VINAYAKA MISSIONS UNIVERSITY, SALEM
TAMILNADU, INDIA.

FACULTY OF ENGINEERING & TECHNOLOGY
SCHOOL OF ELECTRONIC SCIENCES
B.E- ELECTRONICS & COMMUNICATION ENGINEERING
FULL TIME
AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY, PAIYANOOR
&
V.M.K.V. ENGINEERING COLLEGE, SALEM
CHOICE BASED CREDIT SYSTEM

2016 REGULATION
# I SEMESTER

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BE_ECE_(Full Time)_ CBCS_2016
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BE_ECE_(Full Time)_ CBCS_2016
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### VIII SEMESTER

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**INDUSTRIAL ELECTIVES**

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## Overall Credits

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## ENGLISH FOR ENGINEERS

**SEMESTER I**

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(For I year BE- common to all branches)

### 2015-2016 Regulations – First Semester

#### Objectives:

1. To enable students to develop LSRW skills in English.
2. To become effective communicators in English.
3. To ensure that learners use Electronic media materials for developing language skills.

#### Unit – I


#### Unit – II

Articles - Phonetics (Vowels, Consonants and Diphthongs) – Pronunciation Guidelines –Listening to Indian speakers from different regions, intrusion of mother tongue – Homophones – Homonyms, Note taking and Note making - Difference between Spoken and Written English- Use of appropriate language - Listening and Responding to Video Lectures (Green India, environment, social talks) - Extempore.

#### Unit – III

Tense forms- Verbal & Non verbal communication – Describing objects – Process Description- Speaking Practice – Paragraph Writing on any given topic (My favourite place, games / Hobbies / School life, etc.) –Types of paragraphs- Telephone Etiquettes.

#### Unit – IV


#### Unit – V

Sentence Pattern (SVOCA) - Statement of Comparison - Transcoding – Informal letters - SWOT analysis– Resume Writing- Difference –Bio – data, Resume and CV.

#### References:

UNIT I – Properties of matter
Elasticity – Hooke’s law – Stress-strain diagram - Relationship between three moduli of elasticity (qualitative) - Poisson’s ratio – Young’s modulus by uniform bending and non-uniform bending – Experimental determination of rigidity modulus – I-shaped girders.

UNIT II – Crystal Physics
Unit cell – Bravais lattice – Miller indices – Calculation of number of atoms per unit cell – atomic radius – coordination number – packing factor for SC, BCC, FCC, HCP structures – Crystal imperfections – point, line, surface and volume defects.

UNIT III – Lasers

UNIT IV – Fibre Optics
Principle and propagation of light in optical fibres – numerical aperture and acceptance angle – types of optical fibres (material, refractive index, mode) – Applications: Fibre optic communication system – fibre optic displacement sensor and pressure sensor.

UNIT V - Non – Destructive Testing

Total hours : 45

TEXT BOOK
“Engineering Physics”, compiled by Department of Physics, Vinayaka Missions University, Salem.

REFERENCE BOOKS
<table>
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<td><strong>CALCULUS FOR ENGINEERS</strong></td>
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<td>Common to BE First Semester</td>
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(MECH, ECE, CSE, CSSE, EEE, EIE, CIVIL, IT, MECHT, AERO, ETC & AUTO)

**UNIT I – APPLICATION OF DIFFERENTIAL CALCULUS**
Curvature – Cartesian and Parametric Co-ordinates – Centre and radius of curvature – Circle of curvature – Evolute

**UNIT II – FUNCTIONS OF SEVERAL VARIABLES**

**UNIT III – INTEGRATION**
Concept of integration-Integration of Rational andTrigonometric functions – Using Partial Fractions – Integration by parts.

**UNIT IV – MULTIPLE INTEGRAL**
Double integration –change of order of integration- Cartesian and polar coordinates –Area as a double integral – Triple integration.

**UNIT V – VECTOR CALCULUS**
Directional derivatives – Gradient, Divergence and Curl – Irrotational and solenoidal- vector fields – Vector integration – Green”s theorem, Gauss divergence theorem and Stoke”s theorem (excluding proof).

**TEXT BOOK:**
1. “Engineering Mathematics” by Department of Mathematics, VMU

**REFERENCES:**
AIM:
The aim is to introduce the fundamentals of Computer to the students

OBJECTIVES:
- To provide basic knowledge on hardware and software components of computers.
- To introduce and demonstrate various software applications
- To introduce Problem solving methodologies
- To learn about Implementation of Algorithms
- To learn about HTML

UNIT I - Basics of Computer and Information Technology

UNIT II - Software Applications       (Practical Learning)
Office Automation: Application Packages - Word processing (MS Word) - Spread sheet (MS Excel) – Presentation (MS PowerPoint).

UNIT III - Problem Solving Methodologies
Problems Solving Techniques - Program Development Cycle – Algorithm Development - Flow chart generation – Programming Constructs (Sequential, Decision-Making, Iteration) - Types and generation of programming languages

UNIT IV Implementation of Algorithms
Implementation of Algorithms-program verification-The efficiency of algorithms-The analysis of algorithms-Fundamental Algorithms

UNIT V HTML
Basics of HTML – Applications of HTML – HTML Fonts – anchor tag and its attributes – Using images in HTML programs – list tag - Table tag – HTML forms

TEXT BOOKS
1. Essentials of Computer Science and Engineering – by VMU

TOTAL HOURS: 45
A - CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS

UNIT II BUILDING COMPONENTS AND STRUCTURES

B – MECHANICAL ENGINEERING

UNIT III ENERGY SOURCES
Introduction, Classification of Power Plants – Working principle of steam, Diesel, Hydro and Nuclear Power plants – Merits and Demerits – Introduction to Renewable Energy Sources

UNIT IV IC ENGINES & REFRIGERATION AND AIR CONDITIONING SYSTEM

UNIT V BASIC MANUFACTURING PROCESSES
Casting process-Introduction, Principle, Advantages, casting defects Forging process-introduction, forging, rolling, drawing, extrusion Welding process- introduction, principle, types-Gas and arc welding

TOTAL: 45 PERIODS

REFERENCES:
### List of Experiments

1. Young’s modulus of a bar - Non-uniform bending
2. Rigidity modulus of a wire - Torsional Pendulum
3. Viscosity of a liquid - Poiseuille’s method
4. Velocity of ultrasonic waves in liquids - Ultrasonic Interferometer
5. Particle size determination using Laser
6. Wavelength of spectral lines – grating - Spectrometer
7. Thickness of a wire - Air wedge Method
8. Thermal conductivity of a bad conductor - Lee’s disc
9. Band gap determination of a thermistor - Post Office Box
10. Specific resistance of a wire – Potentiometer

### SEMESTER I

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### WORKSHOP PRACTICES

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(Common to all Branches - Except Bio-Tech & Bio info)

### FITTING

1. Square Joint
2. Dove Tail Joint

### CARPENTRY

1. Half Lap Joint
2. Dove Tail Joint

### WELDING

1. Arc Welding of butt Joint
2. Arc Welding of Lap Joint

### CASTING

1. Foundry – Mould Preparation using single piece pattern

### DEMONSTRATION

1. Sheet Metal – Fabrication of cone
2. Black Smithy – Round to square rod

**Reference:**

1. “Basic Workshop Practice”, Department of Mechanical Engineering, Vinayaka Missions University
1. Implement Mail Merge in MS-Word and send letters to parents regarding the semester fee structure of the student.
2. Using MS-Word, create a leave letter addressed to your faculty advisor
3. A) Using MS-Word, create a table for a list of students with different font sizes and colours
   B) Using MS-Word, create a flow-chart using the basic shapes available. Use page border, a watermark, header and footer
4. Using MS-PowerPoint, create a presentation about the university
5. Using MS-PowerPoint, create a story line with various animations and transition effects.
7. Using MS-Excel, create a pivot table
8. Using MS-Excel, create look-up tables
9. Using MS-Excel, create graphs for the weather condition in various cities of India
10. Create an HTML page
    a) Click on a link and go to the bottom of the page using \(<a href>\)
    b) Display an image.
11. Create an HTML page to
    a) Display ordered and unordered lists of your friends names and sports persons
    b) Display a table with 3 columns and 4 rows.
Objectives:

1. To impart and enhance corporate Communication
2. To enable learners to develop presentation skills.
3. To build confidence in learners to use English in Business contexts.

Unit – I

Subject and verb agreement (Concord) – Preposition and Relative Pronoun – Cause and effect- Phrasal Verbs – Idioms and Phrases – Listening comprehension - Listening to Audio Files and Answering Questions – Framing Questions – Negotiation skills, Persuasion Skills and Debating skills.

Unit – II


Unit – III

Reading Skills – Understanding ideas and making inferences – Group Discussion – Types of Interviews, FAQs – e-mail Netiquette, Sample e-mails – Watching Documentary Films and responding to questions.

Unit – IV

Corporate communication – Recommendation - Instruction – Check List- circulars- Inter office memo – Minutes of meeting and Writing agenda – Discourse Markers- Rearranging the jumbled sentences – Technical Articles – Project Proposals, Making Presentations on given topics – Preparing Power Point Presentations.

Unit – V


References:

2. Technical English-Writing, Reading and Speaking- Pickett and Lester, Harper and Row publication.
SEMESTER II

CHEMISTRY FOR ENGINEERS

(Common to all branches except Biotechnology)

To impart in basic knowledge in chemistry so that the student will understand the engineering concept and they can face the competitive examinations effectively.

To improve the knowledge in the instrument applications.

To inculcate the knowledge of advanced material.

UNIT I: ELECTROCHEMISTRY, BATTERIES AND FUEL CELLS   9 Hrs
Primary battery (Daniel and dry cell) – secondary battery (lead Acid storage battery and Nickel-Cadmium battery) – Fuel cell (H₂-O₂ fuel cell)

UNIT II: WATER TECHNOLOGY & CORROSION   9 Hrs
Corrosion – Types – principles – corrosion control methods (Electroplating,Electroless plating, Sacrificial anode and Impressed current method).

UNIT III: CHEMISTRY OF ADVANCED MATERIALS   9 Hrs
Organic electronic material, shape memory alloys, smart materials,polymers(PVC,Teflon, Bakelite)- fibers(optical fibre) & composites (FRP,MMC & PMC)

UNIT IV: PHASE EQUILIBRIA & NUCLEAR CHEMISTRY   9 Hrs
Phase rule: statement and explanation of terms involved – One component system (water) – Condensed phase rule – Two component system (Lead-silver) .
Nuclear Chemistry – Fission – Fusion – working of nuclear reactor – Radiations and harmful effects.

UNIT V: CHROMATOGRAPHY AND SPECTROSCOPY   9 Hrs

TEXT BOOK: Engineering Chemistry by VMU.

References:
4. Engineering Chemistry by Dr.A.Ravikrishnan,Sri Krishna Publications, Chennai

BE_ECE_(Full Time)_ CBCS_2016
Common to BE - Second Semester
( MECH, ECE, CSE, CSSE, EEE, EIE, CIVIL, IT, MECHT, AERO, ETC & AUTO)

UNIT I
MATRICES
Characteristic equation – Eigen values and eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors (Without proof) – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form.

UNIT II
LAPLACE TRANSFORMS

UNIT III
INVERSE LAPLACE TRANSFORMS & APPLICATIONS
Inverse Laplace transform – Convolution theorem – Initial and Final value theorem-Solution of linear ODE of second order with constant coefficients and first order simultaneous equation with constant coefficients using Laplace transforms.

UNIT IV
FOURIER TRANSFORMS

UNIT V
Z-TRANSFORMS

TEXT BOOKS
1. “Engineering Mathematics” by Department of Mathematics, VMU

REFERENCE BOOKS

BE_ECE_(Full Time)_ CBCS_2016
AIM:
The aim is to introduce C programming to the students.

OBJECTIVES:
- To introduce Basics of C
- To understand Control Structures & Arrays
- To learn about String concept, Structure and Union in C
- To introduce the concepts of Functions and Pointers
- To introduce Memory and File management concepts in C

UNIT I - Basics of C
Identifiers, variables, expression, keywords, data types, constants, scope of variables. Operators: arithmetic, logical, relational, conditional and bitwise operators - Special operators: size of () & comma (,) operator - Precedence and associatively of operators - Type conversion in expressions.

UNIT II - Control Structures & Arrays
Basic input/output and library functions: Single character input/output i.e. getch(), getchar(), getche(), putchar() - Formatted input/output: printf() and scanf() – Library functions (mathematical and character functions). Decision Making and Branching – Looping statements. Arrays – Initialization – Declaration – One dimensional and two dimensional arrays.

UNIT III String, Structure & Union
Strings: Declaration-Initialization and string handling functions. Structure and Union: structure declaration and definition – Accessing a Structure variable – Structure within a structure – Union.

UNIT IV Functions and Pointers

UNIT V Memory and File management

TOTAL HOURS: 45

TEXT BOOKS:

REFERENCE BOOKS:
UNIT I-SEMICONDUCTOR DIODES AND SPECIAL PURPOSE DIODES (10 hours)

UNIT II-BIPOLAR TRANSISTORS (6 hours)

UNIT III-FIELD-EFFECT TRANSISTORS (8 hours)
Field-Effect Transistors : construction, working and VI characteristics of JFET – comparison of BJT and JFET – MOSFET – enhancement MOSFET, depletion MOSFET, their working principle and VI characteristics, comparison of MOSFET with JFET, comparison of D MOSFET with E MOSFET, CMOS, MESFET, CCD.

UNIT IV-DC POWER SUPPLIES (12 hours)
Rectifiers and Filters : Block schematic of a typical DC power supply, single phase HWR, FWR, full-wave bridge rectifier, power supply filters (ripple factor and efficiency analysis), bleeder resistor, voltage dividers
Voltage regulators: voltage regulation, zener diode shunt regulator, transistor series regulator, transistor shunt regulator, switching regulators, design of complete DC power supply circuit.

UNIT V-INTEGRATED CIRCUIT FABRICATION (9 hours)
Integrated circuit – advantages and drawback of ICs – scale of integration – classification of ICs – definition of linear IC and digital IC with examples – manufacturing process of monolithic ICs – fabrication of components (diode, capacitor, bipolar transistor, resistor and field – effect transistor) on monolithic IC – comparison of MOS ICs and bipolar ICs.

TEXT BOOKS
2. B. Somanathan Nair, “Electronic Devices and Applications”, PHI, 2006

REFERENCES
To impart in basic knowledge in chemistry so that the student will understand the engineering concept.
To improve the knowledge in the instrument applications.

1. Estimation of total hardness of water sample by EDTA method.
2. Estimation of dissolved oxygen by Winkler’s method.
3. Estimation of ferrous ion by Potentiometry.
4. Precipitation reaction by Conductometry.
5. Acid base reaction by pH metry.
6. Estimation of copper from its ore.
7. Estimation of iron by spectrophotometer.
8. Estimation of sodium by flame photometer.
10. Corrosion experiment by weight loss method.

Concepts and conventions (Not for Examination)
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES AND FREE HAND SKETCHING 9
Conics – Construction of ellipse-Free hand sketching-Representation of Three Dimensional objects – General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT II PROJECTION OF POINTS, LINES 9
Projection of points, Projection of straight lines located in the first quadrant: inclined to both planes – Determination of true lengths and true inclinations – rotating line method only.

UNIT III PROJECTION OF SOLIDS 9
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.
UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones

UNIT V ISOMETRIC VIEW AND PERSPECTIVE PROJECTION
Principles of isometric View – isometric scale – isometric view of simple solids- Introduction to Perspective projection

TEXT BOOKS:

REFERENCES:

SEMESTER II

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(Common for All Branches)

1. Write a C Program to Implementation of Sine and cosine series
2. Write a C Program to calculate Simple Interest
3. Write a C Program to generate Fibonacci Series using for loop
4. Write a C program to calculate factorial using while loop
5. Write a C Program to
   a) Find the greatest of three numbers using if condition.
   b) Find the greatest of three numbers using conditional operator.
6. Write a C program for finding the roots of a given quadratic equation using conditional control statements
7. Write a C program to
   a) Compute matrix multiplication using the concept of arrays.
   b) Illustrate the concept of string handling functions.
8. Write a C program to
   a) Find the largest element in an array using pointers.
   b) Convert a binary number to decimal or decimal to binary using functions.
9. Write a C program to read data from keyboard, write it to a file named student again read the same data from student file and write it into data file.
10. Write a C program to store employee details using the concept of structures.

BE_ECE_(Full Time)_CBCS_2016
### List of Experiments

1. Characteristics of PN junction Diode.
2. Characteristics of Zener diode.
3. Input, Output characteristics of CE Amplifier.
4. Input, Output characteristics of CC Amplifier.
5. Transfer characteristics of JFET.
6. Input, Output characteristics of UJT.
8. Full wave rectifier.
10. Simulation experiments using PSPICE.
OBJECTIVES

 País Partial differential equations arises in most of the Engineering discipline when the number of independent variables in the given problem under discussion is two or more.

 País Fourier series is used to express even aperiodic functions in terms of periodic functions making them amenable for further processing.

 País Fourier series has the wide application in the field of heat diffusion, wave propagation and in signal and systems analysis.

UNIT-I PARTIAL DIFFERENTIAL EQUATIONS

Formation - Solutions of standard types f(p,q)=0, clairauts form, f(z,p,q)=0,f(p,x)=g(q,y) of first order equations

Lagrange's Linear equation - Linear partial differential equations of second and higher order with constant coefficients.

UNIT-II FOURIER SERIES

Dirichlet's conditions - General Fourier series - Half-range Sine and Cosine series - Parseval's identity - Harmonic Analysis.

UNIT-III BOUNDARY VALUE PROBLEMS

Classification of second order linear partial differential equations - Solutions of one - dimensional wave equation, one-dimensional heat equation - Steady state solution of two-dimensional heat equation - Fourier series solutions in Cartesian coordinates.

UNIT-IV ANALYTIC FUNCTIONS

Function of a complex variable – Analytic function – Necessary conditions - Cauchy Riemann equations – Sufficient conditions (excluding proof) – Harmonic conjugate–Constructions of analytic functions-conformal mapping(w=z+c,w=z2,w=1/z)-bilinear transformation

UNIT-V GRAPH THEORY

Graphs, sub graphs, complements-Graph isomorphism-vertex degree, - Eulerian graphs-Hamiltonian graphs-
Matrix representation of graphs(both directed and undirected graphs).

Lecture Hours: 45, Tutorial Hours: 15
Total hours : 60

TEXT BOOKS:

REFERENCES:
AIM
To know about basic analysis and synthesis techniques used in electronics and communications.

OBJECTIVES
- To study about various network theorems and the method of application to analyse a circuit.
- To know the concept of transfer function of a network and the nature of response to external inputs.
- To synthesize a network in different forms from the transfer function.
- To know the concept and design of frequency selective filters.

1. BASICS OF CIRCUIT ANALYSIS

2. NETWORK THEOREMS AND RESONANCE CIRCUITS
   - Thevenin’s and Norton’s theorems, Superposition theorem, Compensation theorem, Reciprocity theorem, Maximum power transfer theorem, series and parallel resonance, Quality factor and Bandwidth.

3. ANALYSIS OF NETWORKS IN ‘S’ DOMAIN
   - Network elements, Transient response of RL, RC and RLC Circuits to DC excitation, Natural and forced oscillations, Two-port Networks, Parameters and transfer function, Interconnection of two-ports.

4. ELEMENTS OF NETWORK SYNTHESIS

5. FILTER DESIGN
   - Butterworth and Chebyshev approximation, Normalized specifications, Low passs filter design, Frequency transformations, Frequency and Impedance denormalisation, Types of frequency selective filters, Linear phase filters, Active filter design concepts.

Total =45 PERIODS

TEXTBOOKS:

REFERENCES:
AIM
The main objective of this subject is to help the students to mathematically analyze different types of signals and their associated systems.

INSTRUCTIONAL OBJECTIVES
At the end of this course, the students will be able to understand the
- Various classifications of both Continuous time and Discrete time Signals and Systems.
- Spectral analysis of Periodic and Aperiodic Signals using Fourier series.
- Analysis and characterization of the CT system through Laplace transform.
- Analysis and characterization of the DT system through Difference equation.
- Analysis and characterization of the DT system through Z transform.

UNIT I-CLASSIFICATION OF SIGNALS AND SYSTEMS
Classification of Signals:
Continuous time signals - Discrete time signals – Periodic and Aperiodic signals – Even and odd signals – Energy and power signals –Deterministic and random signals –Complex exponential and Sinusoidal signals .Unit step, Unit ramp, Unit impulse – Representation of signals in terms of unit impulse.


UNIT II-ANALYSIS OF CONTINUOUS TIME SIGNALS
Fourier series:
Representation of Continuous time Periodic signals – Trigonometric and exponential-Symmetry conditions- Properties of Continuous time Fourier series – Parseval’s relation for power signals – Frequency spectrum.

Fourier transform: Representation of Continuous time signals- Properties of Continuous time Fourier transform – Parseval’s relation for energy signals – Frequency spectrum –Analysis of LTI system using Fourier methods.

UNIT III-LTI CONTINUOUS TIME SYSTEM
System modeling:

UNIT IV-ANALYSIS OF DISCRETE TIME SIGNALS AND SYSTEMS

BE_ECE_(Full Time)_CBCS_2016
Representation of sequences – Discrete Time Fourier Transform (DTFT) - Discrete Fourier Transform (DFT) and its properties – Solution of linear constant coefficient difference equations with initial conditions-Zero state response and Zero input response— impulse response – Convolution sum - Frequency response.

UNIT V-LTI DT SYSTEM CHARACTERIZATION AND REALIZATION


TEXT BOOKS


REFERENCES

Aim
To introduce the student to the fundamental theory and concepts of electromagnetic waves and transmission lines, and their practical applications.

OBJECTIVE
➢ To specify the “constitutive relationships” for fields and understand why they are required.
➢ To estimate electric and magnetic fields from stationary and dynamic charge and current distributions
➢ To acquire knowledge for the measurement of basic transmission line parameters, such as the reflection coefficient, standing wave ratio, and impedance.

UNIT I STATIC ELECTROMAGNETIC FIELDS

UNIT II STATIC MAGNETIC FIELD

UNIT III TIME VARYING ELECTRIC & MAGNETIC FIELDS

UNIT IV TRANSMISSION LINE THEORY

UNIT V RADIO FREQUENCY TRANSMISSION LINES
Line approximations – Parameters of open wire line at radio frequency, parameters of coaxial lines at radio frequencies, constants for the line of zero dissipation – Voltages and Currents on the dissipation-less lines – input impedance of a lossless line – Wavelength and velocity of propagation – Reflection – Reflection coefficient, Reflection loss, Reflection factor, Standing wave ratio, Input impedance in terms of reflection.
coefficient – Practical types – Microstrip line, Microwave Transmission line, Super Conducting transmission line, Characteristics of different printed transmission lines.

Total Hours: 45

TEXT BOOKS:

(Unit IV & V)

REFERENCE:
# SEMESTER III

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**AIM:**
The aim of this course is to introduce to the students the rectifiers, power supplies, basics of biasing transistor circuits, low frequency amplifiers, multi stage amplifiers, power amplifiers, tuned amplifiers, feedback amplifiers and oscillators.

**OBJECTIVES:**
- To study the biasing circuits and anlayse the small signal BJT amplifiers
- To understand the working and to find the efficiency of different types of large signal amplifiers
- To understand the basic concept and working of various types of feedback amplifiers and oscillators.
- To understand the working of different types of tuned amplifiers and multivibrators and their analysis.

## UNIT I - BIASING CIRCUITS AND SMALL SIGNAL MODELS
9


## UNIT II - SMALL-SIGNAL AMPLIFIERS - ANALYSIS AND FREQUENCY RESPONSE
9


## UNIT III - FEEDBACK AND OSCILLATOR CIRCUITS
9


## UNIT IV - POWER AMPLIFIERS AND TUNED AMPLIFIERS
9


## UNIT V - SOLID STATE SWITCHING CIRCUITS
9


**TOTAL HOURS:** 45
TEXT BOOKS:

REFERENCES:
AIM

The Aim of this course is to develop a strong foundation in analysis and design of digital electronics.

OBJECTIVES

- Understand the basic concepts.
- Understand concepts of logic gates constructional features.
- To understand the concepts of gate-level minimization & combinational logic.
- To analyze synchronous sequential logic.

UNIT – I: NUMBER SYSTEM

Digital System, Binary Numbers, Number-Base Conversions, Octal & Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Binary Codes, Binary Storage And Registers, Binary Logic

UNIT – II: BOOLEAN ALGEBRA, LOGIC GATES & GATE –LEVEL MINIMIZATION

Introduction, Boolean algebra, basic theorem & properties of Boolean algebra, Boolean functions, canonical & standard forms, logic operations, logic gates, integrated circuits, map method, four variable K-maps, product of sums simplification, don’t care conditions, NAND & NOR implementations, Exclusive-OR Function, Hardware Description Language.

UNIT – III: COMBINATIONAL LOGIC


UNIT – IV: SYNCHRONOUS SEQUENTIAL LOGIC, REGISTER & COUNTERS

Sequential circuits, storage elements: latches, flip flops, analysis of closed sequential circuits, synthesizable HDL Models of sequential circuits, state reduction assignment, design procedure, shift registers, ripple counters, synchronous counters, HDL for registers and Counters.

UNIT – V: DESIGN AT THE REGISTER TRANSFER LEVEL

Register Transfer Level Notation, Register Transfer Level In HDL, ASM, Sequential Binary Multiplier, Control Logic, HDL Description Of Binary Multiplier, Design With Multiplexers, Race Free Design, Latch Free Design.

TOTAL HOURS: 45
TEXT BOOKS:

REFERENCE BOOKS:
1. Verification of Ohm’s laws and Kirchhoff’s laws.
2. Verification of Thevenin’s and Norton’s Theorem.
3. Verification of Superposition Theorem.
4. Verification of Maximum power transfer theorem.
5. Verification of Reciprocity theorem.
7. Verification of Mesh and Nodal analysis.
8. Transient response of RL and RC circuits for DC input.
AIM:
To provide the ability to design the electronic circuits using the basic electronic components.

OBJECTIVE:
- To study the characteristics of basic amplifiers and power supply.
- To verify practically, the response of various oscillators.
- To study of different Multivibrator circuits.

LIST OF EXPERIMENTS:
Design
1. Fixed Bias amplifier circuits using BJT.
2. BJT Amplifier using voltage divider bias (self-bias) with un bypassed emitter resistor.
3. Class B Complementary symmetry power amplifier.
4. Differential amplifier using BJT.
5. Power supply Full wave rectifier with simple capacitor filter.
7. Design of RC Phase shift oscillator:
8. Design Wein Bridge Oscillator.
10. Design of Astable and Monostable and Bistable Multivibrators.
AIM:
To provide the student with the capability to use simulation tools in digital electronic circuit analysis and design

OBJECTIVE
- To develop necessary skills to design, analyse and construct the digital circuits
- To design and simulate logic circuits using computing tools

LIST OF EXPERIMENTS

1. Design and implementation of Adder and Subtractor 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 2 bit 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.
7. Design and implementation of encoder and decoder using logic gates.
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. Design of experiments 1, 6, 8 and 10 using Verilog Hardware Description Language.
OBJECTIVES:

- To find the missing values in a table of data using interpolation
- To study the initial value problems of Ordinary Differential Equation using various numerical methods
- To study the analysis of electrical system, signal processing operation using the concept of Random Processes.
- To apply the concept of correlation in RADAR, fault detection in VLSI circuits.

UNIT-I: INTERPOLATION AND APPROXIMATION

Interpolation with Newton's divided differences, Lagrange's polynomial, Newton forward and backward differences, central difference Formula (Stirling's and Bessel's)

UNIT-II: INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS


UNIT-III: RANDOM VARIABLES

Discrete and continuous random variables- Probability mass function – Probability density functions - moments, Moment generating functions and their properties.

UNIT-IV: RANDOM PROCESSES

Classification, Stationary and Markov process, Binominal process, Poisson process, Sine-wave process, Ergodic processes.

UNIT-V: CORRELATION FUNCTION AND SPECTRAL DENSITIES

Auto correlation for discrete and continuous process, Cross correlation functions - properties, Power spectral density, Cross spectral density – properties

Lecture Hours: 45  
Tutorial Hours: 15  
Total hours: 60

References:

AIM:
To introduce the concepts of Digital signal processing and DSP Processor. The mathematical analysis of FIR and IIR filter design and simulation using MATLAB are dealt with in detail.

OBJECTIVES
¬ Structures of Discrete time signals and systems.
¬ Frequency response and design of FIR and IIR filters.
¬ Finite word length effect.
¬ DSP Processor- TMS320C5X.

UNIT I-REVIEW OF DISCRETE TIME SIGNALS AND SYSTEMS
Overview of signals and systems – DFT–FFT using DIT and DIF algorithms – Inverse DFT-FFT using DIT and DIF algorithms – Applications – Circular convolution – MATLAB programs for DFT and FFT.

UNIT II-DESIGN AND IMPLEMENTATION OF IIR FILTERS

UNIT III-DESIGN AND IMPLEMENTATION OF FIR FILTERS

UNIT IV-FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS
Fixed point arithmetic – effect of quantization of the input data due to Finite word length. Product round off – need for scaling – Zero input limit cycle oscillations - Limit cycle oscillations due to overflow of adders – Table look up implementation to avoid multiplications.

UNIT V-PROCESSOR FUNDAMENTALS

TOTAL No. OF HOURS: 60

TEXT BOOKS

REFERENCES
AIM
To understand the principles of microcontrollers and applications towards real world existence.

OBJECTIVES
☞ To learn the concepts of microprocessors.
☞ To get knowledge in interfacing devices.
☞ To know the concepts of microcontroller and its applications.
☞ To develop skill in simple program writing.

UNIT I – INTEL 8086 MICROPROCESSOR
Architecture of 8086-Register organization – Signal Description of 8086 - 8086 Instructions set – Addressing modes – Assembler directives and operators- simple programs.

UNIT II – PERIPHERAL INTERFACING

UNIT III – INTEL 8051 MICROCONTROLLER
Introduction to 8 bit microcontroller – architecture of 8051- Signal descriptions of 8051- Role of PC and DPTR- Flags and PSW- CPU registers- Internal RAM & ROM- Special Function Register-Counter & Timers- Serial Communication.

UNIT IV – ASSEMBLY LANGUAGE PROGRAM OF INTEL 8051
Interrupt- Addressing Mode- Data Transfer Instruction- Arithmetic Instruction- Logical Instruction- Jump Loop & Call Instruction- I/O Port Programming.

UNIT V – INTERFACING AND APPLICATION OF INTEL 8051
LCD Interfacing - A/D and D/A Interfacing- Sensor Interfacing- Relays and Optoisolators- Stepper Motor Interfacing- DC Motor Interfacing.

TOTAL PERIODS: 45

TEXTBOOKS

REFERENCE BOOKS
AIM:
To introduce the basic concepts of Digital Communication in baseband and passband domains and to give an exposure to error control coding techniques.

OBJECTIVES:
- To study signal space representation of signals and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals.
- To understand baseband and bandpass signal transmission and reception techniques.
- 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 WAVEFORM CODING TECHNIQUES
9

UNIT II BASEBAND SHAPING FOR DATA TRANSMISSION
9

UNIT III DIGITAL MODULATION TECHNIQUES
9

UNIT IV ERROR-CONTROL CODING
9
Rationale for Coding and Types of Codes- Discrete Memoryless Channels- Linear Block Codes- Cyclic Codes- Convolution Codes-Maximum Likelihood Decoding of Convolution Codes-Distance Properties of Convolution Codes- Sequential Decoding of Convolutional Codes-Trellis Codes.

UNIT V SPREAD-SPECTRUM MODULATION
9

TOTAL HOURS: 45

TEXT BOOK

REFERENCES:
AIM
To provide sound knowledge in the basic concepts of linear control theory and design of control system.

OBJECTIVE
☞ To understand the methods of representation of systems and to desire their transfer function models.
☞ To provide adequate knowledge in the time response of systems and steady state error analysis.
☞ To accord basic knowledge in obtaining the open loop and closed–loop frequency responses of systems.
☞ To understand the concept of stability of control system and methods of stability analysis.
☞ To study the three ways of designing compensation for a control system.

UNIT - I: SYSTEMS AND THEIR REPRESENTATION

UNIT - II: TIME RESPONSE

UNIT - III: FREQUENCY RESPONSE
Frequency response – Bode plot – Polar plot – Determination of closed loop response from open loop response – Correlation between frequency domain and time domain specifications.

UNIT - IV: STABILITY OF CONTROL SYSTEM

UNIT - V: COMPENSATOR DESIGN
Performance criteria – Lag, lead and lag-lead networks – Compensator design using bode plots.

TEXT BOOKS

REFERENCES
3. Samarajit Ghosh, Control systems, Pearson Education, New Delhi, 2004
AIM

To provide the basic concepts in the design of electronic circuits using linear integrated circuits and their applications in the processing of analog signals.

OBJECTIVES

食欲 To introduce the basics of Integrated Circuits and its fabrication.
食欲 To familiarize with operational amplifiers and its Characteristics.
食欲 To introduce the applications of Operational Amplifier
食欲 To Introduce about the regulator and filters.
食欲 To introduce ADC/ DAC and PLL.

UNIT – I: Integrated Circuit Fabrication 9


UNIT – II: Operational Amplifier and its Characteristics 9


UNIT – III: Operational Amplifier Applications 9


UNIT – IV: Regulators and Filters 9

Series Op Amp Regulators – IC Voltage Regulators – 723 General Purpose Regulators – Switching regulators – RC Active Filters – Transformation – State variable Filter – Switched Capacitor Filters – Active Filters using OTA’s.

UNIT – V: D/A and A/D Converters, Timers and PLL 9


TUTORIAL: 15
TOTAL HOURS: 60

Text Book:

Reference Books:
AIM
To provide the knowledge of assembly language programming of microprocessor and microcontroller and interfacing peripheral devices with microcontroller.

OBJECTIVE

- To write the assembly language program for 8086 and 8051.
- To write the programs for communication between microcontroller and peripheral devices.
- To interface ADCs, DACs with microcontroller and learn the real time applications like stepper motor control, key board etc

LIST OF EXPERIMENTS

1. 8085 & 8086 Assembly Language Program (ALP) for Arithmetic Operations.
2. 8051 Assembly Language Program (ALP) for Arithmetic Operations.
3. 8051 Assembly Language Program (ALP) for Logical Operations.
4. 8051 Assembly Language Program (ALP) for Bit Manipulation Operations.
5. 8051 Assembly Language Program (ALP) for arrange the numbers in Ascending and Descending order.
6. 8051 Assembly Language Program (ALP) for Interrupt & UART Operations.
7. Interfacing an ADC to 8051 Controller.
8. Interfacing DAC to 8051 Controller and generate Square, Triangular & Saw-tooth waveform.
9. Interfacing a Stepper motor to 8051 Controller and operate it in clockwise and anti-clockwise directions.
10. Interfacing a Keyboard & Display controller (8279) to 8051 Controller.
AIM:
To acquire the knowledge to construct and realize the basic communication circuits and interpret the obtained results

LIST OF EXPERIMENTS

1. Signal Sampling and reconstruction.
2. Amplitude modulation and demodulation
3. Frequency modulation and demodulation.
4. Pulse code modulation and demodulation.
5. ASK, FSK and PSK Modulation and Demodulation.
6. TDM and FDM
7. Line Coding Schemes
8. FSK, PSK and DPSK schemes (Simulation)
9. Error control coding schemes (Simulation)
10. Spread spectrum communication (Simulation).
AIM: To acquire the knowledge to construct and realize the real time integrated circuits and evaluate its response.

OBJECTIVE: To learn the characteristics of integrated circuits through op-amp

LIST OF EXPERIMENTS:

1. Measurement of op-amp parameters-CMRR, slew rate, open loop gain, input and output impedances
2. Inverting and non-inverting amplifiers, integrators, and differentiators Frequency response, Comparators-Zero crossing detector Schmitt trigger-precision limiter
3. Instrumentation amplifier-gain, CMRR & input impedance
4. Single op-amp second order LFF and HPF
5. Active notch filter realization using op-amps
6. Wein bridges oscillator with amplitude stabilization
7. Generation and demodulation of PWM and PPM
8. Multipliers using op-amps - 1,2 & 4 quadrant multipliers
9. Square, triangular and ramp generation using op-amps
10. Astable and monostable multivibrators using op-amps
11. Log and Antilog amplifiers
12. Voltage regulation using IC 723
13. Astable and monostable multivibrators using IC 555
14. Design of PLL for given lock and capture ranges& frequency multiplication
15. Realisation of ADCs and DACs
Objective:

- To create awareness on the various pollutions and their impact.
- To provide comprehensive insight in natural resources.
- To educate the ways and means to protect natural resources.
- To impart fundamental knowledge on human welfare measures.

UNIT - I - ENVIRONMENT AND NATURAL RESOURCES

Environment - Definition, scope & importance - Public awareness- Forest resources, mineral resources , water resources, food resources , energy resources (uses, over -exploitation & adverse effects in each case) - Scope & role of environmental engineers in conservation of natural resources - Sustainability development.

UNIT - II - ECOSYSTEMS AND BIO – DIVERSITY

Ecosystem - Definition, structure and function - Energy flow -Ecological succession - food chain, food web, ecological pyramids- Introduction, types, characteristics, structure and function of forest, grassland, desert and Aquatic ecosystems - Bio - Diversity :values and uses, hotspots, threats and conservation.

UNIT - III - ENVIRONMENTAL POLLUTION


UNIT - IV - SOCIAL ISSUES AND ENVIRONMENT

Urban problems related to energy - Water conservation – Resettlement and rehabilitation of people - Environmental ethics - Climate change - Global warming - Acid rain - Ozone depletion- Waste land reclamation, Environment Protection Act for air, water, wild life and forests - Pollution Control Board.

UNIT - V - HUMAN POPULATION AND ENVIRONMENT


Total: 45 hours

TEXT BOOKS:


REFERENCES:

2. Bharucha Erach "The Biodiversity of India" Mapin Publishing Pvt Ltd, Ahmedabad, India
SEMESTER V

ANTENNAS & WAVE PROPAGATION

AIM:
To study the course on antenna theory and propagation of waves.

OBJECTIVES:
- To study the EM theory and radiation fundamentals
- To study about wire antenna and arrays
- To study about the aperture antennas
- To study about the antenna measurements
- To study about the wave propagation

UNIT I ELECTROMAGNETIC RADIATION AND ANTENNA BASICS

UNIT II POINT SOURCES AND THEIR ARRAYS

UNIT III LOOP, SLOT and HORN ANTENNAS

UNIT IV SPECIAL ANTENNAS and ANTENNA MEASUREMENTS

UNIT V PROPAGATION OF RADIO WAVES

TUTORIAL: 15
TOTAL HOURS: 60

BE_ECE_(Full Time)_CBCS_2016
TEXTBOOK

REFERENCE BOOKS
AIM: To introduce the student to various image processing techniques.

OBJECTIVES:
- To study the image fundamentals
- To study the mathematical transforms necessary for image processing.
- To study the image enhancement techniques.
- To study image restoration procedures.
- To study the image compression techniques.

UNIT I-DIGITAL IMAGE FUNDAMENTALS

UNIT II-IMAGE TRANSFORMS

UNIT III-IMAGE ENHANCEMENT

UNIT IV-IMAGE RESTORATION

UNIT V-IMAGE COMPRESSION AND SEGMENTATION

Total Hours: 45

TEXT BOOKS:

REFERENCE BOOKS:
AIM: To understand the architecture, recent advances, current prac-tices and trends in computer network, analyze the networking pro-tocols and the contemporary issues in computer networks

OBJECTIVE
√ To know about the concepts of Data communication and net-works and Physical Layer and different protocols.
√ To impart knowledge on Medium Access Layer
√ To impart knowledge on Networks Layer
√ To impart knowledge on transport protocol.
√ To impart knowledge on Application Layer.

UNIT I INTRODUCTION & PHYSICAL LAYER

UNIT II DATA LINK LAYER
Data link layer design issues - framing, error control, flow control - Error detecting codes and Error Correcting codes, Elemen-tary data link protocols -stop-and wait protocol for error free and noisy channel - sliding window protocol - one bit, go back-N and selective repeat.

UNIT III NETWORK LAYER

UNIT IV TRANSPORT LAYER

UNIT V APPLICATION LAYER
DNS-(Domain Name System), Electronic Mail, World Wide Web, Real Time Audio and Video, Content Delivery and Peer-to-peer,

TEXT BOOKS:

TOTAL HOURS: 45
REFERENCE BOOKS:
# VLSI Design

**SEMESTER V**

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**Aim**

To provide the knowledge on VLSI fabrication and circuit design procedures

**Objective**

- To understand the MOS transistor theory, CMOS technologies and the Layout
- To understand the circuit concepts and scaling of MOS Circuits.
- To understand the concepts of designing combinational and sequential circuit using CMOS logic configuration
- To understand the subsystem design of IC’s
- To understand the concepts of CMOS testing

**Unit – I: Introduction to MOS Technology**

A brief History-MOS transistor, Ideal I-V characteristics, C-V characteristics, Non ideal I-V effects, DC transfer characteristics - CMOS technologies, Layout design Rules, CMOS process enhancements, Technology related CAD issues, Manufacturing issues.

**Unit – II: Concepts and Scaling of MOS Circuits**


**Unit – III: Combinational and Sequential Circuit design**

Circuit families – Low power logic design – comparison of circuit families – Sequencing static circuits, circuit design of latches and flip flops, Static sequencing element methodology- sequencing dynamic circuits – synchronizers

**Unit – IV: Datapath and Array Subsystems**


**Unit – V: Testing**

Need for testing- Testers, Text fixtures and test programs- Logic verification- Silicon debug principles- Manufacturing test – Design for testability – Boundary scan

**Total Hours: 45**

**Text Books:**


**Reference Books:**


BE_ECE_(Full Time)_ CBCS_2016
AIM
To impart knowledge on Image processing Techniques

OBJECTIVE:
To expertise in writing the program for generalized image processing and to understand its utilization in real time applications.

LIST OF EXPERIMENTS:
1. Image types - acquisition and display
2. Image Transforms - fourier and inverse fourier
3. Image Transforms - DCT,
4. Image Transforms – Hadamard
5. Image Enhancement - Histogram Equalisation
6. Image Smoothening
7. Image Sharpening
8. Edge detection
9. Image restoration - Noise removal
10. Image Restoration - Inverse filtering
11. Image Compression - Lossy compression
12. Image Compression - Wavelet coding
AIM
To know and understand communication networks using NETSIM Software and LAN Trainer kit.

OBJECTIVES
To study the communication networks characteristics and to analyze various MAC and routing layer Protocols.

LIST OF EXPERIMENTS:

PC to PC/peripherals communication
1. Establish RS232 communication
2. Establish Parallel port communication

MAC Layer LAN Protocols Observe the behavior & measure the throughput, compare the performance with other MAC Layer protocols.
3. CSMA/CD at MAC Layer
4. Token Bus at MAC Layer
5. Token Ring at MAC Layer
6. CSMA/CA at MAC Layer

LLC (Logical Link Control) Layer LAN Protocols observe the behavior & measure the throughput of reliable data transfer protocols. Compare the performance with other LLC Layer protocols.
7. Stop & Wait at LLC Layer
8. Sliding Window - Go-Back-N at LLC Layer
9. Sliding Window - Selective Repeat at LLC Layer

Routing Algorithm Performance Study of Routing Algorithms through simulation
10. Distance Vector Routing
11. Link State Routing Introduction to Socket Communication in Linux & Windows
12. Socket programming concept in Windows & Linux platforms
13. File Transfer between PC's through sockets
14. Study of Data Encryption & Decryption techniques by using them in a File Transfer
AIM
To impart knowledge on design of Digital Circuits using VLSI Techniques

OBJECTIVE:
➢ To gain expertise in design and development and simulation of digital circuits with VHDL and Verilog

LIST OF EXPERIMENTS
1. Design of all logic gates
2. Design of adders
3. Design of subtractors
4. Design of Encoder and Decoder
5. Design of Multiplexer and Demultiplexer
6. Design of Comparator
7. Design of Flip Flop
8. Design of Code converters
9. Design of Magnitude Comparator
10. Design of registers using latches and flip flops
11. Design of Synchronous Counters
12. Design of State machines
13. Design of Microprocessor parts
AIM
To enable the student to become familiar with active & passive microwave devices & components used in RF & Microwave communication systems.

OBJECTIVE
- To study RF and passive microwave components and their S-Parameters.
- To study Microwave Components.
- To study Microwave Tubes.
- To study Microwave Semiconductor Devices.
- To Study Microwave Antennas.

UNIT I INTRODUCTION TO MICROWAVES AND RF
Microwave spectrum and bands-characteristics of microwaves-a typical microwave system. Traditional, industrial and biomedical applications of microwaves. Microwave hazards.S-matrix – significance, formulation and properties. S-matrix representation of a multi port network, S-matrix of a two port network with mismatched load. Introduction to RF, General applications, Frequency band definitions, Overview.

UNIT II MICROWAVE COMPONENTS and their S-parameters
Waveguide Attenuators- Resistive card, Rotary Vane types. Waveguide Phase Shifters: Dielectric, Rotary Vane types. Waveguide Multi port Junctions- E plane and H plane Tees, Magic Tee, Hybrid Ring. Directional Couplers- 2hole, Bethe hole types. Ferrites-Composition and characteristics, Faraday Rotation. Ferrite components: Gyrator, Isolator, Circulator. S-matrix calculations for 2 port junction, E & H plane Tees, Magic Tee, Directional Coupler, Circulator and Isolator

UNIT III MICROWAVE O-type and M-type TUBES
Microwave tubes: O-type – Two cavity Klystrons: structure, resonant cavities, velocity modulation and Apple gate diagram, bunching process. Reflex Klystrons- structure, modes and o/p characteristics, electronic and mechanical tuning. M-type – cross-field effects, Magnetrons- types, 8-cavity Cylindrical Travelling Wave Magnetron- Hull cut-off and Hartree conditions, modes of resonance and PI-mode operation, o/p characteristics. HELIX TWT- types and characteristics of slow wave structures, structure of TWT and amplification process (qualitative treatment), Backward Wave Oscillators

UNIT IV MICROWAVE SEMICONDUCTOR DEVICES AND IC’S
Avalanche Transit Time Devices- principle of operation and characteristics of IMPATT and TRAPATT diodes, Point Contact Diodes, Schottky Barrier Diodes, Parametric Devices, Detectors and Mixers. Monolithic Microwave Integrated Circuits (MMIC), MIC materials- substrate, conductors and dielectric materials. Types of MICs, hybridMICs(HMIC)
UNIT V MICROWAVE MEASUREMENTS


TEXT BOOKS:

REFERENCE BOOKS:
AIM
To learn different types of optical emission, detection, modulation and opto electronic integrated circuits and their applications

OBJECTIVES
- To know the basics of solid state physics and understand the nature and characteristics of light.
- To understand different optical sources.
- To learn the principle of optical detection and mechanism in different detection devices.
- To understand different light modulation techniques and the concepts and applications of optical switching.
- To study optical networks and their applications

UNIT I - INTRODUCTION: OPTICAL FIBRES - STRUCTURES, WAVEGUIDES AND FABRICATION
Introduction to vector nature of light, Basic optical Laws and Definitions, Optical Fiber Modes and Configurations, Single Mode Fibers and Graded-Index Fiber Structures, Fiber Materials, Fiber Fabrication

UNIT II - ATTENUATION AND DISPERSION AND OPTICAL SOURCES
Power Launching and Coupling and Optical Connectors

UNIT III - OPTICAL DETECTORS

UNIT IV OPTICAL AMPLIFIERS
Basic concepts, semiconductor Laser Amplifiers, Erbium-Doped Fiber Amplifier, Raman Fiber amplifier, Brillouin Fiber amplifier. Applications of Optical Amplifiers, Noise in Optical Amplifiers, Noise Figure of Amplifier.

UNIT V OPTICAL NETWORKS AND OPTICAL SPACE COMMUNICATION
Introduction and application of Optical Space Communication.
TEXT BOOKS:

REFERENCE BOOKS:
Objective

- To understand the concept and Devices of Embedded Systems
- To understand the basic programming tool for embedded systems
- To learn about various RTOS available
- To understand the basic real time systems and databases

Unit – I Embedded Devices
9

Unit – II Embedded Programming
9

Unit – III Real Time Operating Systems
9

Unit – IV Real Time Systems and Tasks
9

Unit – V Databases and Communication
9

Text Books

Reference Books:
**AIM**

To make students to understand the Concept and applications of Remote Sensing.

**OBJECTIVE**
- To study the process of remote sensing.
- To study about characteristics of EMR.
- To understand the various satellites and microwave remote sensing.
- To understand the use of Geographic Information System.
- To learn about the recent application of remote sensing.

**UNIT I REMOTE SENSING AND TYPES OF REMOTE SENSING & SENSOR CHARACTERISTICS 9**

**UNIT II EMR INTERACTION WITH ATMOSPHERE AND EARTH MATERIALS 9**

**UNIT III OPTICAL AND MICROWAVE REMOTE SENSING 9**

**UNIT IV GEOGRAPHIC INFORMATION SYSTEM 9**

**UNIT V MISCELLANEOUS TOPICS 9**

**TOTAL HOURS: 45**
TEXT BOOKS

REFERENCE BOOKS
AIM:
Enable students to understand basics, programming techniques, data acquisition and interfacing techniques of virtual instrumentation and to use VI for different applications

OBJECTIVE

- To understand what is Virtual instrumentation and to realize the architecture of VI.
- To familiarize with the VI software and learn programming in VI.
- To study various Instrument Interfacing and data acquisition methods.
- To understand various analysis tools and develop programs for Process control applications.

UNIT I – INTRODUCTION TO REVIEW OF VIRTUAL INSTRUMENTATION

9
History of Instrumentation systems, Evolution of Virtual Instrumentation, Premature Challenges, Virtual Instrumentation - Programming Requirements, Drawbacks of Recent Approaches, Conventional Virtual Instrumentation, Distributed Virtual Instrumentation, Virtual Instruments Versus Traditional Instruments, Advantages of VI

UNIT II – PROGRAMMING TECHNIQUES

9
Introduction, Virtual Instruments, Dataflow Programming, Control Structures, Selection Structures, Arrays, Clusters, Waveform Charts and Graphs, tables, File I/O

UNIT III – DATA ACQUISITION BASICS

9

UNIT IV – COMMON INSTRUMENT INTERFACES

9
Introduction, Current Loop, RS232, RS422 and RSS485, GPIB, VISA, Interface Buses, Data Transmission Concepts

UNIT V – APPLICATIONS OF VI

9

TOTAL HOURS: 45

TEXT BOOKS

REFERENCE BOOKS
AIM
To know and understand how communication is being established at RF, microwave frequencies and using fiber in optical communication.

OBJECTIVES
☞ To have a detailed practical study on RF circuits, microwave equipments
☞ To study the optical devices and to use in the appropriate application

LIST OF EXPERIMENTS
Experiments pertaining to RF, Microwave, Fiber optics, Optical Communication and Fiber optic sensors

RF
2. Characteristics of RF Filter.

MICROWAVE:
2. Characteristics of Reflex Klystron.
3. Characteristics of Directional Coupler
5. Horn Antenna – Gain and directional Characteristics

OPTICAL COMMUNICATION
1. Numerical aperture determination for fibers 
2. D.C. Characteristics of LED and PIN Photo Diode
3. Optical transmission using Analog Modulation
4. Data transmission through Fiber Optic Link.
5. PI Characteristics of LASER diode.
AIM:
To know and understand the concepts of micro controller functioning and to study about various RTOS and their functioning

OBJECTIVE:
To study about the programming concept of embedded systems

LIST OF EXPERIMENTS
1. Design with 16 Bit Processor of Led flash using Msp430.
2. Design with 16 Bit Processor of Timer using Msp430.
3. Design with 16 Bit Processor of Interrupt using Msp430.
4. Design with 16 Bit Processor of Serial communication-RS 232 using Msp430.
5. Design a Led with 8 Bit Microcontrollers-8051.
6. Design a Buzzer with 8 Bit Microcontrollers-8051.
7. Design a Serial port programming with 8 Bit Microcontrollers-8051.
8. Design a LCD with 8 Bit Microcontrollers-8051.
9. Design a Dc motor with 8 Bit Microcontrollers-8051.
10. Design a Timer with 8 Bit Microcontrollers-8051.
11. Study of Real Time Operating System.
13. ADC Interfacing Using 8 Bit Microcontroller-8051.
AIM:
To get practical knowledge in programming techniques, data acquisition and interfacing techniques of virtual instrumentation and to use VI for different applications.

OBJECTIVE
To familiarize with the VI software and learn programming in VI.

LIST OF EXPERIMENTS
2. Verification of Arithmetic Operations.
2. Verification of Half Adder and Full adder.
2. Program to find Addition of First n natural numbers using for and while loop.
3. Implementation of Array functions.
4. Program for implementing seven segment display.
9. Program to perform Traffic light control.
11. Program to control Temperature by using RTD and DAQ.
12. Program to control Temperature by using Thermocouple and DAQ
13. Program to control Temperature by using Thermister and DAQ
14. Program for controlling the Flow of water using DAQ.
15. Program for controlling the Level of water using DAQ.
16. Program for Pressure control using DAQ.
17. Program for controlling the speed of a DC motor using PID tool box.

REFERENCES
AIM:
To create an awareness on Ethics and Human Values in engineering professions and to inspire moral and social values and Loyalty to appreciate the rights of others

OBJECTIVE:
After completing the course the learner should know how to maintain code of conduct in work places and respect to each other.

Unit – I: HUMAN VALUES

Unit – II: ENGINEERING ETHICS

Unit – III: ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study.

Unit – IV: SAFETY, RESPONSIBILITIES AND RIGHTS

Unit – V: GLOBAL ISSUES
Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE),India, etc.

TOTAL HOURS: 45

TEXT BOOKS

REFERENCE BOOKS
## AIM
To impart awareness on disasters and preparedness during disasters.

### OBJECTIVES
- To Understand basic concepts in Disaster Management
- To Understand Definitions and Terminologies used in Disaster Management
- To Understand the Challenges posed by Disasters
- To understand Impacts of Disasters

### UNIT 1 INTRODUCTION
9
Concept of disaster; Different approaches; Concept of Risk; Levels of disasters; Disaster phenomena and events *(Global, national and regional); Natural and man-made hazards*

### UNIT 2 RISK ASSESSMENT AND VULNERABILITY ANALYSIS
9
Response time, frequency and forewarning levels of different hazards; Characteristics and damage potential of natural hazards; hazard assessment ;Dimensions of vulnerability factors; vulnerability assessment; Vulnerability and disaster risk; Vulnerabilities to flood and earthquake hazards

### UNIT 3 DISASTER MANAGEMENT MECHANISM
9
Concepts of risk management and crisis management -Disaster management cycle; Response and Recovery; Development, Prevention, Mitigation and Preparedness-Planning for relief

### UNIT 4 DISASTER RESPONSE
9
Mass media and disaster management-Disaster Response Plan; Communication, Participation, and Activation of Emergency Preparedness Plan-Logistics Management-Psychological Response-Trauma and Stress Management-Rumour and Panic Management-Minimum Standards of Relief-Managing Relief-Funding

### UNIT 5 DISASTER MANAGEMENT IN INDIA
9
Strategies for disaster management planning; Steps for formulating a disaster risk reduction plan; Disaster management Act and Policy in India; Organisational structure for disaster management in India; Preparation of state and district disaster management plans

### TEXT BOOKS

### Total Hours: 45
REFERENCE BOOKS

AIM
To introduce the concepts of wireless / mobile communication using cellular environment and to make the students to know about the various wireless network systems and standards are to be introduced.

OBJECTIVES:
- It deals with the fundamental cellular radio.
- It presents different ways to radio propagation models
- It provides idea about analog and digital modulation techniques used in wireless communication.
- It also deals with the different types of equalization techniques and diversity concepts
- It deals with advanced transceiver schemes and second generation and third generation wireless networks.

UNIT I SERVICES AND TECHNICAL CHALLENGES
Types of Services, Requirements for the services, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems, Principles of Cellular networks, Multiple Access Schemes.

UNIT II WIRELESS PROPAGATION CHANNELS
Propagation Mechanisms (Qualitative treatment), Propagation effects with mobile radio, Channel Classification, Link calculations, Narrowband and Wideband models.

UNIT III WIRELESS TRANSCEIVERS
Structure of a wireless communication link, Modulation and demodulation – Quadrature Phase Shift Keying, π/4-Differential Quadrature Phase Shift Keying, Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Power spectrum and Error performance in fading channels.

UNIT IV SIGNAL PROCESSING IN WIRELESS SYSTEMS
Principle of Diversity, Macrodiversity, Microdiversity, Signal Combining Techniques, Transmit diversity, Equalisers- Linear and Decision Feedback equalisers, Review of Channel coding and Speech coding techniques.

UNIT V ADVANCED TRANSCEIVER SCHEMES
Spread Spectrum Systems- Cellular Code Division Multiple Access Systems- Principle, Power control, Effects of multipath propagation on Code Division Multiple Access, Orthogonal Frequency Division Multiplexing – Principle, Cyclic Prefix, Transceiver implementation, Second Generation(GSM, IS–95) and Third Generation Wireless Networks and Standards

TOTAL HOURS: 45

TEXT BOOKS:

REFERENCES:

BE_ECE_(Full Time)_ CBCS_2016
AIM:
To make students to understand the applications of electronics in diagnostic and therapeutic area.

OBJECTIVE
- To study the methods of recording bio-potentials
- To study how to measure biochemical and various physiological information
- To understand the working of units which will help to restore normal functioning
- To understand the use of radiation for diagnostic and therapy
- To learn about the recent trends in medical field and also the electrical safety in Hospitals

UNIT I - ELECTRO-PHYSIOLOGY AND BIOPOTENTIAL RECORDING
9
The Cell: the Basic Unit of Life - Molecular Components of Cells, The origin of Biopotentials, Biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.

2. BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENTS
9

3. THERAPEUTIC EQUIPMENT
9
Cardiac pacemakers, DC Debrillators, Dialyzer, Artificial Kidney, Artificial Heart, Artificial Ventilation and Ventilators.

4. PHYSICAL MEDICINE AND BIO-TELEMETRY
9
Diathermies – its type and their applications, Bio telemetry – Elements and design of Bio telemetry system, Multi-patient Telemetry, Implantable Telemetry, Tele-stimulation.
Medical imaging-X-ray generation, Magnetic Resonance Imaging system, Image Intensifiers-Computer Aided Tomography,

5. RECENT TRENDS IN MEDICAL INSTRUMENTATION
9

TOTAL HOURS: 45

TEXT BOOKS:
3. Leslie Cromwell, “Biomedical instrumentation and measurement”, Prentice Hall of India New Delhi, 1997. (All Five Units)

REFERENCE BOOKS:
### AIM:
This course is offered to students to gain basic knowledge on RF Identification and various techniques involved in RFID, Applications in Various fields.

### OBJECTIVE:
- To Know the basic concepts in RF Identification
- To learn the Fundamental of RFID Tags
- To learn the RFID authenticity of goods and RFID privacy and regulation.
- To learn the RFID Applications in healthcare, Pharmacy and in Library
- To study about the threats in RFID, hacking and it’s Technical Solutions.

#### Unit-I RFID Principles

#### Unit-II RFID Global and Private Policies
Definitions of Privacy-Personal Information-Current Privacy Paradigm-Privacy through Data protection Law and Fair Information Practices-Understanding RFID’s Privacy threats-current state of RFID Policy-issues – privacy, Integrity, security of the system, Health impact-Labour impact, Current EPC global policy

#### Unit-III RFID in Authenticity of Goods and Interaction Design for Wireless
Important concepts in Authentication-Key Distribution problem-stolen keys and revocation-Authenticity of Tags and Goods. Anticounterfeiting Measures of Goods, Authentication of Readers and Users Across the supply chain-Role of Interaction Design-Designing and Modifying WID Systems-Disclosure at read and Read range, Identifiable Readers, permissions based Tags, Physical remedies

#### Unit-IV RFID Applications

#### Unit-V RFID Technical Solutions, Hacking Problem, threats
Reverse Engineering the protocol-Security Implications-protect against these tyes of Attacks-Bluetooth’s background-Bluetooth security and Privacy Attacks-Cracking Bluetooth-Bluetapping-Locational Surveillance Technical Challenges of RFID Privacy-Blocker Tags-Soft Blocking-Signal to Noise Measurement-Tags with Pseudonyms-Corporate Privacy-Technology and Policy-Robust RFID Security

**Total Hours: 45**

### Text Book:

### Reference Books:
AIM
To enable the students to know about the measurements and recording of Bioelectric Signals.

OBJECTIVES
_videos_
- Record the various Bio Signals and Analysis it.
- To study the different preamplifiers used for amplifying the Bio Signals.
- To measure various physiological parameters using patient monitoring units.

LIST OF EXPERIMENTS
1. Study of Operational amplifier IC741 with its Characteristics.
2. Inverting and Non-Inverting mode of operation.
3. Construction and testing of Instrumentation amplifier
4. Recording and analysis of ECG signals.
5. Recording and analysis of EEG signals.
6. Recording and analysis of EMG signals.
7. Measurement of Heart Beat Rate
8. Measurement of Respiration Rate
9. Measurement of Pulse Rate
10. Study of biotelemetry
### SEMESTER VII

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**AIM:**

The objective of "Comprehension" is to provide opportunity for the student to apply the knowledge acquired during the earlier semesters to real-life problems which he/she may have to face in future as an engineer. While learning as to how to solve real life problems, the student will receive guidance from teachers and also review various courses (subjects) learnt earlier. The comprehension assessment will consist of 100 to 5 tests in each Streams covering all the subject of study in the respective streams under B.E. Electronics and Communication Engineering Course.
OBJECTIVES:

1. The students in batches (not exceeding three in a batch) have to take up a project in the area of their own interest related to their specialization.

2. Each batch is guided by a faculty member. The students have to select suitable problems, design, prepare the drawings, produce the components, assemble and commission the project.

3. The students have to prepare and present a detailed project report at the end of the VI semester.

4. The evaluation will be made for the continuous internal assessment for the Project by a committee nominated by the Head of the Department.
OBJECTIVE

The objective of the project work is to enable the students to form the groups of not more than 3 members on a project involving theoretical and experimental studies related to the branch of study.

- Formation of Group as follows
  - Group A: 8.5 CGPA and above
  - Group B: 7 to 8.49 CGPA
  - Group C: 5 to 6.9 CGPA

Group A Student will have a choice to take 2 students from Group B&C

- Every project work shall have a guide who is the member of the faculty of the institution. Six periods per week shall be allotted in the time table and this time shall be utilized by the students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.

- The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design and manufacture of a device, a research investigation, a computer or management project or a design problem.

- The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department.

- Each student shall finally produce a comprehensive report covering background information, literature survey, problem statement, project work details and conclusion.

- This final report shall be typewritten form as specified in the guidelines.

- The continuous assessment shall be made as prescribed in the regulations.

BE_ECE_(Full Time)_ CBCS_2016
ELECTIVE

SATELLITE COMMUNICATION & BROADCASTING

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AIM:
To understand the basic concept in the field of satellite communication

OBJECTIVE

(web)To obtain knowledge on orbital aspects involved in satellite communication.
(web)To obtain knowledge on Power budget calculation.
(web)To obtain knowledge on Satellite system and services provided

UNIT I - SATELLITE ORBIT

UNIT II - INK DESIGN

UNIT III - SPACE AND EARTH SEGMENT

UNIT IV - SATELLITE ACCESS

UNIT V - BROADCAST AND SERVICES

Total Hours: 45

TEXT BOOK

REFERENCES
ELECTIVE

WIRELESS SENSOR NETWORKS

AIM:
To impart knowledge on the wireless sensors and its network communications

OBJECTIVE

- To study the basic wireless sensor networks
- To study the architecture of WSN
- To study the networking sensors
- To study about infrastructure establishment
- To study the sensor network platforms and tools

UNIT I OVERVIEW OF WIRELESS SENSOR NETWORKS


UNIT II ARCHITECTURES


UNIT III NETWORKING SENSORS


UNIT IV INFRASTRUCTURE ESTABLISHMENT

Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V SENSOR NETWORK PLATFORMS AND TOOLS


TOTAL HOURS: 45

TEXT BOOKS


REFERENCES

AIM
The purpose of Video Processing course is to cover the fundamentals of digital video signal generation and further processing over the communication systems.

OBJECTIVE
To learn the basic concepts of video processing
To learn about the various methodologies for motion estimation
To learn the basic concepts of coding systems
To understand about the waveform based video coding techniques
To understand about the content dependent and scalable video coding techniques

UNIT I VIDEO FORMATION, PERCEPTION AND REPRESENTATION

UNIT II TWO-DIMENSIONAL MOTION ESTIMATION
General Methodologies, Pixel-Based Motion Estimation, Block Matching Algorithm, Mesh-based Motion estimation, Global Motion Estimation, Region Based Motion Estimation, Multi resolution Motion Estimation, Application of Motion Estimation in Video Coding. Feature based Motion Estimation.

UNIT III FOUNDATIONS OF VIDEO CODING
Overview of Coding Systems, Basic Notions in Probability and Information Theory, Information Theory for Source Coding, Binary Encoding, Scalar Quantization, Vector Quantization.

UNIT IV WAVEFORM-BASED VIDEO CODING
Block Based Transform Coding, Predictive Coding, Video Coding Using Temporal Prediction and Transform Coding.

UNIT V CONTENT DEPENDENT & SCALABLE VIDEO CODING
Two Dimensional Shape Coding, Texture coding for Arbitrarily Shaped Regions, Joint Shape & Texture Coding, Region-Based Video Coding, Object-based Video Coding. Basic Modes of Scalability, Object Based Scalability, Wavelet-transform Based Coding.

TOTAL HOURS: 45

TEXT BOOKS:

REFERENCES:
AIM

To learn the architecture and programming of advanced Intel family microprocessors and microcontrollers.

OBJECTIVES

❖ 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

9
Internal Microprocessor Architecture-Real mode memory addressing – Protected Mode Memory addresses – 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

9
Modular programming – Using keyboard and Video display – Data Conversions- Disk files- Interrupt hooks-using assembly languages with C/ C++

UNIT III PENTIUM PROCESSORS

9

UNIT-IV 16-BIT MICRO CONTROLLER

9

UNIT V RISC PROCESSORS AND ARM

9

Total Hours: 45

TEXT BOOK

1. Barry B.Brey, The Intel Microprocessors 8086/8088, 80, 86, 80286, 80386 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, Architecture, Programming and interfacing,
   (UNIT V)
REFERENCE BOOKS
UNIT I - INTRODUCTION TO PHOTONICS

UNIT II - OPTICAL FIBER WAVEGUIDES, SOURCES AND DETECTORS

UNIT III - OPTICAL COMPONENTS AND SYSTEM DESIGN

UNIT IV - OPTICAL NETWORKS ARCHITECTURE

UNIT V - WDM NETWORK DESIGN
WDM network elements, WDM network design - Cost tradeoffs, virtual Topology design, Routing and wavelength assignment, statistical dimensioning models.

TEXT BOOKS
ELECTIVE
MODERN WIRELESS COMMUNICATION SYSTEMS

AIM:
To provide comprehensive background knowledge of wireless, mobile communication and to introduce all the most important wireless technologies

OBJECTIVES
- To discuss the fundamentals of cellular mobile wireless networks
- To provide an overview of various approaches to communication networks
- To study the numerous different-generation technologies with their individual pros and cons
- To discuss about the principles of operation of the different access technologies like FDMA, TDMA, SDMA and CDMA and their pros and cons.

UNIT I-TRANSMISSION FUNDAMENTALS

UNIT II-NETWORK CONCEPTS
Communication Networks: LANs, MANs, WANs, circuit switching, packet switching, ATM Cellular Networks: Cells, duplexing, multiplexing, voice coding Multiple Access Techniques: FDMA, TDMA, SDMA, CDMA, spectral efficiency.

UNIT III-Personal Communication Services
GSM, HSCSD, GPRS, D-AMPS, CDMA One, CDMA Two, Packet Data Systems.

UNIT IV - 3G & BEYOND
IMT-2000, W-CDMA, CDMA 2000, EDGE, Wi-Fi, WiMAX, OFDM.

UNIT V-MOBILE DATA SERVICES & SHORT-RANGE NETWORKS
Mobile Data Services: Messaging, wireless web, WAP, site design Short-Range Wireless Networks: Unlicensed spectrum, W-LANs, cordless telephony, IrDA, Bluetooth Smart Phones: Future phones, mobile OSs, smart phone applications.

TEXT BOOKS:

REFERENCE BOOKS:
AIM

To learn the fundamentals of Robotics and implementation aspects of real time concepts.

OBJECTIVES

☞ To learn about the Basic concepts of Robots
☞ To study the Sensor and Vision Systems.
☞ To learn the Grippers and robot dynamics.
☞ To know about kinematics and path planning.
☞ To learn about Robot Programming Languages and applications

UNIT I BASIC CONCEPTS


UNIT II SENSORS AND VISION SYSTEM


UNIT III GRIPPERS AND ROBOT DYNAMICS


UNIT IV KINEMATICS AND PATH PLANNING


UNIT V PROGRAMMING LANGUAGES AND APPLICATIONS

Robot programming - Fixed instruction, sequence control, General programming language, Specific programming languages. Robots for welding, painting and assembly – Remote Controlled robots – Robots for nuclear, thermal and chemical plants.

Total Hours: 45

TEXT BOOKS:


REFERENCE BOOKS:


BE_ECE_(Full Time)_CBCS_2016
ELECTIVE

ADVANCED DIGITAL DESIGN

3 0 0 3

AIM:
Learning design of digital circuits is a fundamental necessity for designing embedded systems. This subject provides necessary instruments to achieve that goal.

OBJECTIVE:
To make the student learn: theory of logic and logic functions, design of digital circuits, and an introduction to VHDL language.

1. ADVANCED TOPICS IN BOOLEAN ALGEBRA
   Shannon's expansion theorem, Consensus theorem, Octal designation, Run measure, INHIBIT / INCLUSION / AOI / Driver / Buffer gates, Gate expander, Reed Muller expansion, Synthesis of multiple output combinational logic circuits by product map method, Design of static hazard free and dynamic hazard free logic circuits.

2. THRESHOLD LOGIC
   Linear separability, Unateness, Physical implementation, Dual comparability, reduced functions, various theorems in threshold logic, Synthesis of single gate and multigate threshold Network.

3. SYMMETRIC FUNCTIONS
   Elementary symmetric functions, partially symmetric and totally symmetric functions, Mc Cluskey decomposition method, Unity ratio symmetric ratio functions, Synthesis of symmetric function by contact networks.

4. SEQUENTIAL LOGIC CIRCUITS
   Mealy machine, Moore machine, Trivial / Reversible / Isomorphic sequential machines, State diagrams, State table minimization, Incompletely specified sequential machines, State assignments, Design of synchronous and asynchronous sequential logic circuits working in the fundamental mode and pulse mode, Essential hazards Unger's theorem.

5. PROGRAMMABLE LOGIC DEVICES
   Basic concepts, Programming technologies, Programmable Logic Element (PLE), Programmable Logic Array (PLA), Programmable Array Logic (PAL), Structure of Standard PLD’s, Complex PLD’s (CPLD). System Design Using PLD’s - Design of combinational and sequential circuits using PLD’s, Programming PAL device using PALASM, Design of state machine using Algorithmic State Machines (ASM) chart as a design tool. Introduction To Field Programmable Gate Arrays - Types of FPGA, Xilinx XC3000 series, Logic Cell array (LCA), Configurable Logic Blocks (CLB) Input/Output Block (I/OB)-Programmable Interconnect Point (PIP), Introduction to Actel ACT2 family and Xilinx XC4000 families, Design examples.

Reference


OBJECTIVES:
- To tutor the basics of EMI, EMC
- To instill knowledge on the EMI coupling mechanism and its mitigation techniques
- To impart comprehensive insight about the current EMC standards and about various measurement techniques

UNIT I | INTRODUCTION

UNIT II | INTERFERENCE MEASUREMENT
Introduction to Radiated Interference measurement- Anechoic chamber- Transverse electromagnetic cell- Reverberating chamber- Giga-Hertz TEM cell- Comparison of test facilities- Introduction to Conducted Interference measurement- Characterization of conduction currents/voltages- Conducted EM noise on power supply lines- Conducted EMI from equipment.

UNIT III | EMI FILTERS AND COMPONENTS
Introduction to EMI filters- Characteristics of filters- Power line filter design- Introduction to cables, connectors and components- EMI suppression cables- EMC connectors- EMC gaskets- Isolation transformer- Opto-isolators- Transient and surge suppression devices- EMI accessories.

UNIT IV | SPECTRUM CONSERVATION AND EMC COMPUTER MODELING
Introduction to Frequency allocation and frequency assignment- Modulation techniques- Introduction to spectrum conservation- Introduction to EMC computer modeling and simulation- EMC analysis of complex systems- Illustrating an automated system level EMC analysis procedure- Future of EMC computer modeling and simulation.

UNIT V | SIGNAL INTEGRITY AND EMC STANDARDS

TOTAL HOURS: 45

TEXT BOOK:
AIM:
To learn the VLSI Signal Processing Techniques.

OBJECTIVE:
- v To study about Iteration Bound and parallel processing
- v To study about Retiming and Unfolding
- v To study about Systolic Architecture Design
- v To study about Scaling and Lattice Filter
- v To study about pipelining and power reduction techniques

UNIT-I

UNIT-II
Retiming-Unfolding-critical path-retiming properties of unfolding transformation-algorithmic strength reduction in filters & transforms-Discrete cosine transform & Inverse DCT.

UNIT-III
Systolic architecture design-FIR systolic arrays-Systolic design for Space representation containing delays-fast convolution-Pipelined & parallel recursive and adaptive filters.

UNIT-IV
Scaling and round off noise-Digital lattice filter structure-Schur Algorithm-Derivation of one multiplier lattice filter-Normalized lattice filter-Bit level arithmetic Architecture-Bit-serial multipliers-Bit-serial filter design and implementation-Redundant arithmetic-Redundant number representation.

UNIT-V
Numerical strength reduction-synchronous pipelining and clocking styles-Wave pipelining-Asynchronous pipelining-Low power design-Scaling versus power consumption-Power reduction techniques-Programmable digital signal processors.

TOTAL HOURS: 45

TEXT BOOKS:

REFERENCES:
UNIT I – INTRODUCTION

UNIT II – TQM PRINCIPLES

UNIT III – STATISTICAL PROCESS CONTROL (SPC)

UNIT IV – TQM TOOLS

UNIT V – QUALITY SYSTEMS

Total Hours: 45

TEXT BOOKS

REFERENCES
UNIT - I Introduction to Managerial Economics  

UNIT - II Theory of Production and Cost Analysis  
Production Function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, Opportunity cost, Fixed Vs Variable costs, Explicit costs Vs Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA) - Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA.

UNIT III Introduction to Markets & Pricing strategies  
Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing Strategies

UNIT IV Capital and Capital Budgeting  
Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (only theory)

UNIT V Introduction to Financial Accounting & Ratios  
Introduction to Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments only). Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt-Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TOTAL HOURS: 45

TEXT BOOK

REFERENCES
AIM:
This course is offered to students to gain basic knowledge on Nano electronics and various fabrication techniques involved in Nano science.

OBJECTIVE:
- To Know basic concepts in Nanotechnology
- To learn the Fundamental of Nano electronics
- To learn the silicon MOSFET and Quantum Transport Devices
- To learn the fabrication of Carbon Nanotubes
- To study about the Molecular Electronics in Nanotechnology

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

REFERENCES:
AIM

To learn about Programmable logic Controllers.

OBJECTIVES

- To study about programmable logic.
- To study about PLCs and operation of PLC
- To study about PLC programming.
- To study about Timers and counters
- To get an idea about PLC applications

UNIT I PROGRAMMABLE LOGIC

Programmable logic introduction, Programmbale logic structures, Programmbale Logic Arrays (PLAs), Programmable Array Logic (PALs). Field Programmable Gate Array(FPGA). Sequential network design with Programmable logic devices. Design of sequential networks using ROMs and PLAs. Traffic light controller using PAL.

UNIT II PROGRAMMABLE LOGIC CONTROLLERS (PLCS)

Programmable Logic Controller. Introduction part of PLC- Principles of operation. PLC sizes, PLC hardware components, I/O section, Analog I/O section, Analog I/O modules, digital I/O modules. CPU, Processor memory module, Programming devices, Diagnostics of PLCs with computers.

UNIT III PLC PROGRAMMING

PLC programming, simple instructions, Programming EXAMINE ON and EXAMINE OFF instructions , Electromagnetic control relays, Motor starters, Manually operated switches, Mechanically operated and proximity switches, Output control devices, Latching relays, PLC ladder diagram, Converting simple relay ladder diagram into PLC relay ladder diagram.

UNIT V TIMERS

Timer instructions, ON DELAY timer and OFF DELAY timer , counter instructions, UP/DOWN counters, Timer and counter applications, Program control instructions, Data manipulating instructions, math instructions.

UNIT V APPLICATIONS OF PLC

Automatic control of warehouse door, Automatic lubricating oil supplier, Conveyor belt motor control, Automatic car washing machine, Bottle label detection, Process control applications.

TOTAL HOURS : 45

TEXT BOOKS:

REFERENCE BOOKS:
AIM
To students to gain basic knowledge on MEMS (Micro Electro Mechanical System). This enables them to design, analyze, fabricate and test the MEMS based components.

OBJECTIVES
- Introduction to MEMS.
- To study the Mechanics for MEMS Design.
- To study Electro Static Design and System Issues.
- To know various MEMS Applications

UNIT I  INTRODUCTION TO MEMS  9

UNIT II  PRINCIPLES OF MICROSYSTEEMS  9
Micro sensors- Acoustic wave sensors, Biomedical Sensors and Biosensors, Optical Sensors, Pressure sensors, Micro actuation- Actuation using Thermal Forces, Piezoelectric Crystals, Electrostatic Forces, MEMS with Micro actuators- Micro grippers, Micro motors, Micro valves, Micro accelerometers

UNIT III  MICROMACHINING  9
Introduction, Photolithography, Bulk Micromachining, Thin Film Deposition, Etching, surface Micromachining, LIGA

UNIT IV  MICRO-OPTO-ELECTROMECHANICAL SYSTEMS  9
Fundamental Principle of MOEMS Technology, Review Properties of Light, Light Modulators, Beam Splitter, Micro lens, Micro mirrors, Digital Micro mirror Device(DMD), Light Detectors, Grating Light Valve, Optical Switch

UNIT V  MEMS APPLICATION  9

TOTAL HOURS: 45

TEXT BOOKS:

REFERENCE BOOKS:
AIM
To provide adequate knowledge in Electrical and electronic measurements and instrumentation

OBJECTIVES
叆 To make the students to gain a clear knowledge of the fundamental elements of an instrument and static and dynamic characteristics.
叆 Emphasis is laid on the meters used to measure current & voltage and instrument transformers.
叆 To have an adequate knowledge in the measurement techniques for power and energy meters are included.
叆 To have basic knowledge about output display devices.
叆 Elaborate discussion about transducer and its classification.

UNIT I - INTRODUCTION
Functional elements of an instrument - static and dynamic characteristics – errors in measurement - statistical evaluation of measurement data - standard and calibration.

UNIT II - ELECTRICAL AND ELECTRONICS INSTRUMENTS
Principle and types analog and digital ammeters and voltmeters – single and three phase Wattmeters and Energy meter – instrument transformers – instruments for measurement of frequency and phase.

UNIT III - SIGNAL CONDITIONING CIRCUITS

UNIT IV - STORAGE AND DISPLAY DEVICES
Magnetic disc and tape recorders – digital plotters and printers – CRT displays – digital CRO – LED, LCD and Dot matrix displays. Data Logger

UNIT V - TRANSDUCERS
Classification of transducers – selection of transducers – resistive, capacitive and inductive transducers – piezo electric transducers – optical and digital transducers. - transducers for measurement of displacement, temperature, level, flows, pressure, velocity, torque, speed. Smart sensor.

Total Hours = 45

TEXT BOOKS
REFERENCES

AIM:
To study the internal organization and the architecture of computer.

OBJECTIVE:
- To learn about the design of the processors.
- To learn about the data transfer

UNIT I: INTRODUCTION
9

UNIT II: PROCESSOR DESIGN AND CONTROL UNIT
9
Goals – Design process – Data path organization – Main memory interface – Data path for single instructions- Floating point unit data path – Role of control unit – Reset sequence – Interrupt recognition and servicing – Abnormal situation handling – Hardwired control unit – Micro programmed control unit

UNIT III: MEMORY DESIGN & MEMORY MANAGEMENT
9
Memory types – Functional and usage modes – Memory allocation- Multiple memory decoding – Memory hierarchy – Instruction pre fetch – Memory interleaving – Write buffer – Cache memory – Virtual memory – Associative memory

UNIT IV: INTRA SYSTEM COMMUNICATION AND I/O
9

UNIT V: ADVANCED ARCHITECTURE
9

TOTAL HOURS: 45

TEXT BOOKS
REFERENCE BOOKS
AIM:
To learn the basic concepts of Neural Networks & Fuzzy Logic and learn to design and use them for biomedical applications

OBJECTIVES
✧ To understand the basic concepts of artificial neural networks
✧ To study the various ANN Models
✧ To familiarize about the Self organizing maps and competitive networks
✧ To study the basic concepts of fuzzy Logic systems
✧ To apply the concepts of ANN and Fuzzy Logic in Biomedical applications

UNIT I - ARTIFICIAL NEURAL NETWORKS - AN OVERVIEW
9
Neural Networks Basics-Biological Neural nets, Processing elements-Mc Culloh Pitts Model, Types of Learning, Network Parameters-Weights, Activation, Threshold Functions, Hebb Rule, Delta Rule, Perception learning Algorithm.

UNIT II - ANN MODELS
9

UNIT III - SELF ORGANIZING MAPS (SOM)
9

UNIT IV - INTRODUCTION TO FUZZY LOGIC
9
Fuzzy logic-Basic concepts -Fuzzy Vs Crisp set, Linguistic variables, Membership functions, Fuzzy IF-THEN rules, Variable inference techniques, De-fuzzification techniques, Basic fuzzy inference algorithm,. Implementation

UNIT V - NEURAL NETWORK AND FUZZY LOGIC APPLICATIONS IN MEDICINE
9
Neural Networks in Biomedical Applications, Cancer, Cardiovascular Applications, Medical Image Analysis using neural networks, Image Analysis –Case Study, Fuzzy Logic Applications, Fuzzy Logic Controller, Neuro fuzzy systems- Applications in medicine

TEXT BOOKS

BE – ECE (Full Time) – CBCS
REFERENCE BOOKS
AIM:
To represent the concepts of intelligent agents, search techniques, knowledge, reasoning and planning and applications in expert systems.

OBJECTIVE
- To study the ideas of intelligent agents and search methods.
- To study about knowledge representation.
- To study about planning and learning methodologies.
- To construct plans and methods for designing controllers.
- To study the concepts of expert systems

UNIT I – INTRODUCTION TO ARTIFICIAL INTELLIGENCE

UNIT II – SEARCH STRATEGIES AND ALGORITHMS.

UNIT III – KNOWLEDGE REPRESENTATION AND REASONING.

UNIT IV – PLANNING AND LEARNING

UNIT V – EXPERT SYSTEMS

TEXT BOOKS

REFERENCE BOOKS
AIM
To Study about Grid and Cloud Computing.

OBJECTIVES
☞ Understand how Grid computing helps in solving large scale scientific problems.
☞ Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
☞ Learn how to program the grid and the cloud.
☞ Understand the security issues in the grid and the cloud environment.

UNIT I INTRODUCTION

UNIT II GRID SERVICES

UNIT III VIRTUALIZATION
Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

UNIT IV PROGRAMMING MODEL

UNIT V SECURITY
Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TOTAL HOURS: 45

TEXT BOOKS:
REFERENCES
1. Jason Venner, “Pro Hadoop- Build Scalable, Distributed Applications in the Cloud”, A Press, 2009
AIM

To study the critical need for ensuring Information Security in Organizations

OBJECTIVES

❖ To understand the basics of Information Security
❖ To know the legal, ethical and professional issues in Information Security
❖ To know the aspects of risk management
❖ To become aware of various standards in this area
❖ To know the technological aspects of Information Security

UNIT 1

INTRODUCTION


UNIT II

SECURITY INVESTIGATION

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III

SECURITY ANALYSIS

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV

LOGICAL DESIGN


UNIT V

PHYSICAL DESIGN


TOTAL HOURS: 45

TEXT BOOK


REFERENCE BOOKS

AIM
To study the critical need for ensuring Cyber Security in real time problems

OBJECTIVES
‣ To understand the legal, ethical and professional issues in Cyber Security
‣ To know the various attacker techniques

UNIT I CYBER SECURITY FUNDAMENTALS

UNIT II ATTACKER TECHNIQUES AND MOTIVATIONS
Antiforensics – Tunneling techniques – Fraud Techniques - Threat Infrastructure.

UNIT III EXPLOITATION
Techniques to gain a foot hold – Misdirection, Reconnaissance, and disruption methods.

UNIT IV MALICIOUS CODE

UNIT V DEFENSE AND ANALYSIS TECHNIQUES

TEXT BOOK

REFERENCE BOOKS

### ELECTIVE

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**AIM:**
To impart the knowledge on basic functioning of GPS and its calibration.

**OBJECTIVE:**
- To understand Global Positioning systems
- To analyse and calibrate GPS devices
- To learn about various types of communication in GPS

**Unit – I: Overview of GPS**
Basic concept, system architecture, space segment, user segment, GPS aided Geo-augmented navigation (GAGAN) architecture.

**Unit II GPS Signals**
Signal structure, anti spoofing (AS), selective availability, Difference between GPS and GALILEO satellite construction.

**Unit III GPS coordinate frames**
Time references: Geodetic and Geocentric coordinate systems, ECEF coordinates, world geodetic 1984 (WGS 84), GPS time.

**Unit IV GPS orbits and satellite position determination**
GPS orbital parameters, description of receiver independent exchange format (RINEX) – Observation data and navigation message data parameters, GPS position determination.

**Unit V GPS Errors**
GPS error sources – clock error, ionospheric error, tropospheric error, multipath, ionospheric error estimation using dual frequency GPS receiver.

**TEXTBOOKS:**

**REFERENCE BOOKS:**
AIM
To learn about the building up of a successful BI strategy.

OBJECTIVES
- Introduce students to various business intelligence concepts
- To learn the concepts of data integration
- To introduce enterprise reporting

UNIT-I  INTRODUCTION TO BUSINESS INTELLIGENCE

UNIT - II  BASICS OF DATA INTEGRATION

UNIT - III  INTRODUCTION TO MULTIDIMENSIONAL DATA MODELING
Introduction to Data and Dimensional Modeling – Multi Dimensional Data Model – ER modeling Vs Multi Dimensional Model – Concepts of Dimensions - facts - cubes- attributes- hierarchies- star and snowflake schema – Introduction to Business Metrics and KPIs – Creating Cubes using SSAS.

UNIT - IV  BASICS OF ENTERPRISE REPORTING
Introduction to Enterprise Reporting - Concepts of dashboards - balanced scorecards – Introduction to SSRS Architecture– Enterprise Reporting using SSRS reporting service

UNIT - V  BI ROAD AHEAD
BI and Mobility – BI and cloud computing – BI for ERP systems - Benefits of BI in ERP-NorthWind_Traders Data-Data Analyses through Excel-Kettle Tool – Conversion of data using Kettle Tool.

TOTAL HOURS: 45

TEXT BOOKS
1. RN Prasad, Seema Acharya, "Fundamentals Of Business Analytics" Wiley India,2011

REFERENCES
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UNIT I

UNIT II

UNIT III
RDBMS- data processing - the database technology - data models, ER modeling concept -notations - Extended ER features, Logical database design – normalization, SQL - DDL statements - DML statements - DCL statements, Writing Simple queries - SQL Tuning techniques - Embedded SQL – OLTP

UNIT IV

UNIT V

TOTAL: 45 PERIODS