fall time, power dissipation, transmission gate, tristate inverter.

UNIT III SPECIFICATION USING VERILOG HDL 9
Basic Concepts: VLSI Design flow, identifiers, gate primitives, value set, ports, gate delays, structural gate level and switch level modeling, Design hierarchies, Behavioral and RTL modeling: Operators, timing controls, Procedural assignments conditional statements, Data flow modeling and RTL.
Structural gate level description of decoder, equality detector, comparator, priority encoder, D-latch, D-ff, half adder, Full adder, Ripple Carry adder.

UNIT IV  
CMOS CHIP DESIGN  
Logic design with CMOS: MOSFETS as switches, Basic logic gates in CMOS, Complex logic gates, Transmission gates: Muxes and latches, CMOS chip design options: Full custom ASICs, Std. Cell based ASICs, Gate Array based ASICs Channelled, Channelless and structured GA, Programmable logic structures; 22V10, Programming of PALs, Programmable Interconnect, Reprogrammable GA: Xilinx programmable GA, ASIC design flow.

UNIT V  
CMOS TESTING  
Need for testing, manufacturing test principles, Design strategies for test, Chip level and system level test techniques.

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.vlsi-design.net/category/websites
2. www.wiley.com
3. uapro143.blogspot.com

11UEC7004  
MICROWAVE ENGINEERING  

OBJECTIVES
At the end of the course the student should be able
- To understand passive microwave components and their S- Parameters.
- To know about Microwave semiconductor devices & applications.
- To know about Microwave sources and amplifiers.

UNIT I  
INTRODUCTION  
Microwave Frequencies, Microwave Devices, Microwave Systems, Microwave Units of Measure, Microwave Hybrid Circuits, Waveguide Tees, Magic Tees (Hybrid Trees), Hybrid Rings (Rat-Race Circuits), Waveguide Corners, Bends and Twists, Directional Couplers, Two-Hole Directional Couplers, Z & ABCD Parameters- Introduction to S parameters, S Matrix of a Directional Coupler, Hybrid Couplers, Circulators and Isolators, Microwave Circulators, Microwave Isolators.

UNIT II  
TRANSFERRED ELECTRON DEVICES (TEDs) and AVALANCHE TRANSIT-TIME DEVICES  


**AVAILANCHE TRANSIT-TIME DEVICES**, Introduction, Read Diode, Physical Description, Avalanche Multiplication, Carrier Current \( I_s(t) \) and External Current \( I_e(t) \), Output Power and Quality Factor, IMPATT Diodes, Physical Structures, Negative Resistance, Power Output and Efficiency, TRAPATT Diodes, Physical Structures, Principles of Operation, Power Output and Efficiency, BARITT Diodes.

**UNIT III**  
**MICROWAVE LINEAR-BEAM TUBES (O TYPE) and** **MICROWAVE CROSSED-FIELD TUBES (M TYPE)**  

**UNIT IV**  
**STRIP LINES and MONOLITHIC MICROWAVE INTEGRATED CIRCUITS**  

**UNIT V**  
**MICROWAVE MEASUREMENTS**  
Slotted line VSWR measurement, VSWR through return loss measurements, power measurement, impedance measurement insertion loss and attenuation measurements- measurement of scattering parameters –network analyzer and its application. Frequency measurement-directional coupler characteristics measurement.

**TOTAL 45**

**TEXT BOOKS**

**REFERENCE BOOKS**
2. P.A.Rizzi – Microwave Engg. (Passive ckt)s – PHI.

**11UEC7007 VLSI LABORATORY 0 0 3 1**

**I - Design and simulation of Combinational Logic Circuit using VHDL**
1. Adder
2. Multiplexer and Demultiplexer
3. Encoder and Decoder
4. Multiplier

II - Design and simulation of Sequential logic circuit using VHDL
5. Flip Flops
6. Counter
7. Shift registers
8. Frequency Divider

III - CMOS Circuit design using SPICE (DC and Transient Analysis)
9. CMOS Inverter
10. CMOS NAND and NOR Gates
11. CMOS D Latch

IV - FPGA Implementation
12. 4 bit Adder
13. Real Time Clock

Equipment / Tools Required
1. HDL Simulation Tool
2. FPGA Synthesis Tool
3. Any SPICE simulator
4. At least 500K Gate density FPGA trainer boards with adequate peripherals

WEBSITE INFORMATION
1. ugro143.blogspot.com
2. www.pageinsider.com
3. chips.ece.iisc.ernet.in

TOTAL 45

11UEC7008  MICROWAVE & OPTICAL LAB  0031

OBJECTIVES
At the end of the course the student should be able
- To learn the characteristics of optical sources and optical fiber.
- To determine the parameters of microwave devices and antennas.

EXPERIMENTS PERTAINING TO FIBER OPTICS, OPTICAL COMMUNICATION AND FIBER OPTIC SENSORS:
1. Numerical aperture determination for fibers and Attenuation Measurement in Fibers.
2. Eye pattern measurement for various data rate using CRO
3. Analog and Digital link using fiber optic communication
4. Bending loss measurement using fiber optic communication
5. LED and photo diode Characteristics

MICROWAVE EXPERIMENTS:
1. VSWR Measurements (High and Low VSWR) – Determination of terminated impedance.
2. Attenuation measurement – determination of terminated impedance.
3. Determination of guide wavelength, frequency measurement.
4. Radiation Pattern of Antennas.
5. Microwave Power Measurement.
7. Characteristics of directional coupler.

WEBSITE INFORMATION
1. www.globalshiksha.com
2. www.ece.ucdavis.edu
3. www.agilent.com

11UEC7010 COMPREHENSIVE VIVA-VOCE 0 0 0 1
Comprehensive viva-voce is to refresh all the departmental courses studied in the earlier semesters. The viva-voce will be conducted as a Semester End Examination with internal and external examiners for the total of marks.

11UEC8001 WIRELESS COMMUNICATION 3 0 0 3
OBJECTIVES
At the end of the course the student should be able
- To deal with the fundamental cellular radio concepts such as frequency reuse and handoff, trunking efficiency.
- To learn about radio propagation models and study about small scale fading and large scale fading.
- To gain idea about analog and digital modulation techniques, equalization techniques, diversity concepts used in wireless communication.
- To understand the concepts of speech coding and multiple access techniques.
- To know about the second generation and third generation wireless networks and worldwide wireless standards.

UNIT I CELLULAR CONCEPT AND SYSTEM DESIGN FUNDAMENTALS 9
Introduction to wireless communication: Evolution of mobile communications, mobile radio systems-Examples, trends in cellular radio and personal communications.
Cellular Concept: Frequency reuse, channel assignment, hand off, Interference and system capacity, tracking and grade of service, Improving Coverage and capacity in Cellular systems.

UNIT II MOBILE RADIO PROPAGATION 9
Free space propagation model, reflection, diffraction, scattering, link budget design, Outdoor Propagation models, Indoor propagation models, Small scale Multipath propagation, Impulse model, Small scale Multipath measurements, parameters of Mobile multipath channels, types of small scale fading, statistical models for multipath fading channels.

UNIT III MODULATION TECHNIQUES AND EQUALIZATION 9

UNIT IV CODING AND MULTIPLE ACCESS TECHNIQUES
Coding: Vocoders, Linear Predictive Coders, Selection of Speech Coders for Mobile Communication, GSM Codec, RS codes for CDPD.
Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, Capacity of Cellular CDMA and SDMA.

UNIT V WIRELESS SYSTEMS AND STANDARDS
Second Generation and Third Generation Wireless Networks and Standards, WLL, Blue tooth, AMPS, GSM, IS-95 and DECT.

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.networktutorials.info
2. www.wiley.com
3. www.informaworld.com

11UEC8002 OPTICAL COMMUNICATION 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
• To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
• To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. Design optimization of SM fibers, RI profile and cut-off wave length.
• To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes and different fiber amplifiers.
• To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration.
• To learn fiber slicing and connectors, noise effects on system performance, operational principles WDM and solutions.

UNIT I INTRODUCTION TO OPTICAL FIBERS
UNIT II  SIGNAL DEGRADATION OPTICAL FIBERS

UNIT III  FIBER OPTICAL SOURCES AND COUPLING

UNIT IV  FIBER OPTICAL RECEIVERS

UNIT V  DIGITAL TRANSMISSION SYSTEM

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.opticaldictionary.com
2. www.informaworld.com
3. www.opticsinfobase.org
11UGEE001  INTELLECTUAL PROPERTY RIGHTS  3 0 0 3

OBJECTIVE
At the end of the course the student should be able
- To learn about the patents and intellectual property rights.

UNIT I  INTRODUCTION  9

UNIT II  COMPONENTS  9

UNIT III  POLICES AND REGULATIONS  9

UNIT IV  LEGISLATIONS  9

UNIT V  CASE STUDIES  9
Case Studies on – Patents (Basmati rice, turmeric, Neem, etc.) – Copyright And related rights – Trade Marks – Department related Topic* – geographic indications – Protection against unfair competition.

- Not for examination purpose (Not to be included in Question paper)

TOTAL 45

TEXT BOOKS

WEBSITE INFORMATION
1. ubiquity.acm.org
2. www.astratech.com
3. www.out-law.com

11UECE001  ADVANCED MICROPROCESSORS  3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To introduce the concepts in internal programming model of Intel family of microprocessors.
- To introduce the programming techniques using MASM, DOS and BIOS function calls.
- To introduce the basic architecture of Pentium family of processors.
- To introduce the architecture programming and interfacing of 16 bit microcontrollers.
- To introduce the concepts and architecture of RISC processor and ARM.

**UNIT I  ADVANCED MICROPROCESSOR ARCHITECTURE**

Internal Microprocessor Architecture—Real mode memory addressing – Protected Mode Memory addressing – Memory paging – Data addressing modes – Program memory addressing modes – Stack memory addressing modes – Data movement instructions – Program control instructions- Arithmetic and Logic Instructions.

**UNIT II  MODULAR PROGRAMMING AND ITS CONCEPTS**


**UNIT III  PENTIUM PROCESSORS**


**UNIT IV  16-BIT MICRO CONTROLLER**


**UNIT V  RISC PROCESSORS AND ARM**


**TOTAL 45**

**TEXT BOOKS**


**REFERENCE BOOKS**


**WEBSITE INFORMATION**

1. www.freebyte.com/electronics
2. www.topsite.com/best/microprocessor
OBJECTIVES
At the end of the course the student should be able
- To study the parametric methods for power spectrum estimation.
- To study adaptive filtering techniques using LMS algorithm and to study the applications of adaptive filtering.
- To study multirate signal processing fundamentals.
- To study the analysis of speech signals.
- To introduce the student to wavelet transforms.

UNIT I PARAMETRIC METHODS FOR POWER SPECTRUM ESTIMATION 9

UNIT II ADAPTIVE SIGNAL PROCESSING 9

UNIT III MULTIRATE SIGNAL PROCESSING 9
Decimation by a factor D – Interpolation by a factor I – Filter Design and implementation for sampling rate conversion: Direct form FIR filter structures – Polyphase filter structure.

UNIT IV SPEECH SIGNAL PROCESSING 9

UNIT V WAVELET TRANSFORMS 9

TOTAL 45

TEXTBOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.springer.com/engineering/signals
11UECE003  MEDICAL ELECTRONICS  3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To study the methods of recording various biopotentials.
- To study how to measure biochemical and various physiological information.
- To understand the working of units that helps to restore normal functioning.
- To understand the use of radiation for diagnostic and therapy.
- To understand the need and technique of electrical safety in Hospitals.

UNIT I  ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING  9
The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT II  BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT  9
PH, PO2, PCO2, PHCO3, Electrophoresis, colorimeter, photometer, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, and Blood cell counters.

UNIT III  ASSIST DEVICES AND BIO-TELEMETRY  9
Cardiac pacemakers, DC Defibrillator, Telemetry principles, frequency selection, Bio-telemetry, radiopill and tele-stimulation.

UNIT IV  RADIOLOGICAL EQUIPMENTS  9
Ionizing radiation, Diagnostic x-ray equipments, use of Radio Isotope in diagnosis, Radiation Therapy.

UNIT V  RECENT TRENDS IN MEDICAL INSTRUMENTATION  9
Thermograph, endoscopy unit, Laser in medicine, Diathermy units, Electrical safety in medical equipment.

TOTAL 45

TEXTBOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.hotcoursesabroad.com
2. www.medicalelectronicsdesign.com

11UGEE004  OPERATION RESEARCH  3 0 0 3

OBJECTIVE
At the end of this course student should be able
• To understand the concepts of Operations Research (OR) concerning with the efficient allocation of scarce resources.
• To know the art that lies in the ability to reflect the concepts (efficient and scarce) in a well-defined mathematical model of a given situation.
• To understand the science consists in the derivation of computational methods for solving models.

UNIT I  INTRODUCTION
9
Basic concepts and scope of OR – Phases of OR.

UNIT II  TRANSPORTATION MODEL
9
Mathematical formulation of the problem – Methods for finding an initial solution – North West corner method, Least cost method, Vogel’s approximation method (VAM) – Test for optimality – Variants of the Transportation Problem.

UNIT III  INTEGER LINEAR PROGRAMMING
9
Types – Concept of a Cutting Plane – Gomary’s cutting plane method – Branch and bound method.

UNIT IV  PROJECT MANAGEMENT: PERT AND CPM
9
Concept of Network – PERT, CPM - Construction of Network – Critical path analysis – Probability in PERT analysis. project evaluation and review technique- resource analysis in network scheduling.

UNIT V  INVENTORY CONTROL
9

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
OBJECTIVES
At the end of the course the student should be able
- To study about power electronic circuits for voltage and current control and protection.
- To learn the switching characteristics of transistors and SCRs. Series and parallel functions of SCRs, Programmable triggering methods of SCR.
- To learn controlled rectification AC supplies.
- To study of converters and inverters.
- To learn about motor control, charges, SMPS and UPS.

UNIT I  POWER ELECTRONICS DEVICES  9

UNIT II  TRIGGERING TECHNIQUES  9
Turn on circuits for SCR – triggering with single pulse and train of pulses – synchronizing with supply – triggering with microprocessor – forced commutation – different techniques – series and parallel operations of SCRs.

UNIT III  CONTROLLED RECTIFIERS  9

UNIT IV  INVERTERS  9
Voltage and current source inverters, resonant, Series inverter, PWM inverter. AC and DC choppers – DC to DC converters – Buck, boost and buck – boost.

UNIT V  INDUSTRIAL APPLICATIONS  9

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. powerelectronics.com
OBJECTIVES
At the end of the course the student should be able
- To provide mathematical basis for acoustics waves
- To introduce the concept of radiation, reception, absorption and attenuation of acoustic waves.
- To present the characteristic behavior of sound in pipes, resonators and filters.
- To introduce the properties of hearing and speech.
- To describe the architecture and environmental inclusive of reverberation and noise.
- To give a detailed study on loud speakers and microphones.

UNIT I INTRODUCTION
Reflection and Transmission: Transmission from one fluid to another normal and oblique incidence – method of images.

UNIT II RADIATION AND RECEPTION OF ACOUSTIC WAVES
Radiation from a pulsating sphere – Acoustic reciprocity – continuous line source - radiation impedance - Fundamental properties of transducers.
Absorption and attenuation of sound
Absorption from viscosity – complex sound speed and absorption – classical absorption coefficient

UNIT III PIPES, RESONATORS AND FILTERS
Resonance in pipes - standing wave pattern absorption of sound in pipes – long wavelength limit – Helmholtz resonator - acoustic impedance - reflection and transmission of waves in pipe - acoustic filters – low pass, high pass and band pass.
Noise, Signal detection, Hearing and speech

UNIT IV ARCHITECTURAL ACOUSTICS
Sound in endosure – A simple model for the growth of sound in a room – reverberation time - Sabine, sound absorption materials – measurement of the acoustic output of sound sources in live rooms – acoustics factor in architectural design.
Environmental Acoustics: Weighted sound levels speech interference – highway noise – noise induced hearing loss – noise and architectural design specification and measurement of some isolation design of portions.

UNIT V TRANSDUCTION

TOTAL 45
TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. en.wikibooks.org
2. www.acoustics-engineering.com

11UECE007 EMBEDDED SYSTEMS 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To introduce students to the embedded systems, its hardware and software.
- To introduce devices and buses used for embedded networking.
- To explain programming concepts and embedded programming in C and C++.
- To explain real time operating systems, inter-task communication and an exemplary case of MUCOS – IIRTOS.

UNIT I INTRODUCTION TO EMBEDDED SYSTEMS 9
Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on Chip (SoC) and the use of VLSI designed circuits.

UNIT II DEVICES AND BUSES FOR DEVICES NETWORK 9

UNIT III PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C, C++ 9

UNIT IV REAL TIME OPERATING SYSTEMS – PART - 1 9

UNIT V REAL TIME OPERATING SYSTEMS – PART - 2

Study of Micro C/OS-II or Vx Works or Any other popular RTOS – RTOS System Level Functions – Task Service Functions – Time Delay Functions – Memory Allocation Related Functions – Semaphore Related Functions – Mailbox Related Functions – Queue Related Functions – Case Studies of Programming with RTOS – Understanding Case Definition – Multiple Tasks and their functions – Creating a list of tasks – Functions and IPCs – Exemplary Coding Steps.

TOTAL 45

TEXTBOOKS


REFERENCE BOOKS


WEBSITE INFORMATION

1. www.embeddedinfo.com

11UECE008 SPEECH PROCESSING

OBJECTIVES

At the end of the course the student should be able
- To introduce the models for speech production.
- To develop time and frequency domain techniques for estimating speech parameters.
- To introduce a predictive technique for speech compression.
- To understand speech recognition, synthesis and speaker identification.

UNIT I NATURE OF SPEECH SIGNAL

Speech production mechanism, Classification of speech, sounds, nature of speech signal, models of speech production.
Speech signal processing: purpose of speech processing, digital models for speech signal, Digital processing of speech signals, Significance, short time analysis.
UNIT II  TIME DOMAIN METHODS FOR SPEECH PROCESSING  9
Time domain parameters of speech, methods for extracting the parameters, Zero crossings, Auto correlation function, pitch estimation.

UNIT III  FREQUENCY DOMAIN METHODS FOR SPEECH PROCESSING  9
Short time Fourier analysis, filter bank analysis, spectrographic analysis, Format extraction, pitch extraction, Analysis - synthesis systems.

UNIT IV  LINEAR PREDICTIVE CODING OF SPEECH  9
Formulation of linear prediction problem in time domain, solution of normal equations, Interpretation of linear prediction in auto correlation and spectral domains.

UNIT V  HOMOMORPHIC SPEECH ANALYSIS  9
Central analysis of speech, format and pitch estimation, Applications of speech processing - Speech recognition, Speech synthesis and speaker verification.

TOTAL 45

TEXTBOOKS

REFERENCE BOOK

WEBSITE INFORMATION
1. nist.gov/itl/iad/mig/
2. www.digitalspeech.com
OBJECTIVES
At the end of the course the student should be able
- To introduce issues related to CPU and memory.
- To understand the components on the motherboard.
- To understand different storage media.
- To introduce the features of different I/O peripheral devices and their interfaces.

UNIT I CPU AND MEMORY

UNIT II MOTHERBOARDS

UNIT III STORAGE DEVICES

UNIT IV I/O PERIPHERALS

UNIT V BUS ARCHITECTURE

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.bestsearchers.com
2. www.ultimatehardware.net/links.htm
3. www.topiccraze.com

11UECE010 ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY 3003

OBJECTIVES
At the end of the course the student should be able
• To understand EMI Sources, EMI problems and their solution methods in PCB level/Subsystem and system level design.
• To measure the emission, immunity level from different systems to couple with the prescribed EMC standards.

UNIT I BASIC CONCEPTS 9
Definition of EMI and EMC with examples, Classification of EMI/EMC - CE, RE, CS, RS, Units of Parameters, Sources of EMI, EMI coupling modes - CM and DM, ESD Phenomena and effects, Transient phenomena and suppression.

UNIT II EMI MEASUREMENTS 9
Basic principles of RE, CE, RS and CS measurements, EMI measuring instruments- Antennas, LISN, Feed through capacitor, current probe, EMC analyzer and detection technique open area site, shielded anechoic chamber, TEM cell.

UNIT III EMC STANDARD AND REGULATIONS 9

UNIT IV EMI CONTROL METHODS AND FIXES 9
Shielding, Grounding, Bonding, Filtering, EMI gasket, Isolation transformer, opto isolator.

UNIT V EMC DESIGN AND INTERCONNECTION TECHNIQUES 9
Cable routing and connection, Component selection and mounting, PCB design- Trace routing, Impedance control, decoupling, Zoning and grounding.

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.powermag.com
2. www.wiley.com

11UECE011 HIGH SPEED NETWORKS 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To get an introduction about ATM and Frame relay.
- To provide an up-to-date survey of developments in High Speed Networks.
- To know techniques involved to support real-time traffic and congestion control.
- To provide different levels of quality of service (Q.S) to different applications.

UNIT I HIGH SPEED NETWORKS 9
High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel.
Wireless LANs: Applications, requirements – Architecture of 802.11.

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9
Queuing Analysis - Queuing Models – Single Server Queues.

UNIT III TCP AND ATM CONGESTION CONTROL 9

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9

UNIT V PROTOCOLS FOR QOS SUPPORT 9
RTP – Protocol Architecture, Data Transfer Protocol, RTCP.
TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.pearsonhighered.com
2. www.fileguru.com
3. williamstallings.com

11UECE012  TELEVISION AND VIDEO ENGINEERING  3 0 0 3

OBJECTIVES
- To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver Picture Tubes and Television Camera Tubes
- To study the principles of Monochrome Television Transmitter and Receiver Systems.
- To study the various Color Television systems with a greater emphasis on PAL system.
- To study the advanced topics in Television systems and Video Engineering

UNIT I  FUNDAMENTALS OF TELEVISION  8

UNIT II  MONOCHROME TELEVISION TRANSMITTER AND RECEIVER  9

UNIT III  ESSENTIALS OF COLOUR TELEVISION  8

UNIT IV COLOUR TELEVISION SYSTEMS:

UNIT V ADVANCED TELEVISION SYSTEMS

TOTAL: 45

TEXT BOOKS
2. R.R.Gulati “Monochrome and colour television “, New age International Publisher, 2003 (Unit I,III and IV)

REFERENCES

11UECE013 SOFT COMPUTING 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
• To know about Neural networks.
• To know about the genetic algorithm and fuzzy logic.
• To model a neuro- fuzzy model of a system.

UNIT I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS 9
Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II GENETIC ALGORITHMS 9
Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT III  NEURAL NETWORKS  9

UNIT IV  FUZZY LOGIC  9

UNIT V  NEURO-FUZZY MODELING  9

TEXT BOOKS:

REFERENCES:

11UECE014  ADVANCED ELECTRONIC SYSTEM DESIGN  3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To study RF component such as resonator, filter, transmission lines.
- To learn design of RF amplifiers using transistors.
- To study modern Power Supplies using SCR and SMPS technology
- To learn about fabrication of PCBs using CAD.

UNIT I  INTRODUCTION TO RF DESIGN  9
RF behaviour of passive components, Chip components and circuit board considerations, Review of transmission lines, Impedance and admittance transformation, Parallel and series connection of networks, ABCD and scattering parameters, Analysis of amplifier using scattering parameter. RF filter –

UNIT II RF TRANSISTOR AMPLIFIER DESIGN 9

UNIT III DESIGN OF POWER SUPPLIES 9
DC power supply design using transistors and SCRs, Design of crowbar and foldback protection circuits, Switched mode power supplies, Forward, flyback, buck and boost converters, Design of transformers and control circuits for SMPS.

UNIT IV DESIGN OF DATA ACQUISITION SYSTEMS 9
Amplification of Low level signals, Grounding, Shielding and Guarding techniques, Dual slope, quad slope and high speed A/D converters, Microprocessors Compatible A/D converters, Multiplying A/D converters and Logarithmic A/D converters, Sample and Hold, Design of two and four wire transmitters.

UNIT V DESIGN OF PRINTED CIRCUIT BOARDS 9
Introduction to technology of printed circuit boards (PCB), General lay out and rules and parameters, PCB design rules for Digital, High Frequency, Analog, Power Electronics and Microwave circuits, Computer Aided design of PCBs.

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. electronicdesign.com
2. ezinearticles.com
3. www.mentor.com

11UECE015 RADAR AND NAVIGATIONAL AIDS 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To derive and discuss the Range equation and the nature of detection.
To apply doppler principle to radars and hence detect moving targets, cluster, also to understand tracking radars.

To refresh principles of antennas and propagation as related to radars, also study of transmitters and receivers.

To understand principles of navigation, in addition to approach and landing aids as related to navigation

To understand navigation of ships from shore to shore.

UNIT I  INTRODUCTION TO RADAR


The Radar Equation


UNIT II  MTI AND PULSE DOPPLER RADAR

Introduction to Doppler and MTI Radar - Delay –Line Cancellers - Staggered Pulse Repetition Frequencies – Doppler Filter Banks - Digital MTI Processing - Moving Target Detector - Limitations to MTI Performance - MTI from a Moving Platform (AMIT) - Pulse Doppler Radar – Other Doppler Radar Topics - Tracking with Radar – Monopulse Tracking – Conical Scan and Sequential Lobing - Limitations to Tracking Accuracy - Low-Angle Tracking - Tracking in Range - Other Tracking Radar Topics - Comparison of Trackers - Automatic Tracking with Surveillance Radars (ADT).

UNIT III  DETECTION OF SIGNALS IN NOISE


Radar Receivers - The Radar Receiver - Receiver noise Figure - Superheterodyne Receiver - Duplexers and Receiver Protectors- Radar Displays.

UNIT IV  METHODS OF NAVIGATION


Radio Ranges - The LF/MF Four course Radio Range - VHF Omni Directional Range (VOR) - VOR Receiving Equipment - Range and Accuracy of VOR - Recent Developments.

UNIT V  NAVIGATION SYSTEMS

DME and TACAN - Distance Measuring Equipment - Operation of DME - TACAN - TACAN Equipment.

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.tchb.gov.tw
2. www.navaidsltd.net/

11UECE016 RF MEMS 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To know about the MEMS technology.
- To design micro machined RF filter and phase shifters
- To know about RF antennas.

UNIT I  MEMS AND RADIO MEMS
Introduction – RF mems configurations – micro fabrication for MEMS – electromechanical transducer – Microsensor for mems –metal and metal alloys for mems – polymer for MEMS- others materials for MEMEs

UNIT II  RF MEMS SWITCHES AND RELAYS

UNIT III  MEMS INDUCTORS AND CAPACITORS

UNIT IV  MICRO MACHINED RF FILTER AND PHASE SHIFTERS
Modeling of reasonators- Mechanical coupling components – general considerations for mechanical filter – surface acoustic wave files operation wave propagation in piezoelectric substrates-design of interdigital transducers-single phase unidirectional transducers –saw devices;capabilities, limitations
and application. Ferrite phase shifters-semiconductor phase shifters –ferroelectric thin film phase shifters- limitations of phase shifters- MEMS phase shifters-Ferroelectric phase shifters

UNIT V  MICROMACHINED TRANSMISSION LINES AND ANTENNA  9
Introduction-micromachined transmission lines and components –design, fabrication and measurements. overview of microstrip antenna-micromaching techniques to improve antenna performance – micromaching as a fabrication process for small antenna – micromachined reconfigurable antenna.

TEXT BOOKS

REFERENCE BOOKS
2. Tai- Ran Hsu , “ MEMS and microsystems” , Mc Graw- hill , 2002

11UECE017  MICROWAVE INTEGRATED CIRCUITS  3 0 0 3

OBJECTIVE
At the end of the course the student should be able
• To learn Recent Trends in Microwave Integrated Circuits
• To provide an exposure to familiarize analysis, design and fabrication techniques of Microwave Integrated Circuits.

UNIT I  TECHNOLOGY OF HYBRID MICS  9
Dielectric substrates-thick film technology and materials-thin film technology and materials-methods of testing-encapsulation of devices for MICs-mounting of active devices.

UNIT II  TECHNOLOGY OF MONOLITHIC MICS  9
Processes involved in fabrication-epitaxial growth of semiconductor layer-growth of dielectric layer-diffusion-ion implantation- electron beam technology

UNIT III  ANALYSIS OF MICROSTRIP LINE  9

UNIT IV  COUPLED MICROSTRIP SLOT LINE AND COPLANAR WAVEGUIDES  9
Coupled microstrips – even and odd mode analysis – micro directional coupler – branch line coupler – periodic branch line coupler – synchronous branch line coupler

UNIT V  LUMPED ELEMENTS AND NON–RECIProCAL COMPONENTS  9
Design and fabrication using microstrip – Flat resistors – fat inductors – inter digit capacitors – sandwich capacitors-ferromagnetic substrates for non reciprocal devices- microstrip circulators- latching circulators- isolators – phase shifter

**TEXT BOOK**

**REFERENCE BOOK**

11UECE018 WIRELESS NETWORKS 300 3

**OBJECTIVES**
At the end of the course the student should be able
- To understand physical as wireless MAC layer alternatives techniques.
- To learn planning and operation of wireless networks.
- To study various wireless LAN and WAN concepts.
- To understand WPAN and geo-location systems.

**UNIT I  PHYSICAL AND WIRELESS MAC LAYER ALTERNATIVES**

*Wired transmission techniques:* design of wireless modems, power efficiency, out of band radiation, applied wireless transmission techniques, short distance base band transmission, UWB pulse transmission, broad Modems for higher speeds, diversity and smart receiving techniques, random access for data oriented networks, integration of voice and data traffic.

**UNIT II  WIRELESS NETWORK PLANNING AND OPERATION**

Wireless networks topologies, cellular topology, cell fundamentals signal to interference ratio calculation, capacity expansion techniques, cell splitting, use of directional antennas for cell sectoring, micro cell method, overload cells, channels allocation techniques and capacity expansion FCA, channel borrowing techniques, DCA, mobility management, radio resources and power management, securities in wireless networks.

**UNIT III  WIRELESS WAN**

Mechanism to support a mobile environment, communication in the infrastructure, IS-95 CDMA forward channel, IS – 95 CDMA reverse channel, packet and frame formats in IS – 95, IMT – 2000; forward channel in W-CDMA and CDMA 2000, reverse channels in W-CDMA and CDMA-2000, GPRS and higher data rates, short messaging service in GPRS, mobile application protocols.

**UNIT IV  WIRELESS LAN**

Historical overviews of the LAN industry, evolution of the WLAN industry, wireless home networking, IEEE 802.11. The PHY Layer, MAC Layer, wireless ATM, HYPER LAN, HYPER LAN – 2.

**UNIT V  WPAN AND GEOLOCATION SYSTEMS**
IEEE 802.15 WPAN, Home RF, Bluetooth, interface between Bluetooth and 802.11, wireless geolocation technologies for wireless geolocation, geolocation standards for E.911 service.

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.networktutorials.info
2. www.flukenetworks.com
3. www.ehow.com

11UECE019 TELECOMMUNICATION SWITCHING AND NETWORKS 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To understand the concepts of Frequency and Time division multiplexing.
- To understand digital multiplexing and digital hierarchy namely SONET / SDH.
- To understand the concepts of space switching, time switching and combination switching
- To understand the need for network synchronization, network control and management issues.
- To study the enhanced local loop systems in digital environment.
- To understand statistical modeling, blocking system characteristics and queuing system characteristics of telephone traffic.
- To characterize blocking probability holding service time distributions in speech and data networks.

UNIT I MULTIPLEXING 9

UNIT II DIGITAL SWITCHING 9
Switching Functions, Space Division Switching, Time Division Switching, two-dimensional switching: STS Switching, TST Switching, No.4 ESS Toll Switch, Digital Cross-Connect Systems, Digital Switching in an Analog Environment- Elements of SSN07 signaling.
UNIT III NETWORK SYNCHRONIZATION CONTROL AND MANAGEMENT


UNIT IV DIGITAL SUBSCRIBER ACCESS


UNIT V TRAFFIC ANALYSIS


TOTAL 45

TEXTBOOKS

WEBSITE INFORMATION
1. www.globalshiksha.com
2. professional-ebooks.blogspot.com

11UECE020 SATELLITE COMMUNICATION 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To know an overview of satellite systems in relation to other terrestrial systems.
- To know about satellite orbits and launching.
- To understand earth segment and space segment components
- To know satellite access by various users.
- To know DTH and compression standards.

UNIT I OVERVIEW OF SATELLITE SYSTEMS, ORBITS AND LAUNCHING METHODS


UNIT II GEOSTATIONARY ORBIT & SPACE SEGMENT


UNIT III EARTH SEGMENT & SPACE LINK

UNIT IV SATELLITE ACCESS

UNIT V DIRECT BROADCAST SATELLITE SERVICES

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. members.tripod.com/
OBJECTIVES
At the end of the course the student should be able
  • To know the basics of solid state physics and understand the nature and characteristics of light.
  • To understand different methods of luminescence, display devices and laser types and their applications.
  • To learn the principle of optical detection mechanism in different detection devices.
  • To understand different light modulation techniques and the concepts and applications of optical switching.
  • To study the integration process and application of opto electronic integrated circuits in transmitters and receivers.

UNIT I  ELEMENTS OF LIGHT AND SOLID STATE PHYSICS  9

UNIT II  DISPLAY DEVICES AND LASERS  9

UNIT III  OPTICAL DETECTION DEVICES  9
Photo detector, Thermal detector, Photo Devices, Photo Conductors, Photo diodes, Detector Performance.

UNIT IV  OPTOELECTRONIC MODULATOR  9

UNIT V  OPTOELECTRONIC INTEGRATED CIRCUITS  9
Introduction, hybrid and Monolithic Integration, Application of Opto Electronic Integrated Circuits, Integrated transmitters and Receivers, Guided wave devices.

TOTAL 45
TEXTBOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.informaworld.com
2. www.ebook3000.com/Optoelectronic-Devices
3. www.answers.com

11UECE022 REMOTE SENSING 3003

OBJECTIVES
At the end of the course the student should be able
- To learn the basic concepts of remote sensing
- To study the effect of atmosphere and earth material in communication.
- To learn about optical and remote sensors.
- To learn and interpret the results of Geographic Information systems.

UNIT I REMOTE SENSING 9

UNIT II EMR INTERACTION WITH ATMOSPHERE AND EARTH MATERIALS 9

UNIT III OPTICAL AND MICROWAVE REMOTE SENSING 9
UNIT IV  GEOGRAPHIC INFORMATION SYSTEM


UNIT V  MISCELLANEOUS TOPICS


TOTAL 45

TEXT BOOKS

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.ssmi.com
2. rst.gsfc.nasa.gov

11UECE023  NANO ELECTRONICS  3 0 0 3

OBJECTIVES
At the end of the course the student should be able
- To learn the basic concepts of nano electronics and nano technologies
To learn about silicon MOSFETS, quantum transport devices, carbon nano tubes and its applications
To study about molecular electron devices and its applications.

UNIT I  INTRODUCTION TO NANOTECHNOLOGY

UNIT II  FUNDAMENTALS OF NANOELECTRONICS

UNIT III  SILICON MOSFETs & QUANTUM TRANSPORT DEVICES

UNIT IV  CARBON NANOTUBES

UNIT V  MOLECULAR ELECTRONICS

TEXTBOOKS

TOTAL 45
WEBSITE INFORMATION
1. www.nanotech-now.com
2. www.freewebs.com
3. www.nanonews.tv

11UECE024 INDIAN CONSTITUTION AND SOCIETY 3 0 0 3

OBJECTIVES
At the end of the course the student should be able
• To know about the Indian constitution and its policies.
• To know about the state and central government structures and its functions.
• To know about the Indian Federal system.

UNIT I INDIAN CONSTITUTION 9

UNIT II UNION GOVERNMENT 9
Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT III STATE GOVERNMENT 9

UNIT IV INDIAN FEDERAL SYSTEM 9
Indian Federal System – Center – State Relations – President’s Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India.

UNIT V SOCIETY 9
Society : Nature, Meaning and definition; Indian Social Structure; Castle, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TOTAL 45

TEXT BOOKS
2. R.C.Agarwal, “(1997) Indian Political System “, S.Chand and Company, New Delhi.

REFERENCE BOOKS

WEBSITE INFORMATION
1. www.shvoong.com
2. www.globalshiksha.com
3. www.unesco.org