Bharati Vidyapeeth University, Pune

Faculty of Engineering & Technology

Programme : B.Tech (Electronics) Sem – V (2014 Course)

Sr. No.	Name of the Course	Teaching Scheme (Hrs/week)			Examination Scheme (Marks)						Total Marks	Credits		
		L	P	T	End Semester Exam	Continuous Assessment			TW & PR	TW & OR		Theory	TW	Total Credits
						Unit Test	Attendance	Assignments						
27	Microprocessors and Microcontrollers	4	2	0	60	20	10	10	50	-	150	4	1	5
28	Electronic Instruments & Measurement System	3	2	0	60	20	10	10	-	50	150	3	1	4
29	Digital Communication	3	2	0	60	20	10	10	-	50	150	3	1	4
30	Power Devices & Machines	3	2	0	60	20	10	10	-	50	150	3	1	4
31	Electromagnetic Engineering	3	0	1	60	20	10	10	-	-	100	4	-	4
32	Professional Skill Development-V	4	0	0	100	0	-	-	-	-	100	4	-	4
	Total	**20**	**08**	**01**	**400**	**100**	**50**	**50**	**50**	**150**	**800**	**21**	**4**	**25**

Optional Subject

Sr. No.	Name of Course	Teaching Scheme			Examination Scheme							Credits		
		L	P	T	ESE	Continuous Assessment			Practical		Total	Theory	TW	Total
						Unit Test	Attendance	Assignment	TW PR	TW OR				
	Engineering Mathematics IV	4	--	--	60	20	10	10	--	--	100	4	--	4

Bharati Vidyapeeth University, Pune

Faculty of Engineering & Technology

Programme : B.Tech (Electronics) Sem – VI (2014 Course)

Sr. No.	Name of the Course	Teaching Scheme (Hrs/week)			Examination Scheme (Marks)						Total Marks	Credits		
						Continuous Assessment								
		L	P	T	End Semester Exam	Unit test	Attendance	Assignments	TW & PR	TW & OR		Theory	TW	Total Credits
33	Digital Signal Processing	4	2	0	60	20	10	10	-	50	150	4	1	5
34	Embedded Systems	3	2	0	60	20	10	10	-	50	150	3	1	4
35	VLSI Design	3	2	0	60	20	10	10	50	-	150	3	1	4
36	Project Management & Finance	3	0	0	60	20	10	10	-	-	100	3	-	3
37	Electronic Circuit Design	4	2	0	60	20	10	10	-	50	150	4	1	5
38	Professional Skill Development-VI	4	0	0	100	0	-	-	-	-	100	4	-	4
	Total	**21**	**8**	**0**	**400**	**100**	**50**	**50**	**50**	**150**	**800**	**21**	**4**	**25**

Total Credits Sem – V : 25
Total Credits Sem – VI : 25
Grand total : 50

Bharati Vidyapeeth Deemed University,
College of Engineering, Pune

Class: B.Tech (Electronics) Sem:- V

SUBJECT: - Microprocessors & Microcontrollers

Teaching Scheme	**Examination Scheme**
Lecture: 4 Hours/week	**End semester exam: 60 Marks**
Practical: 2 Hours/week	**Continuous Assessment: 40 Marks**
	TW & PR: 50 Marks
	Credits: 05

Course Prerequisites: Students should have basic knowledge of:

- Hexadecimal Number System
- Concept of Encoder Decoder & Multiplexer Demultiplexer

Course Objectives:

- To understand the architecture, instruction sets and various techniques to interface them with different real world I/O devices to accomplish certain tasks.
- To study the architecture of microcontrollers like 8051 and PIC and the instruction set and programming concepts.
- To know the techniques of interfacing them to the real world peripheral devices.
- To impart practical knowledge of 8051, and PIC Microcontroller.

Course Outcomes: On successful completion of this course, students will be able to

1. Identify the different block of microprocessor and microcontroller
2. Study the architecture and instruction set of 8051 and PIC microcontrollers.
3. Use the knowledge of instruction set to perform practical for 8051 and PIC Microcontrollers.
4. Interface peripheral devices with 8051 microcontroller for different applications.

Contents:

Unit I **(08 Hours)**

Introduction to Microprocessors

Evolution of Microprocessors, comparison of Microprocessor & Micro controller. Difference between RISC & CISC microcontrollers, Harvard & Von Neumann Architectures Internal architecture of 8 bit Microprocessor 8085, concept of fetch –decode and execute, Stack and Subroutines, concept of Memory mapped I/O, I/O mapped I/O

Unit-II

8051 Micro Controllers **(08 Hours)**

Architecture, Pin configuration, 8051 timers, counter and related SFR's, Internal RAM structure, 8051 addressing modes.8051 Interrupts Interrupt Priority in the 8051 concept of RESET. Introduction to 8051 assembly language programming: JUMP, LOOP and CALL instructions, Arithmetic instructions, Logic and Compare instructions, and I/O PORT Single bit instruction programming, single bit operations with CY.

Unit-III

8051 Serial Communication &Interfacing of 8051(08 Hours)

Serial Communication of 8051: Basics, SBUF register, SCON and PCON registers, Modes of operation Simple program of serial communication.

Interfacing of 8051 with devices: LED, LCD, keyboard, LM35 temperature sensor & A/D converter

Unit-IV

Communication Protocols **(08 Hours)**

Use of communication protocols, need of communication interface in embedded system

Serial communication protocols: I2C, CAN, USB, UART, Serial peripheral interface(SPI),synchronous serial protocol(SSP).

Parallel communication protocol: PCI,PCI-X

RS232C, RS485/422.

Unit -V

PIC18F Family **(08 Hours)**

PIC18F programming model, instruction set Data copy, arithmetic, branch, logical, bit manipulation and multiply-divide operations, Stacks, subroutines and macros, Role of Assembler.

Unit-VI

Interrupts, Timers & Serial I/0 in PIC18F (08 Hours)

Concepts of Interrupts and Timers, Interrupts and their implementation in PIC18, The PIC18 timers, Use of Interrupts in applications. Concept of serial I/O, SPI protocol

List of Experiments:

Any 8 experiments should be conducted

1. Study of 8051µc using Keil software:
   (a) Block transfer without memory overlapping
   (b) Block transfer without memory overlapping
2. (a) To convert BCD no. to Hex no.
   (b) To convert Hex no. to BCD no.
3. To perform: (a) BCD up Counter
   (b) BCD down Counter
4. To generate a square wave of 5ms delay
5. To interface stepper motor with 8051µc
6. To interface LED with 8051µc
7. To interface Keyboard with 8051µc
8. To interface ADC/DAC with 8051µc
9. To perform 8/16-bit addition & subtraction using PIC microcontroller.
10. Serial communication by PIC microcontroller

List of Assignments:

1. Explain a Boolean processor of microcontroller 8051with two examples
2. Mention a real time application of microcontroller 8051.
3. Mention a real time application of PIC microcontroller.
4. Design a microcontroller (8051) based interfacing system with memory.
5. What is memory address decoding? Explain the different types of decoding.
6. An overview on PIC families.

Content Delivery Methods: Chalk & talk, Power point presentation

Assessment Methods:

1. Continuous Assessment (Unit Test, Tutorials/ Assignments, Attendance)
2. End term Examination

Text Books:

1. Muhammad Ali Mazidi, Janice Gillespie Mazidi, "The 8051 Microcontroller and Embedded System" Pearson Education.
2. Muhammad Ali Mazidi, Rolin D. McKinlay, Danny Causey," PIC Microcontroller and Embedded Systems"3rd Edition ,Pearson Education
3. Ramesh Gaonkar "Fundamentals of Microcontrollers and Applications in Embedded Systems" (with the PIC18 Microcontroller Family) 2007 Edition,Penram international

Reference Books:

1. John B Peatman "Designing with PIC Microcontrollers" 2004 Pearson Education.
2. Ajay V. Deshmukh, "Micro-controllers - Theory and Applications", Tata McGraw Hill.
3. Kenneth J. Ayala, "The 8051 Micro-controller – Architecture, Programming & Applications", Second Edition Penram International & Thomson Asia,

Bharati Vidyapeeth Deemed University,
College of Engineering, Pune

Class: B. Tech. (Electronics) Sem: - V

SUBJECT: - Electronic Instruments and Measurement System

Teaching Scheme	**Examination Scheme**
Lecture: 3 Hours/week	**End semester exam: 60 Marks**
Practical: 2 Hours/week	**Continuous Assessment: 40 Marks**
	TW &OR : 50 Marks
	Credits: 04

Course Prerequisites:

- Knowledge of process instrumentation.
- Knowledge of Integrated circuits.

Course Objectives:

- To help the students to have knowledge of the basic of instrumentation.
- To study the principles of working of various signal generators and wave analyzers
- To study the principle of working of CRO is specifications, applications in detail and study the working of various advanced CRO's and their applications.

Course Outcomes: On successful completion of this course, students will be able to:

1. Describe specifications, features and capabilities of electronic instruments
2. Use the electronic instruments like signal generators, wave analyzers, and various oscilloscopes by knowing their specifications for electronic measurements.
3. Make the required measurement using various instruments

Contents:

Unit-I

Fundamentals of Instrumentation & Measurement: (06 Hours)

Necessity of Electronic Measurements, Block diagram of electronic measuring system, Concepts of Accuracy, Precision, Linearity, Sensitivity, Resolution, Hysteresis, Calibration etc. Measurement Errors, Voltage, Current, Resistance measurement using DMM- 4 ½ & 6 ½, Auto zeroing, Auto ranging.

Unit-II

Measuring Instruments (06 Hours)

Voltage, current and impedance measurement, VTVM, TVM, DVMs, AC voltmeters true RMS meters, vector voltmeter, vector impedance meter, direct current probes, alternating current probes, LCR-Q meter.

Unit-III

Signal Generators & counters (06 Hours)

standard signal generators, swept frequency generator, random noise generator, Audio frequency signal generation, RF generator, Pulse generator (block diagram), Function generator Time, Frequency, Ratio, Time interval, Period & Multiple Period averaging using digital universal frequency counter.

Unit-IV

Oscilloscopes: (06 Hours)

Overview of analog CRO, dual/ Multi-trace CRO, Various CRO probes &its applications. Digital Storage Oscilloscope - Sampling speed & Memory depth of DSO, Design considerations, Attachments to DSO for enhancing the functionality, Measurements such as FFT, Math Functions, Curve Tracer, and Power scope.

Unit-V

Communication Measurements: (06 Hours)

Communication measurements, Measurements on transmitter and receiver: sensitivity, selectivity, phase jitter, S/N ratio, co-channel interference, SINAD test etc. Network analyzer-system elements, measurement accuracy, scalar network analyzer, vector network analyzer, S-parameter measurement using network analyzer, EMI/EMC standards.

Unit-VI

Signal Analyzers & computer aided measurements: (06 Hours)

Harmonic and Wave analyzer, Distortion factor meter, Spectrum analyzer -FFT analyzer, tracking generator, Logic analyzer, logic timing analyzer, logic state analyzer, FFT analyzer, Mixed signal oscilloscope, IEEE 488, VXI based instruments, Introduction of Lab view software.

Content Delivery Methods: Chalk & talk, Power point presentation

Assessment Methods:

1. Continuous Assessment (Unit Test, Tutorials/ Assignments, Attendance)
2. End term Examination

List of Experiments:

1. Peak, average and r.m.s. measurement using rectifier circuit.
2. Measurement using spectrum analyzer and tracking generator. Observing spectrum of AM and FM waveforms for different modulation indices
3. Measurements on DSO:
   i) FFT analysis of LF signal
   ii) Capturing transients
   iii) Storing and retrieving number of different signals
   iv) Study of various operations like add, subtract, integrate, differentiate.
4. Measurement and timing analysis of digital signals using Logic Analyzer.
5. Measurement of Total harmonic distortion using distortion factor meter.
6. Measurements on L-C-R Q meter.
7. Measurements with Universal counter (Frequency, Period, frequency ratio, Period Averaging and Time interval).

8. Study of characteristics of Diode, Transistors using Curve Tracer.

List of Assignments:

1. Calibration of DVM for any one range: e.g. 200V dc, 200Vac, 200mA dc, using standard calibrator or standard 6½ DMM.
2. Presentation on LCR-Q meter.
3. Describe any one real time applications of random noise generator.
4. Mathematical operations using Lab view software.
5. Seminar on network analyzer.
6. Describe any one real time applications of power scope.

Text Books:

1. Oliver-Cage, "Electronic Measurements and Instrumentation", TATA McGraw Hill, 1975.
2. M.M.S. Anand, "Electronics Instruments and Instrumentation Technology", Prentice Hall India, New Delhi, 2009.
3. Albert D. Helfrick and William D. Cooper,"Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall of India, 2010.

Reference Books:

1. Coombs, Clyde F. Jr., "Electronic Instrument Handbook", McGraw Hill, 2000.
2. J.J. Carr, "Elements of Electronic Instrumentation and Measurement", Pearson Education India, New Delhi, 2011.
3. A. J. Bouwens, "Digital Instrumentation", TATA McGraw Hill, 1997.
4. H.S. Kalsi, "Electronic Instrumentation", Tata McGraw Hill, New Delhi, 2010

Bharati Vidyapeeth Deemed University,
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Class: B.Tech (Electronics) Sem :- V

SUBJECT :- Digital Communication Systems

Teaching Scheme	**Examination Scheme**
Lecture: 3 Hours/week	**End semester exam: 60 Marks**
Practical: 2 Hours/week	**Continuous Assessment: 40 Marks**
	TW &OR : 50 Marks
	Credits: 04

Course Prerequisites:

- Understanding of continuous and discrete linear systems.
- Knowledge of probabilities and random variables.
- Understanding of Fourier Transform.

Course Objectives:

- To understand the building blocks of digital communication system.
- To prepare mathematical background for communication signal analysis.
- To understand the basics of baseband and pass band digital communication systems.
- To analyze error performance of a digital communication systems.
- To acquire the knowledge of spread spectrum communication systems.

Course Outcomes: At the end of the course, a student will be able to

1. Solve and analyze problems related to Probability theory & random processes.
2. Identify and describe different modulation & detection techniques in digital communication &compare their performance.
3. Characterize error-control coding techniques

4. Analyze Performance of spread spectrum communication systems.

Contents:

Unit –I **(06 Hours)**

Overview of Probability Theory and Random Variables:

Sample space, events, Conditional probability, Joint probability, Baye's rule, random variables. Continuous and discrete random variables, ,Cumulative distribution Function, probability distribution function, Statistical averages, Random Processes, Time average, Ergodicity.

Unit -II

Digital transmission of analog signals **(06 Hours)**

Introduction to Digital Communication System, Sampling Process, Quantization–Uniform, Non-Uniform ,Companding, A-Law, μ Law, Pulse code modulation Delta Modulation, Adaptive Delta Modulation, Delta Sigma Modulation, Differential Pulse Code Modulation.

Unit –III : **(06 Hours)**

Baseband Transmission and Reception:

Line codes: Unipolar, Bipolar, NRZ, RZ, RZ-AMI, Manchester, Properties & their spectra, M-ary Signaling, ISI, scrambler, Unscramble. Optimum Receivers-Matched Filters, Correlation receivers.

Unit-IV **(06 Hours)**

Bandpass Modulation Techniques:

ASK, PSK, FSK, Binary Phase shift keying, Differential Phase shift keying, Differential encoded PSK, Quadrature PSK, M-ary PSK, Quadrature Amplitude shift keying (QASK), Binary frequency shift keying, Minimum shift keying (MSK) , signal space representation, Performance evaluation of modulation techniques in terms of probability of error (No derivations)

Unit-V

Error Control Coding: **(06 Hours)**

Types of Errors & codes, Linear block codes, error detection & correction, Hamming codes. Cyclic codes: Encoding and syndrome decoding. Convolutional codes, Introduction to turbo codes.

Unit-VI **(06 Hours)**

Spread Spectrum Techniques:

Introduction, Generation of PN Sequences and its properties, Direct Sequence Spread Spectrum Signals, Frequency Hopped Spread Spectrum Signals, Introduction to Multiple Access Techniques: CDMA, TDMA, FDMA.

List of Experiments:

Minimum 8 experiments should be conducted.

1. To verify the sampling theorem.
2. To study Pulse Code Modulation System (PCM) System.
3. To analyze a Delta modulation system and interpret the modulated and demodulated waveforms.
4. To perform ASK (Amplitude Shift Keying) System.
5. To study PSK (Phase Shift Keying) System.
6. To study FSK (Frequency Shift Keying) System.
7. To study of Quadrature Phase Shift Keying (QPSK).
8. To study of Spread Spectrum techniques.
9. To simulate any digital modulation scheme using MATLAB.
10. To perform different Data Formats
11. To study of Hamming codes.

List of Assignments:

Any six assignments can be completed

1. Study of sampling theorem using Virtual Labs
2. Study of ASK/FSK/PSK system using Virtual Labs.
3. Study of hamming code.
4. Experiments on random signals using MATLAB
5. Simulation of communication system using MATLAB.
6. Study of Eye Diagram using oscilloscope
7. Presentation on any communications topic relevant to the course.

8. Industrial Visit

- **Content Delivery Methods:** The course will be delivered through lectures, class room interaction, group discussion, exercises and quizzes.
- **Assessment Methods:**
  1. Unit Test 2. Assignments
  3. Continuous Assessment 4. End term Examination

Text books:

1. Sklar, Bernard, "Digital Communications, Fundamentals & Applications," Second Edition, Prentice-Hall Inc.,2001.
2. Leon W. Couch, "Digital and Analog Communication Systems", Sixth Edition, Pearson Education, 2001.
3. Lathi B P, and Ding Z "Modern Digital and Analog Communication Systems," Fourth Edition ,Oxford University Press.

Reference Books:

4. Haykin Simon, "Digital Communication Systems," Forth Edition,John Wiley and Sons, New Delhi.
5. Taub, D. Schlling, and G. Saha, "Principles of Communication Systems," Third Edition, Tata McGraw Hill.
6. John G. Proakis , "Digital Communication" ,Fifth Edition, Pearson Education.

Bharati Vidyapeeth Deemed University,
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Class: B.Tech (Electronics) Sem:-V
SUBJECT: - Power Devices & Machines

Teaching Scheme	**Examination Scheme**
Lecture: 3 Hours/week	**End semester exam: 60 Marks**
Practical: 2 Hours/week	**Continuous Assessment: 40 Marks**
	TW &OR : 50 Marks
	Credits: 04

CoursePrerequisites:

- Knowledge of the principals and applications of electronic devices including semiconductor diodes, bipolar-junction and field-effect transistors.
- Understanding of transformers and magnetically coupled circuits

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Course Objectives:

- To understand and acquire knowledge about various power semiconductor devices.
- To understand the operation, characteristics and performance parameters of controlled rectifiers.

Course Outcomes: On successful completion of this course, students will be able to

1. Compare various power devices with their driver circuits & protection circuits
2. Comprehend the principle operationand models of different types of power electronic converters AC-DC, DC-AC and DC-DC converter systems.
3. Describe the basic principles of HVDC, UPS, motors, etc.

Contents:

UNIT I : (06 Hours)

Power devices

Power Diodes: Construction, Switching characteristics; Power BJT, PBJT: Construction, Operation, switching characteristics, Power MOSFET: PMOSFET, Construction, Operation, Static characteristics, switching characteristics, safe Operating Area, IGBT: Construction, Operation, Switching characteristics, Safe operating area.

Thyristor: Construction, Operation, transistor analogy, static characteristics, switching characteristics, thyristor turn-on, thyristor turn-off. DIAC / TRIAC – construction and operating Principle, Applications. GTO: Construction, Operation, Turn off mechanism, Applications, driver, protection and snubber circuits for power devices

UNIT II. **(07 Hours)**

Single phase AC-DC converters

Concept of line commutation, Single phase half controlled and fully controlled converters- Circuit diagram, operation and waveforms for resistive and highly inductive loads, Analysis of output voltage and supply current including following performance parameters: average and RMS output voltage, Fourier series expressions for supply current, power factor improvement, performance factors of line commuted converters, effect of source impedance.

UNIT III **(05 Hours)**

Three phase AC-DC converters

Three phase half controlled and fully controlled converters- Circuit diagram, operation and waveforms for resistive and highly inductive loads, Analysis of output voltage and supply current including following performance parameters: average and RMS output voltage.

UNIT IV **(06 Hours)**

Inverters

Single & Three-phase Inverters:

Circuit diagram, operation & waveforms for single phase full bridge &Push pull inverters. Switching techniques for obtaining square, quasi-square & sinusoidal PWM o/p waveforms. Use of Pulse width modulated IC's for Inverter control. Fourier analysis of quasi-square waveform & harmonic load currents for R& RL loads. Circuit diagram, operation & waveforms for three phase voltage source bridge inverters for 120 degree & 180 degree conduction for balanced star resistive load.

UNIT V. **(06 Hours)**

Switched & resonant DC/DC converters

Control of DC/ DC converters. Circuit diagram, Waveforms & operation (o/p voltage calculation) of step down chopper (Buck converter), Step up chopper (Boost converter) & 2-

quadrant type C chopper. Circuit diagram, waveforms, operation & design of Fly back converter (SMPS)

Need for resonant converters:

Circuit diagram, waveforms & operation of SLR half bridge DC/DC converter in low frequency (discontinuous conduction) mode.

UNIT VI **(06 Hours)**

Introduction to Motors and Power converter applications

Motors: DC motors, AC Motors, Special Purpose Motors, Induction Motor, Universal Motor, Stepper Motor, Servomotors etc. (Qualitative analysis only)

Applications: UPS, HVDCtransmission, electronic ballast

Content Delivery Methods: Chalk & talk, Power point presentation.

Assessment Methods:

1. Unit Test
2. Continuous Assessment
3. End term Examination

List of Experiments:

1. Study of characteristics of SCR
2. Study of Triggering circuits
3. Study of characteristics of IGBT
4. Study of characteristics of TRIAC
5. Study of single phase half controlled converter
6. Study of single phase fully controlled converter
7. Study of three phase half controlled converter
8. Study of TRIAC based AC motor control
9. Study of three phase VSI inverter
10. Study of first quadrant chopper
11. Study of UPS
12. Study of light dimmer

List of Assignments:

1. Real life applications of inverters.
2. Real life applications of PV cells.

3. Applications of single phase converter.
4. Different types of cyclo converters.
5. Describe AC Voltage regulators.
6. Real life applications of power devices.

Text Books:

1. M. H. Rashid, "Power Electronics Circuits, Devices And Applications", PHI, 3rd Edition, 2004, New Delhi
2. M D Singh & K B Khanchandani, "Power Electronics", TMH, New Delhi
3. P. C. Sen, "Modern Power Electronics", S. Chand & Co., New Delhi

Reference Books:

1. S. Tamil Asgar, "Power Electronics", PHI, 2004, New Delhi
2. N. Mohan, T. M. Undeland& W. P. Robbins, "Power Electronics, Converters Applications And Design", John Willey and sons, 3rd edition, Singapore
3. V. R. Moorthi, "Power Electronics, Devices, Circuits & Industrial Applications", Oxford University Press, New Delhi, 2005.

Bharati Vidyapeeth Deemed University,
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Class: B. Tech (Electronics) Sem:-V

SUBJECT: - Electromagnetic Engineering

Teaching Scheme	**Examination Scheme**
Lecture: 3 Hours/week	**End semester exam: 60 Marks**
Tutorial: 1 Hour/week	**Continuous Assessment: 40 Marks**
	Credits: 04

CoursePrerequisites:
Fundamentals of integration, differentiations, partial diffraction.

Course Objectives:

- Provide fundamentals of Static Electromagnetic Fields.
- Explain basics of the vector Differential, Integral operators to Electromagnetic theory & Electrostatic & Electromagnetic fields.
- Define and derive different laws in Electrostatic & Electromagnetic fields.
- Explain Maxwell's equations and concepts of transmission lines.
- Analyze techniques for formulating and solving problems in Electrostatic & Electromagnetic fields.
- Develop mathematical skills related with differential, integral and vector calculus.

Course Outcomes: On successful completion of this course, students will be able to

4. Comprehend the fundamentals of Electrostatic and Electromagnetic fields..
5. Apply Gauss' law, Ampere's Law, Biot-Savart law, Faraday's law and laws related with steady magnetic field while solving problems in Electrostatic and Electromagnetic fields.
6. Develop field equations from understanding of Maxwell's Equations.

7. Extend the knowledge of basic properties of transmission lines to analyzeelectromagnetic wave propagation in generic transmission line geometries.
8. Demonstrate mathematical skills related with differential, integral and vector calculus.

Contents:

Unit I

Co-ordinate Systems (5 Hours)

Vector Algebra, product of vectors, Co-ordinate systems, Curl, Divergence & Gradient, Stoke's Theorem, Poisson's and Laplace Equations, Coulomb's law, line, Surface & Volume Charge distribution.

Unit II

Electrostatic Fields (7 Hours)

Electric Field Intensity, Electric Field due to infinite line and surface charges, Electric Flux Density, Gauss law (differential and integral form) and its applications, Divergence Theorem, Electric Potential and gradient, Work done, Energy Density, Electric Dipole and moment. Polarization in Dielectrics, Boundary conditions for Dielectric and Dielectric, boundary conditions for Conductor and Dielectric, boundary conditions for Conductor and free space. Method of Images for point and line charge, Capacitance – parallel, co-axial and spherical, Continuity equation.

Unit III

Magnetostatic Fields (6 Hours)

Biot - Savart law, Magnetic Field Intensity due to infinite and finite line. Ampere's Circuital Law in integral and differential form, Applications of Amperes Circuital law, Magnetic flux density, vector magnetic potential, Magnetic Torque, moment and dipole, nature of magnetic material, magnetization, Magnetic boundary conditions

Unit IV

Time Varying Fields& Wave Propagation (7 Hours)

Faradays law of induced emf, displacement current, Maxwell's Equations in point form & Integral form for various fields, Wave equations, wave propagation through different medium,

skin depth, Poynting theorem, wave polarization, Reflection of plane wave from conducting medium, perfect dielectric.

Unit V
Transmission Lines (6 Hours)

Physical Description of Transmission line propagation, Transmission Line equations, Characteristic equation of infinite Transmission Line, Complex analysis of sinusoidal waves, Transmission lines equations & their solutions in phasor form, Uniform terminated Transmission Line, Input impedance, Phase velocity and group velocity, Short circuited and open circuited line, Reflection coefficient VSWR, smith chart (Numerical expected) and applications.

Unit VI
Waveguides & Electromagnetic radiation (5 Hours)

Plane wave analysis of parallel-plate waveguide, rectangular waveguides, TE and TM modes, wave impedance, wave velocities, attenuation in waveguide, EMI/EMC concepts, basic radiation principles, Hertzian dipole, magnetic dipole, thin wire antennas, antenna specifications, antenna arrays.

Content Delivery Methods: Chalk & talk, Power point presentation.

Assessment Methods:

4. Unit Test
5. Continuous Assessment
6. End term Examination

List of Assignments:

1. Analyze Coulombs law, Gauss Law, Divergence theorem with different problems on Scilab / MATLAB (Refer www.scilab.in-resources/completd book and Hayt& Buck, Engineering Electromagnetics, 7th Edition Tata McGraw-Hill).
2. Analyze Maxwell's equations for different fields on Scilab / MATLAB
3. Experimental study on antenna trainer kit & study different antenna specifications.
4. Analyze experimentally waveguides on Microwave test bench.
5. Analyze uniform plane wave for different media on Scilab / MATLAB

6. Analytical problems on transmission lines.

List of Tutorials: The main objective of this tutorial is to focus on the outcomes defined in the theory syllabus by solving the following problems based on paper work.

1. Find the Electric field intensity and electric flux density at a given point due to following charge distributions. (In all coordinate systems)
    - Point charges
    - Line charges (finite and infinite)
    - Surface charges (finite and infinite)
    - Mixed charges (Point charge, Line charge, Surface charge)
2. Application of Gauss's law
    - Given ρ_v (volume charge density) in a particular region, find $\overline{D}$ (electric flux density) using Law at the given location.
    - Given ρ_s(surface charge density), find $\overline{D}$ (electric flux density) using Gauss's Law at the given location.
    - Given $\overline{D}$ (electric flux density), find total charge enclosed by the surface (Q), ρ_v (volume charge density) using Gauss's Law.(In all coordinate systems).
3. Find the electrostatic fields (Tangential and Normal) at the boundary between,
    - Free space and dielectric medium
    - Free space and conductor
    - Dielectric medium and conductor
    - Two dielectric media.
    - Two dielectric media when boundary is defined by a equation of plane.
4. Find $\overline{H}$ (Magnetic field intensity) and $\overline{B}$ (Magnetic flux density) at a given point due to,
    - Infinitely long current carrying conductor
    - Finite current carrying conductor
    - Infinite conducting surface
    - Finite conducting surface

- Different current carrying configurations (i.e. thin conductor, surface all together)

5. For the following current carrying configurations, find the $\overline{H}$ (Magnetic field intensity) in a given region (or point) using Ampere's circuital law.
   - Infinitely long current carrying conductor
   - Infinite cylindrical surfaces of different radii all centered at the same axis.
   - Spherical surfaces of different radii all centered at a given point.
6. Given the (Magnetic field intensity) of a particular region, find current (I), current density (J), enclosed by the given surface. (In all coordinate systems).
7. Given $\overline{H}$ (or $\overline{E}$) and the region properties (like ε, μ, σ etc.), find $\overline{B}$, $\overline{D}$ and $\overline{E}$ (or $\overline{H}$) using Maxwell's equations. (In all coordinate systems).
8. Given the primary constants (R, L, G, C) along with the generator specifications and termination, find secondary constants (α, β, γ, Z_0) and other parameters like Velocity, wavelength, received voltage, received power, reflection coefficient etc.
9. Problems on Transmission Line Analysis.
10. Problems on Impedance matching and design of stub matching using Smith Chart.

Text Books:

1. A. Murthi," Electromagnetic fields", S. Chand.
2. Edminister J.A, "Electromagnetics", Tata McGraw-Hill.

Reference Books:

1. Hayt& Buck, "Engineering Electromagnetics", 7th Edition, Tata McGraw-Hill.
3. Kraus,Fleisch, "Electromagnetics with applications", 5th Edition, McGraw Hill.
4. A. Das & S. K. Das, "Microwave Engineering", 2nd edition, McGraw Hill.
6. Jordan &Balmain, "Electromagnetic waves & radiating systems", 2nd edition, PHI.

Bharati Vidyapeeth Deemed University,
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Class: B. Tech (Electronics) Sem:-VI

SUBJECT: - Digital Signal Processing

Teaching Scheme	**Examination Scheme**
Lecture: 4 Hours/week	**End semester exam: 60 Marks**
Practical: 2 Hours/week	**Continuous Assessment: 40 Marks**
	TW& OR: 50 Marks
	Credits: 05

CoursePrerequisites:

- Knowledge of mathematics
- Knowledge of signals and systems

Course Objectives:

- To introduce the concept of discrete Fourier transform.
- To learn the algorithm of fast computation.
- To design the finite impulse response filter & infinite impulse response filter.
- To learn the finite word length effect of filter.
- To understand the architecture & programming of DSP processor.

Course Outcomes: On successful completion of this course, students will be able to

1. Compute the Discrete Fourier transform & Fast Fourier transform.
2. Design FIR and IIR filters.
3. Understand the finite word length effect in digital filters.
4. Implement the various applications on DSP processor.

Contents:

Unit –I **(07 Hours)**

Discrete Fourier Transform:

Definition, periodicity concept, relationship with Z transform and Fourier series, properties, circular convolution, applications like linear filtering, overlap save, overlap add method, frequency analysis etc.

Unit-II **(09 Hours)**

Fast Fourier Transform Algorithm:

Direct computation of D.F.T., its computational complexity, FFT algorithms, their classification, radix 2 FFT algorithms, DIT – FFT, DIF –FFT, Inverse radix 2 algorithms, FFT algorithms for composite value of N, Goertzel algorithm, Chirp Z transform algorithm, Quantization effects, applications.

Unit-III **(08 Hours)**

Design of FIR Filters

Realization of FIR filters,Symmetric and anti symmetric FIR filters, design of linear phase FIR filters using different windows, frequency sampling method, FIR differentiators, Hilbert transformers, and Optimum equiripple linear FIR filters.

Unit-IV **(08 Hours)**

Design of IIR Filters:

Realization of IIR filters, Butterworth and Chebyshev approximations, frequency transformations, design of IIR filters from analog filters using Approximation of derivatives, impulse invariance, Bilinear transform, design of IIR filters from pole zeroplots.

Unit-V **(08 Hours)**

Finite Word Length Effects in Digital Filters

Number representation, fixed point, sign-magnitude, one's complement, two's complement forms, floating point numbers , Quantization, truncation, rounding, effects due to truncation and rounding, Input quantization error, Product quantization error, co-efficient quantization error, zero-input limit cycle oscillations, overflow limit cycle oscillations, scaling, Quantization in Floating Point realization IIR digital filters, finite word length effects in FIR digital filters, quantization effects in the computation of the DFT- quantization errors in FFT algorithms.

Unit-VI **(08 Hours)**

Introduction to DSP Processors

Introduction to fixed point and floating point DSP processor, multiplier and multiplier accumulator (MAC), modified bus structures and memory access schemes in DSPs, multiple access memory, multiport memory, VLIW architecture, pipelining, special addressing modes, on-chip peripherals .

Features of TMS 320C67xx DSP processor, architecture of TMS 320c67xx DSP processor, architecture features: computational units, bus architecture memory, data addressing, address generation unit, program control, program sequencer, pipelining, interrupts, features of external interfacing, Speech Processing: Speech analysis, digital processing of audio signals.

Content Delivery Methods: Chalk & talk, Power point presentation.

Assessment Methods:

7. Unit Test
8. Continuous Assessment
9. End term Examination

List of Experiments:

Minimum 10 experiments should be conducted using MATLAB & at least one using hardware.

1. To find DTFS for periodic and DTFT for non periodic signal.
2. To find DFT IDFT of DT signal.
3. To find the response of DT system using convolution.
4. To find the stability of DT system using the concept of convolution.
5. To perform convolution using overlap and add method.

6 To perform circular convolution.

7. To plot pole zero plot of Z-domain using transfer function.
8. To solve the difference equation and find the system response using Z transform.
9. To find the impulse invariance IIR digital filter to realize the first order analog Butterworth filter.
10. To design IIR filter for first order analog Butterworth approximation using bilinear transformation.
11. To find and plot the frequency response for the rectangular and Hamming window.
12. To Design FIR filter using frequency sampling method.
13. To plot spectrogram of speech signal.
14. To implement convolution sum using DSP processor.
15. To implement Speech processing applications using DSP processors.

List of Assignments:

Assignments should be conducted using SCILAB

1.Linear and circular convolution

2.DFT and IDFT

3.FFT& IFFT

4.Realization of filters

5..Design of FIR filter

6.Design of IIR filter

Text Books:

1.Proakis J., Manolakis D., "*Digital Signal Processing*", Pearson Education

References Books:

1. Babu R., "Digital Signal Processing", 4th Edition, Scitech Publications.

2. Salivahanan, Ganpriya and Vallavraj,"Digital signal Processing"Tata McGraw-Hill.

3. Ifeachor, Jervis "Digital Signal Processing ", Pearson Education.

4.Texas Instruments, DSP Manual.

5. B. VenkataRamani and M. Bhaskar, "Digital Signal Processors, Architecture, Programming and Applications", Tata McGraw Hill.

Bharati Vidyapeeth Deemed University,
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Class: B. Tech (Electronics) SEM:-VI

SUBJECT: - Embedded Systems

Teaching Scheme	**Examination Scheme**
Lecture: 3 Hours/week	**End semester exam: 60 Marks**
Practical: 2 Hours/week	**Continuous Assessment: 40 Marks**
	TW& OR: 50 Marks
	Credits: 04

CoursePrerequisites:

- Fundamentals of Computer, Digital Logic Circuits, Computer Organization and Architecture.

Course Objectives:

- To understand need and application of ARM Microcontroller in embedded system.
- To study the architecture of ARM series microcontroller
- To understand architecture and features of typical ARM7& ARM CORTEX-M3 Microcontroller.
- To learn interfacing of real world input and output devices

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Course Outcomes: On successful completion of this course, students will be able to

1. Develop Firmware Embedded Systems.
2. Interface the advanced peripherals to microcontrollers.
3. Design embedded system with available resources.

Contents:

Unit 1:Introduction to Embedded Systems (4 Hours)

Definition of Embedded System, Embedded Systems Vs General Computing Systems, Classification, Characteristics of Embedded Systems, Hardware and Software components of an Embedded System, Introduction to IDEs. Major Application Areas.

Unit 2:Introduction to embedded programming & RTOS (8 Hours)

Introduction to embedded data types in embedded C, addressing memory & I/O, I/O functions of embedded C. Examples on Embedded C.

RTOS:Architecture of kernel, Task and Task scheduler, Interrupt service routines, Semaphores, Mutex, Mailboxes, Message queues, Event registers, Pipes, Signals, Timers, Memory management, Priority inversion problem.

Unit 3:ARM7 Based Microcontroller (8 Hours)

Introduction to ARM processors and its versions: ARM7, ARM9 & ARM11 features, ARM7 data flow model, programmer's model, modes of Operations, Overview of Instruction set.

ARM7 Based Microcontroller LPC2148: Features, Architecture (Block Diagram and Its Description), System Control Block (PLL and VPB divider) , Memory Map, GPIO, Pin Connect Block, timer.

Unit 4: Interfacing with ARM7 (6 Hours)

Interfacing the peripherals with LPC2148: LED, LCD, GLCD, KEYPAD, GSM and GPS using UART, on-chip ADC using interrupt (VIC), EEPROM using I2C, SDCARD using SPI, on-chip DAC for waveform generation.

Unit 5:ARM CORTEX Processors (6 Hours)

Introduction to ARM CORTEX series, improvement over classical series. CORTEX A, CORTEX M, CORTEX R processors series, versions, features and applications.

ARM-CM3 Based Microcontroller LPC1768: Features, Architecture (Block Diagram & Its Description), System Control, Clock & Power Control, GPIO and Pin Connect Block.

Unit 6:Interfacing with ARM CORTEX M3 (4 Hours)

Interfacing peripherals with LPC1768: RGB LED, Seven Segment, TFT Display, Motor control using PWM.

Content Delivery Methods: Chalk & talk, Power point presentation

Assessment Methods:

3. Continuous Assessment (Unit Test, Tutorials/ Assignments, Attendance)
4. End term Examination

List of Experiments: Minimum 8 experiments should be conducted.

1. Interfacing LPC2148 with LCD/GLCD
2. UART Interfacing LPC2148 in embedded system (GSM/GPS)
3. Interfacing LPC2148 for internal ADC on interrupt basis
4. Interfacing SD card with LPC2148
5. Interfacing EEPROM with LPC2148 using SPI protocol
6. SRAM interfacing with LPC2148/LPC1768.
7. Interfacing LPC1768 to Seven Segment / RGB LED
8. Generation of PWM signal for motor control using LPC1768
9. Interfacing TFT display to LPC1768
10. Implementing CAN protocol using LPC1768
11. Implementing ETHERNET protocol using LPC1768.
12. Semaphore as signaling and synchronizing in ARM7.
13. Mailbox implementation for message passing in ARM7.

List of Assignments:

1. Case study of any one of the latest ARM processors and Power point presentation of the same in class.
2. Survey of CORTEX M3 based controllers, its features and comparison.
3. Design of Firmware Embedded system using LPC 2148 (Simulation only).
4. Design of Firmware Embedded system using LLPC1768 (Simulation only).
5. Case study of any one of the RTOS with examples.

T**ext Books:**

1. Rajkamal, “Embedded system-Architecture, Programming and Design”, TMH Publications, Edition 2003.
2. Andrew Sloss, Dominic Symes, Chris Wright, “ARM System Developers Guide – Designing and Optimizing System Software”, ELSEVIER.
3. Joseph Yiu, “The Definitive Guide to the ARM Cortex-M”, Newness, ELSEVIER.

Reference Books:

1. LPC 214x User manual (UM10139) :- www.nxp.
2. LPC 17xx User manual (UM10360) :- www.nxp.com
3. ARM architecture reference manual : - www.arm.com
4. Trevor Martin, “An Engineer’s Introduction to the LPC2100 series”, Hitex (UK) Ltd.

Bharati Vidyapeeth Deemed University,
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Class: B.Tech (Electronics) Sem:-VI

SUBJECT: - VLSI Design

Teaching Scheme	**Examination Scheme**
Lecture: 3 Hours/week	**End semester exam: 60 Marks**
Practical: 2 Hours/week	**Continuous Assessment: 40 Marks**
	TW& PR: 50 Marks
	Credits: 04

CoursePrerequisites:

- Analog Electronics
- Digital Electronics

Course Objectives:

- To introduce the VLSI Design Flow and design styles
- To introduce the VHDL Hardware Description Language (HDL) that shall help in describing a circuit to the tools for simulation and further processing of the same towards implementation.
- To introduce MOSFET physics and CMOS logic gates.

Course Outcomes: On successful completion of this course, students will be able to

1. Design and simulate digital system using structural, Behavioral, dataflow or mixed style of Modeling.
2. Apply concepts of Finite State Machine On sequential circuits.
3. Realize digital hardware system utilizing PLDs.
4. Identify MOSFET Physics and CMOS structures.
5. Implement CMOS combinational logic Design.

Contents:

UNIT I: (07 Hours)

HDL Modeling and Design Flow

Introduction to VLSI design flow (with reference to an EDA tool), sequential, data flow and structural modeling, functions, procedures, attributes, test benches, synthesizable and non synthesizable statements, packages and configurations, VHDL modeling.

UNIT II: (05 Hours)

FSM and sequential logic Principles

Sequential circuits, Meta stability synchronization, design of finite state machines and state minimization, Modeling of FSM-Mealy and Moore machines, FSM case studies- traffic light control, lift control, UART.

UNIT III: (05 Hours)

Programmable logic devices

CPLD: Introduction, study of architecture. FPGA: Introduction, study of architecture, PLAs, PALs, function implementation using PLDs.

UNIT IV: (07 Hours)

MOS Device Physics

MOSFET structure, MOS I/V characteristics, body effect, Scaling of MOS circuits, MOSFET capacitances, MOS small signal model, MOS amplifiers.

UNIT V: (06 Hours)

CMOS VLSI

CMOS parasites, equivalent circuit, CMOS inverter characteristics, power dissipation, power delay product, Layout design rules, introduction to CMOS layout, CMOS logic structures, concept of regularity, modularity and locality.

UNIT VI: (06 Hours)

CMOS Logic Circuits:

CMOS logic gates – NOR & NAND gate, Complex Logic circuits design – Realizing Boolean expressions using CMOS gates , W/L calculations of CMOS, CMOS transmission gates, Designing with Transmission gates.

Content Delivery Methods: Chalk & talk, Power point presentation.

Assessment Methods:

1. Unit Test
2. Continuous Assessment
3. End term Examination

List of Experiments:

1. To model 8:1mux, 1:8 demux, 3:8line decoder, 8:3 encoder using VHDL
2. To model adder and subtractor
3. To model synchronous and asynchronous D FF
4. To model 4- bit universal shift register
5. To model 4-bit counter
6. To model bidirectional buffer
7. To model parity generator and checker
8. Study of RAM/FIFO
9. Study of Temperature sensing using ADC
10. Study of real time moving generator chip CMOS

List of Assignments:

1. Simulate TLC
2. Simulate UART
3. Simulate LIFT controller
4. Design Barrel shifter.
5. Design a Mealy and Moore Sequence Detector
6. Real life applications of FPGA/CPLD

Text Books:

1. Neil IL E. Weste and Kamran Eshraghain,"Principles of CMOS VLSI Deign", Pearson Education Publication.
2. Wayne Wolf, “Modern VLSI Design", Prentice Hall Publication.
3. J.Bhaskar”A VHDL primer” Pearson Education Publication.
4. BehzadRazavi,“Design of Analog CMOS Integrated Circuits”, Tata McGraw Hill

Reference Books:

1. John Walkerly,"Digital Design Principles and Practices",Prentice Hall Publication
2. Douglas Perry,"VHDL", Pearson Education Publication.
3. Charles Roth, "Digital System Design using VHDL", Tata McCraw Hill.

4. Wayne Wolf," FPCA Based System Design", Prentice Hall
6. Ken Martin, “Digital Integrated Circuit Design”, Oxford University Press, 2011.
7. Sung-Mo Kang, Yusuf Leblebici, “CMOS Digital Integrated Circuits Analysis and Design”, TMH, 3rd Ed., 2011.
8. ParthPratimSahu, “VLSI Design”, McCraw Hill Education Pvt. Ltd.

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Class: B. Tech (Electronics) Sem:-VI

SUBJECT: - Project Management & Finance

Teaching Scheme	**Examination Scheme**
Lecture: 3 Hours/week	**End semester exam: 60 Marks**
	Continuous Assessment: 40 Marks
	Credits: 03

Course Prerequisite:

- Understanding the various forms of Math, Economics and Statistics.

Course Objectives:

- To understand basic principles/concepts of project management and finance.
- To describe the most well-known theories and perspectives on project managements.

Course Outcomes: At the end of the course, a student will be able to

1. Describes the Characteristics, objectives and Stages of Project management.
2. Explain importance of time and work estimation in Project management.
3. Analyze Management Concepts for Developing Project Plan.
4. Analyze and Understand Financial & Project Management.
5. Demonstrate Scope, Objectives and Importance of Financial Management.
6. Identify and understand the main responsibilities and tasks of Securities and Exchange Board of India (SEBI) in money market and capital Market.

Unit -I **(06 Hours)**

Introduction to Project management:

Characteristics of projects, Definition and objectives of Project Management, Stages of Project Management, Project Planning Process, Establishing Project organization.

Unit –II **(06 Hours)**

Work Definition:

Defining work content, Time Estimation Method, Project Cost Estimation and budgeting, Project Documentation Introduction to CMM, Project Risk Management, Project scheduling and Planning Tools: Work Breakdown structure, LRC, Gantt charts, ,CPM/PERT Networks

Unit-III **(06 Hours)**

Management Concepts:

Developing Project Plan (Baseline) , Project cash flow analysis, Project scheduling with resource constraints: Resource Levelling and Resource Allocation. Time Cost Trade off: Crashing Heuristic.

Unit-IV **(06 Hours)**

Project Implementation:

Project Monitoring and Control with PERT/Cost, Computers applications in Project Management, Contract Management, Project Procurement Management.

Unit-V **(06 Hours)**

Financial Management:

Introduction of Finance, Types of Finance, Financial Management, Scope & Objectives of Financial Management, function of finance manager, Importance of Financial Management, Sources of finance, Security Finance.

Unit-VI **(06 Hours)**

Working Capital Management:

Capital Structure, Fixed & working capital, Role of Securities and Exchange Board of India (SEBI), function of money market and capital Market, sources of finance. Introduction to capital budgeting, Techniques of capital budgeting. Break even analysis - assumptions, importance, Cost-Benefit analysis, CVP graph.

List of Assignments:

1. Explain the nature and purpose of financial management
2. Discuss the relationship between financial objectives, corporate objectives and corporate strategy.
3. Identify the nature and role of money and capital markets, both nationally and internationally.
4. Write in brief on Concepts & Importance of organization.
5. Critically evaluate various approaches to the financial management
6. Explain the functions of a stock market and a corporate bond market..

Content Delivery Methods: Chalk & talk, Power point presentation.

Assessment Methods:

1. Continuous Assessment (Unit Test, Tutorials/ Assignments, Attendance)
2. End term Examination

Text Books:

1.Shtub, Bard and Globerson, "Project Management: Engineering, Technology, and Implementation", Prentice Hall, India

2. C. Paramasivan and T. Subramanian, "Financial Management", New age international publishers.

3. John M Nicholas, "Project Management for Business and Technology: Principles and Practice", Prentice Hall, India, 2002.

4. Cleland and King, "VNR Project Management Handbook".

5.Wiest and Levy, "Management guide to PERT/CPM", Prentice Hall. India.

Reference Books:

1.HoraldKerzner, "Project Management: A Systemic Approach to Planning, Scheduling and Controlling", CBS Publishers, 2002.

2. S. Choudhury, " Project Scheduling and Monitoring in Practice".

3. P. K. Joy, "Total Project Management: The Indian Context", Macmillan India Ltd.

Bharati Vidyapeeth Deemed University,
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Class: B. Tech (Electronics) Sem:-VI

SUBJECT: - Electronics Circuit Design

Teaching Scheme	**Examination Scheme**
Lecture: 4 Hours/week	**End semester exam: 60 Marks**
Practical: 2 Hours/week	**Continuous Assessment: 40 Marks**
	TW& OR: 50 Marks
	Credits: 05

Course Prerequisites:

- Knowledge of basic electronics components and its functions.
- Knowledge of rectifiers, amplifiers, filters etc.
- Knowledge of basic Data acquisition systems.

Course Objectives:

- To introduce the basic concepts needed for Circuit design.
- To introduce the techniques such as signal amplification, filtering, audio power amplification etc
- To emphasize the understanding and practical implementations of the electronics circuits.

Course Outcomes: At the end of the course, a student will be able to

1. Choose proper electronic component for designing circuits.
2. Design basic electronics circuits like rectifiers, filters, voltage regulators, amplifiers, etc.
3. Distinguish between linear power supply and SMPS.
4. Implement Data Acquisition Systems.

Contents:

Unit-I

Electronic Components Selection: (08 Hours)

Passive and active components, types of resistors, capacitors and Inductors. Transformers types: power transformer, audio frequency transformer and intermediate frequency transformer. Integrated Circuits (ICs), wire/cable selection, shielding and grounding techniques.

Unit-II

Design of Analog Filter: (08 Hours)

Low pass filter and high pass filter. Design of Inductor Filter, Capacitor filter, LC- filter, RC-Filter and π section Filter.

Unit-III

Design of Linear power supply: (08 Hours) Block Schematic, Types of voltage regulators, Design of Zener diode shunt regulator , Transistor shunt regulator and transistor series voltage regulator. Short circuit protection, fold back current limiting. Discrete components & IC based design for linear power supply e.g. Three terminal regulators (LM317,LM78XX).

Unit-IV (08 Hours)

Switched Mode Power Supply:

Topology of SMPS. Comparison between Linear Power Supply and SMPS. IC based design for switch mode power supply with latest SMPS ICs.

Unit-V

Design of Data Acquisition System: (08 Hours)

Circuit level design of DAS, Design should include signal sensing, isolation, and signal conditioning ADC storage & display systems.

Unit-VI (08 Hours)

Audio Power Amplifier:

Design of Audio Power Amplifier: Design using ICs like TBA810, Design of signal conditioner, Design of pre amplifier, Design should include various controls, Parameters optimization & protection circuits.

Content Delivery Methods: Chalk & talk, Power point presentation.

Assessment Methods:

10. Unit Test
11. Continuous Assessment
12. End term Examination.

Mini Project & Assignments:

Mini-project should be from small systems required in laboratory or real life, project to be designed, tested on bread board, fabricated on manual or CAD based PCBs with due consideration to mechanical aspects for enclosure & control panel design. Complete documentation in the form of project report is to be submitted. Due consideration should be given to Mini Project while assessing students for term work.

Five assignments must be completed. Out of five assignments four should be corresponding to complete design of analog and digital system. Fifth assignment should be corresponding to the software simulation of system.

Use of softwares like MULTISIM / PROTEUSis expected.

List of Assignments:

1. Design of low pass filter.
2. Design of linear power supply using discrete components.
3. SMPS Topology.
4. Data acquisition system.
5. Design of audio power amplifier.

Text Books:

1. P.M.Chirlial, “Analysis & Design of Integrated Electronic Circuits”, Wiley Eastern.
2. Hayt&Nudeck, “Electronic Circuit Analysis & Design “, Jaico Publishing House.
3. Horowitz Paul & Winfield Hill, “Art of Electronics”, Cambridge University Press 2nd Edition 1989.
4. B.S.Sonde, “Introduction to system Design Using Integrated Circuits”, Wiley Eastern-2nd Edition.
5. M.M.Shah, “Design of Electronic Circuits & Computer Aided Design”, Wiley Eastern.

Reference Books:

1. Sergio Franco, “Design with Operational amplifiers and analog Integrated circuits”, 3rd edition, TMH.
2. Franklin P. Prosser, David E. Winkel, “The Art of Digital Design”, PHI.
3. Gotlib, “Power Supply Design”, PHI