Shivaji University, Kolhapur

Revised Structure & Syllabus of S.E., T.E. & B.E. (Electronics Engg) course w.e.f. July 2014-15

Scheme of Teaching & Examination

SE Electronics –I **SEMESTER – III**

Sr. No.	Subject	Teaching Scheme (Hrs)				Examination Scheme (Marks)				
		L	T	P	Total	Theory	TW	POE	OE	Total
1.	Engg. Maths III	3	1	0	4	100	25	--	--	125
2.	Electronic Measurement and Instrumentation	3	0	2	5	100	25	--	--	125
3.	Electronics Circuits Analysis & Design -I	4	1	2	7	100	25	50	--	175
4.	Analog Communication	3	0	2	5	100	25	50	--	175
5.	Network Analysis	4	1	0	5	100	25	--	--	125
6.	Programming Language-I	2	0	2	4	--	25	50	--	75
		19	**3**	**8**	**30**	**500**	**150**	**150**	**--**	**800**

SE Electronics –II **SEMESTER – IV**

Sr. No.	Subject	Teaching Scheme (Hrs)				Examination Scheme (Marks)				
		L	T	P	Total	Theory	TW	POE	OE	Total
1.	Linear Integrated Circuits	3	0	2	5	100	25	50	--	175
2.	Electronics Circuits Analysis Design-II	4	1	2	7	100	25	50	--	175
3.	Data Structures and Algorithms	3	1	0	4	100	25	--	--	125
4.	Digital System and Microprocessor	4	0	2	6	100	25	50	--	175
5.	Control system Engineering	3	0	2	5	100	25	--	--	125
6.	Circuit Simulation	1	0	2	3	--	25	--	--	25
		18	**2**	**10**	**30**	**500**	**150**	**150**	**--**	**800**

Shivaji University, Kolhapur

Revised Structure & Syllabus of S.E., T.E. & B.E. (Electronics Engg) course w.e.f. July 2014-15

Syllabus Structure

Class:- TE(Electronics)-I **SEM-V**

Sr. No.	Subject	Teaching Scheme (Hrs)				Examination Scheme (Marks)				
		L	T	P	Total	Theory	TW	POE	OE	Total
1.	Signal & Systems	4	1	0	5	100	25	-	-	125
2.	Microcontroller	4	0	2	6	100	25	50	-	175
3.	Electromagnetic Engineering	3	1	0	4	100	25	-	-	125
4.	VLSI Design	4	0	2	6	100	25	50	-	175
5.	Digital Communication	4	0	2	6	100	25	-	-	125
6.	Programming Lab-II	1	0	2	3	-	25	-	50	75
		20	**2**	**8**	**30**	**500**	**150**	**100**	**50**	**800**

Programming Lab-II should contain minimum four practicals based Signal & Systems and Electromagnetic Engineering topics.

Class:- TE(Electronics)-II **SEM-VI**

Sr. No.	Subject	Teaching Scheme (Hrs)				Examination Scheme (Marks)				
		L	T	P	Total	Theory	TW	POE	OE	Total
1.	Digital Signal Processing	4	0	2	6	100	25	-	-	125
2.	Video Engg.	3	0	2	5	100	25	50	-	175
3.	Power Electronics	4	0	2	6	100	25	50	-	175
4.	Computer Architecture & Operating system	4	0	2	6	100	25	-	-	125
5.	Electronic System Design	4	1	0	5	100	25	-	-	125
6.	Mini Project	0	0	2	2	-	25		50	75
		19	**1**	**10**	**30**	**500**	**150**	**100**	**50**	**800**

Minimum 08 Practicals of Mini Project will be based on ESD Syllabus and a Mini Project designed developed and demonstrated by a batch of 2 to 3 students at the time of Oral. Term work of ESD will be assessed on Tutorials (Minimum 10 tutorials).

Shivaji University, Kolhapur

Revised Structure & Syllabus of S.E., T.E. & B.E. (Electronics Engg) course w.e.f. July 2014-15

Syllabus Structure

Class:- BE(Electronics)-I **SEM-VII**

Sr. No.	Subject	Teaching Scheme (Hrs)				Examination Scheme (Marks)				
		L	T	P	Total	Theory	TW	POE	OE	Total
1.	Information Theory & Coding Techniques	3	1	0	4	100	25	-	-	125
2.	Embedded System Design	4	0	2	6	100	25	50	-	175
3.	Computer Network	4	0	2	6	100	25	-	50	175
4.	Image Processing	4	0	2	6	100	25	-	-	125
5.	Elective-I	3	1	0	4	100	25	-	-	125
6.	Project-I	0	0	2	2	-	50	-	25	75
		18	**2**	**8**	**28**	**500**	**175**	**50**	**75**	**800**

Class:- BE(Electronics)-II **SEM-VIII**

Sr. No.	Subject	Teaching Scheme (Hrs)				Examination Scheme (Marks)				
		L	T	P	Total	Theory	TW	POE	OE	Total
1.	Microwave Engineering	4	0	2	6	100	25	-	50	175
2.	Wireless Comm. N/w	4	0	2	6	100	25	-	-	125
3.	Power Electronics & Drives	4	0	2	6	100	25	50	-	175
4.	Elective-II	3	1	0	4	100	25	-	-	125
5.	Project-II	0	0	4	4	-	100	-	100	200
		15	**1**	**10**	**26**	**400**	**200**	**50**	**150**	**800**

Note:- Project-II Term Work evaluation should be based on two seminars/Demos (One in February and one at submission).Project I & II Term Work should be assessed by panel of at least THREE Experts decided by Head of Deptt.

Elective-I	Elective-II
Optimization Techniques	System On Chip
Robotics & Artificial Intelligence	Advanced Image Processing
Satellite Communication	Computer Vision
Information Technology	Fuzzy & neutral systems
Advanced Control System	Adaptive signal Processing
Modern Power Electronics Devices	Automatic Electronics
Bio- Medical Instrumentation	High performance computer n/w
Real Time Systems	Remote Sensing & GIS

T.E.(Electronics Engg.) Part-I Semester V (Revised) with effect from July 2015

1. SIGNALS & SYSTEMS

Teaching Scheme
Theory: 4 Hrs/Week
Tutorial: 1 Hr/Week

Examination Scheme
Theory: 100 Marks
Term Work: 25 Marks

Course Objective

1) To understand basic of CT & DT signals & system and there representation .
2) To therefore analysis of CT & DT systems.
3) To understand concept of sampling.
4) To analyze signals by using different mathematical tools.
5) Understand realization of system.

Course Outcomes :-

At the end of the course students will be ask to :

1) Represent CT & DT signals & perform various operations on the signals.
2) Compute response of LTI system.
3) Select appropriate sampling rate for reconstruction of signals
4) Perform the analysis of CT & DT signals by using furies & Z- Transform.
5) Realize the system using basic building block

Note : 1) Minimum 12 Tutorials should be conducted.
2) Some tutorial should be implemented using sci lab / Matlab.

Unit I : Introduction to Signals & Systems. (9hrs)

Defination of signals , classification of signals : continuous time signals & discrete time signals , even & odd signals , periodic & non-periodic , deterministic & non-deterministic , energy & power, elementary signals : unit impulse , unit step , unit ramp , exponential & sinusoidal , basic operations on signals.

Unit II : Time Domain Analysis of CT and DT systems, (6hrs)

Impulse response representation, convolution integral , convolution sum, properties of convolution, Relationship between LTI system, properties and impulse response.

Unit III : Sampling and Reconstruction (7hrs)

Sampling theorem reconstruction , effect of under sampling (Numerical based on Sampling theorem).

Unit IV : Fourier Transform. (8hrs)

Fourier Transform , Limitations of Fourier Transform , Properties of Fourier Transform, Discrete time Fourier Transform and its Properties, Discrete Fourier Transform IDFT properties of Discrete Fourier Transform.

Unit V : Z Transform . (9hrs)

Introduction of Z-Transform , ROC ,Properties of ROC , Unilateral Z-Transform. Properties of Z-Transform : linearity , time shifting, time reversal, time scaling , convolution , differentiation , multiplication, Perceval theorem, initial value & final value theorem. Inverse Z-Transform : PFE method, long division method , residue method , convolution method.

Unit VI : System Realization (7hrs)

Continuous time system representation by differential equation, discrete time system representation by difference equation , and transfer function in Z-domain. Realization of discrete time systems by Direct from I and Direct Form II

Text Books :-

1) Signals and Systems (second edition) by Alan Oppentim, Alan S. Willsky Pearson Publication
2) Signals and Systems (second edition) by S.Palani Ane's Publication.

Reference Books :-

1) Signals & systems by B.P.Lathi
2) Signals and Systems (second edition) by simon Haykin Wiley Publication
3) Signals & systems (first edition) by Tarun kumar Rawat Oxford Publication.
4) Signals & systems (Tata Mcgraw – Hill) by P.Ramkrishanarao.
5) Signals & systems by R.D. Patil, K.P.Pardeshi Electrotech Publication.

T.E.(Electronics Engg.) Part-I Semester V (Revised) with effect from July 2015

2. MICROCONTROLLERS

Teaching Scheme	Examination Scheme
Lectures : 4 Hours/Week	Theory : 100 Marks
Practical's : 2 Hours/Week	Term work : 25 Marks
	POE : 50 Marks

COURSE OBJECTIVES

1.The objective of this course is to understand the basic concepts of microcontrollers 8051 and PIC 16F877 .
2.To understand ON CHIP resources , peripheral interfaces and their features .
3. To understand various programming aspects of Embedded C.
4. To learn the interfacing of real world input and output devices.

COURSE OUTCOME

Upon successful completion of this course, a student will be able to
1.Analyse the various pins and its functions of 8051 and PIC 16F877 microcontroller.
2.Understand the instruction sets of 8051 and PIC 16F877 microcontroller.
3.Understand various addressing modes in 8051 and PIC 16F877 microcontroller and write assembly language programs.
4.Write embedded c programs for on chip resources of 8051.
5.Interface the external devices with 8051 microcontroller.
.

UNIT-I : 8 BIT MICROCONTROLLER -8051: (8Hours)

Introduction to Microcontrollers, Architecture, Functional pin description, Memory organization (Internal and External memory concept),Introduction to ON CHIP resources and respective SFRs ,External Program and Data memory interface , Comparison between different family members (89C52,89C51 RD2,80C535,89C420 and ADUC 812)

UNIT-II: PROGRAMMING OF 8051: (7Hours)

Addressing modes, Instruction set, Assembly language programming, Assembler directives

UNIT-III:ON CHIP RESOURCES,PROGRAMMING and INTERFACING: (8 Hours)

Interrupt structure, Port structure and operation, Timer/Counters(Internal architecture of different modes and programming),Serial port and its operating modes(hardware details of mode-1 only).Interfacing of Keypad, Seven Segment display, ADC, DAC, Stepper motor, LCD to 8051.

UNIT-IV: Embedded –C for 8051: (8 Hours)

Advantages and disadvantages of 8051-C,Data types, Memory types and models, pointers, Functions, Embedded c programs for arithmetic and Logical operations, Keypad interface, Seven Segment display, ADC, DAC, Timers, serial port, Interrupts

UNIT-V:INTRODUCTION TO PIC MICROCONTROLLER-16F877: (7 Hours)

Architecture ,RESET options ,Watch DOG timer ,Memory organization ,,Instruction set and simple assembly language programming(small programs to introduce instruction set).

UNIT-VI:ON CHIP RESOURCES OF PIC 16F877: (8 Hours)

Overview of I/O Ports(internal structure of PORT A only) ,Timers, CCP, ADC ,SSP (SPI and I2C) Interrupt structure.

Note: Programming of ON CHIP recourses of PIC16F877 is not expected)

Practicals:

Minimum ten experiments based on above syllabus

Text Books:

1."The 8051 microcontroller and embedded systems using assembly and c",--By M a Mazidi and J G Mazidi, R D McKinlay-Pearson Education
2."The 8051 Microcontroller "-By I Scott Mackenzie and R C W Phan,4th edition ,Pearson education
3Desgin with PIC microcontroller By J B Peatman, Pearson education

Reference Books:

1. .Intel Handbook on 8 Bit and 16 bit embedded controllers
2. PIC microchip Midrange MCU family reference manual.
3. "The 8051Microcontroller-Archictecture,programming & applications"-K. J. Ayala
4. "microcontrollers theory and Applications"-By Ajay Deshmukh-TATA McGraw Hill

T.E. (Electronics Engineering) Part-I Semester –V (Revised) with effect from July 2015

3. Electromagnetic Engineering

Teaching Scheme	Examination Scheme
Lectures : 3 Hours/Week	**Theory : 100 Marks**
Tutorial : 1 Hour/Week	**Term work : 25 Marks**

UNIT-I: Vector Algebra **(4 Hrs.)**
Review of vector Analysis and coordinate systems, Basic vector algebra, Dot product,Cross product, curl, divergence, Gradient

UNIT-II: Electrostatics **(6 Hrs.)**
Coulomb's law & electric field, field due to distributed charges, Flux density, Gauss's law and its applications, divergence theorem, Electrostatic potential, potential gradient, electric dipole, Electrostatic energy density, Boundary conditions for electrostatic field.

UNIT-III: **Steady Magnetic Field** **(7 Hrs.)**
Biot Savarts law, Ampere's circuital law, Stoke's Theorem, Magnetic flux density & Vector magnetic potential, Current carrying conductors in magnetic fields, Torque on loop, Energy stored in magnetic field, Boundary conditions for magneto static field.

UNIT-IV: Maxwell's Equations **(3 Hrs.)**
Inconsistency of Ampere's law, Faraday's law, Maxwell's equations for static field, time varying field & harmonically varying fields, Comparison of field & circuit theory.

UNIT-V: Electromagnetic Waves (9 Hrs.)

Wave propagation in dielectric & conducting media, Modification in wave equations for sinusoidaltime variations, Characteristics of plane wave in a) pure dielectric media, b) Conducting media,Reflection of electromagnetic wave for normal incidence, Polarization.

Poynting theorem, Power flow in uniform plane wave, Circuit applications of the Poynting vector.

UNIT-VI: Transmission Lines (7 Hrs.)

Transmission line equations, Transmission line parameters, Infinite line, terminated uniform transmission line, Reflection coefficient, VSWR, group velocity, phase velocity, Applications of Smith chart for Impedance matching Technique a) Single stub b) Double stub.

Term Work: Minimum 8 Tutorials based on the above units.

Text Books:

1. William Hayt, Buck, "Engineering Electromagnetics", Mc Graw Hill.
2. Sadiku, "Elements of Electromagnetics" 4th edition, Oxford University Press.
3. John D. Kraus, "Electromagnetics", Mc Graw Hill
4.G.S.N. Raju, "Electromagnetic field theory & Transmission lines", 1st edition, Pearson Education.
5. Nanna Paneni Narayana Rao, "Elements of Engineering Electromagnetics", 6th edition, Pearson Education.

Reference Books:

1. Jordan & Balmain, "Electromagnetic Fields & Radiation Systems", 2nd edition, PHI.
2. David K Cheng, "Field & Wave Electromagnetics", 2nd edition, Pearson Education.
3. Rohit Khurana"Electromagnetic Field Theory"Vikas Publishing House.
4. Sunil Bhooshan,"Fundamentals of Engineering Electromagnetics ,Oxford

T.E. (Electronics Engineering) Part-I Semester –V (Revised) with effect from July 2015

4. VLSI Design

Teaching Scheme	Examination Scheme
Lectures : 4 Hours/Week	**Theory : 100 Marks**
Practical : 2 Hours/Week	**Term work : 25 Marks**
	POE : 50 Marks

Course Objectives:

1. To understand the concept of hardware description language.
2. To study the various VHDL features.
3. To Design and test combinational logic using VHDL.
4. To study design issues related to Digital System Design.
5. To Design and Implement sequential logic using various CPLD and FPGA devices.
6. To understand the different aspects of testing ASIC and FPGA based designs.
7. To teach fundamental of VLSI circuit design and implementation using circuit simulators and layout editors.
8. To highlight the circuit design issues in the context of VLSI technology.

Course outcomes:

1. Student should be able to use HDL for combinational and sequential logic design.
2. Ability to simulate and test digital logic using simulator.
3. Ability to design and test combinational and sequential logic using VHDL.
4. Ability to implement digital systems.
5. Ability to design and implement digital logic using various CPLD and FPGA devices.
6. Students will be able to understand various methods of testing ASIC and FPGA based designs.
7. Ability to design MOS based circuit and draw layout.
8. Ability to understand the choice of technology and technology scaling.
9. Ability to demonstrate CMOS design and designing issues such as protection, timing, Delays and power dissipation.
10. Ability to realize logic circuits with different design styles.

Unit 1: Introduction to VHDL (8 hrs.)

Levels of abstraction, Need of HDL , VLSI Design flow, Features and capabilities of VHDL, Elements of VHDL (Entity, Architecture, Library, Package, configuration),Identifiers ,literals , data types, operators. Introduction to CMOS Technology, VLSI Circuits, Comparison of BJT, NMOS and CMOS technology. Fabrication process flow for NMOS, PMOS and CMOS. MOSFET characteristics, MOS modelling. Types of MOSFET scaling, Lambda based design rules, MOSFET capacitances.

Unit 2 : Combinational logic design using VHDL (6hrs)

Adder, subtractor, decoder, encoder, tristate buffer, multiplexer, parity generator, parity checker, comparator, using Concurrent & Sequential statements.

Unit 3: FSM Design Using VHDL (9 hrs)

Impediments to synchronous design, clock jitter, skew, gating the clock, asynchronous inputs, meta-stability and synchronizer failure. VHDL implementation of counter, shift register, LFSR, Serial adder. Bus arbiter, Single port RAM, Dual port RAM,

Unit 4: VHDL Features (6 hrs)

Attributes (type, signal, signal value, array, block) , wait statement, Simulators, Event based simulator,Cycle based Simulator, Flow chart for Event scheduling and delays , Inertial delay, Transport delay.

Unit 5: Datapath and Control unit Design (7 hrs)

Datapaths : Designing Dedicated Datapaths, Selecting Registers, Selecting Functional units, Data transfer methods, Generating Status signals, Using Dedicated Datapaths, Examples of Dedicated Datapaths, Simple IF-THEN-ELSE, COUNTING 1 TO 10, Summation of n down to 1, Factorial of n, Counting 0's amd 1's, General Datapaths, Using General Datapaths,

Control units: Constructing the Control unit, Counting 1 to 10, Simple IF-THEN-ELSE, Generating Status signals, Stand –Alone Controllers, Rotating Lights.

Unit 6: MOSFET Inverter: **(11 hrs)**

CMOS inverter, Static and dynamic analysis such as noise, Propagation delays/switching delays, power dissipation, etc. CMOS latch up, CMOS circuits and Logic design, transistor sizing, basic physical design of simple logic gates.MOS design styles, realization of universal gates and compound gates using MOS Transistors, Fundamentals of circuit characterization and performance estimation, Transmission gates, pass transistor logic.

PLD Architectures and Testing: Xillnx 9500 series CPLD (XC9572), Spartan II FPGA (XCS 2s30) Testing: Fault models, path sensitizing, random test, design for testability, Built-in self test and Boundary scan, Test Bench in VHDL, Text I/O using VHDL.

Text books:

1. Enoch O. Hwang "Digital logic and microprocessor design with VHDL", Thomson Publication
2. Roth John "Principals of Digital System Design using VHDL", 2nd Edition, Cengage Learning

Reference Books :

1. K. C. Chang "Digital Systems Design with VHDL and Synthesis An Integrated Approach", 1st Wiley- India.
2. Stephen Brown and Zvonko Vranesic "Fundamentals of Digital Logic with VHDL design", Tata- McGraw Hill
3. Xilinx data manual " The Programmable Logic data Book"
4. S. S. Limaye "VHDL a Design Oriented approach" , Mc-Graw Hill .
5. Neil Weste - K. Eshraghian : Principle of CMOS / VLSI Design (Person Education).

Practicals:

Each design must be tested through VHDL test bench / CPLD and FPGA kits. MOS layout must be design and simulate using MOS layout design and simulation tool.

Design and implement the following, tested through VHDL test bench / CPLD and FPGA kits

1. To Design and implement Full Adder
2. To design and implement Parity Generator
3. To design and implement Programmable counter
4. To Measure the Period/frequency of a Signal
5.Write and read into RAM.

Design and simulate the MOS layout with load. Observe the propagation delays, power dissipation, area etc. for the following

6. CMOS Inverter and its sizing
7. CMOS 2 input NAND and NOR gate.
8. 2:1 MUX using Transmission gate.
9.CMOS combinational logic for 4 variables.
10. CMOS Ring oscillator

Lab Requirement:
Model Technology, Modelsim simulator and Xilinx Web pack.
VLSI universal trainer for FPGA and CPLD of Xilinx.
Any MOS layout design and simulation tool like Microwind.

T.E.(Electronics Engg.) Part-I Semester V (Revised) with effect from July 2015

5. DIGITAL COMMUNICATION

Teaching Scheme	**Examination Scheme**
Theory: 4 Hrs/Week	**Theory: 100 Marks**
Practical: 2 Hrs/Week	**Term Work: 25 Marks**

Course Objectives :
The course aims to:

1. Understand basic component of digital communication systems & study of probability theory
2. Study of source coding techniques and various data formats.
3. Students will make acquainted with digital modulation techniques and spread spectrum techniques.
4. To realize need of synchronization and their methods
5. Understand concept of baseband transmission and optimum detection

Course Outcomes :
Upon successful completion of this course:

1. Students are able to understand and analyze the design issues of digital communication system
2. Students are capable to describe different source coding techniques and data formats.
3. Students are able to identify digital modulation schemes and compute performance of these techniques.
4. Students are able to understand concept of spread spectrum techniques
5. Students are able to explain the concept of optimum receiver and equalizer

Unit – I: Probability Theory, Random Variables & Processes (10 Hrs.)

Probability, Properties of Probability, Joint & Conditional Probability, Random Variables: Cumulative Distribution Function(CDF), Probability Mass Function, Probability Density Function(PDF), Joint CDF and joint PDF, Statistical Averages, uniform distribution, Rayleigh distribution and Gaussian PDF.

Random Process, Time averaging and Ergodicity, Auto correlation, Power spectral density of stationary random process

UNIT-II: Source Coding (9 Hrs.)

Quantization: Uniform Quantization, Non uniform Quantization, Companding, Pulse Code Modulation (PCM), Differential Pulse code modulation (DPCM), Delta modulation, Noise in delta modulation, Adaptive delta modulation(ADM), CVSD. Performance of all coding schemes based on, Effect of noise, Bandwidth and Signal to Noise ratio (SNR)

Unit-III: Digital Signaling Formats (5 Hrs.)

Introduction, Non Return to zero (NRZ) codes, Return to Zero, Phase Encoding, M-array format, Synchronization: Bit and Symbol Synchronization, Frame Synchronization, Carrier recovery circuits, scramblers & unscrambles.

UNIT –IV: Band pass Modulation & Demodulation (10 Hrs.)

Generation, Detection, Signal Space diagram, Spectrum, Bandwidth, Efficiency and probability of error analysis of : Amplitude Shift Keying (ASK), Phase Shift Keying (PSK), Frequency Shift Keying (FSK), Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK) , Differential Phase Shift Keying (DPSK), Differentially Encoded Phase Shift Keying (DEPSK), Minimum Shift Keying (MSK), Gaussian Minimum Shift Keying (GMSK), Quadrature Amplitude Modulation (QAM).

UNIT –V: Baseband Transmission & Optimum Detection (9 Hrs.)

Baseband transmission of binary data, Inter symbol Interference (ISI) & its minimization, NYQUIST Pulse Shaping Criterion, Pulse Shaping by Digital Methods, Eye Pattern, M-ary signaling, Correlative coding- Duo-binary signaling.

Optimum Receiver-Matched Filter& its Properties, Correlation receiver, Adaptive equalization scheme

UNIT – VI: SPREAD SPECTRUM MODULATION (5 Hrs.)

Introduction, Direct Sequence (**DS**) Spread Spectrum, Use of Spread Spectrum with Code Division Multiple Access(CDMA), Ranging Using DS Spread Spectrum, Frequency Hopping (**FH**) Spread Spectrum, Generation & Characteristics of PN Sequences

Text Books:

1. Simon Haykin, “Digital Communication” Student Edition Wiley India
2. Bernard Sklar, “Digital Communication-Fundamentals and Applications” IInd Edition, Pearson Education

Reference Books:

1. B.P. Lathi & Zhi Ding "Modern Digital & Analog Communication System" IVth Edition, Oxford University press
2. Singh & Sapre "Communication Systems" IInd Edition, Tata McGraw Hill publication
3. John Prokis "Digital Communication" IVth Edition, McGraw Hill
4. M.S. Roden "Analog & Digital Communication Systems", 5th Edition, Shroff Publications.
5. Taub & Schiling "Principles of communication System"IInd Edition, Tata McGraw Hill
6. R.N. Mutagi "Digital Communication: Theory, Techniques and application" Iind Edition, Oxford University press

Practicals:

Minimum Ten Experiments should be performed.

Experiment List:

1. Study of Pulse Code Modulation
2. Study of Delta Modulation
3. Study of Adaptive Delta Modulation
4. Study of Data format
5. Study of Amplitude Shift Keying
6. Study of Frequency Shift Keying
7. Study of Phase Shift Keying
8. Study of Quadrature Phase Shift Keying
9. Study of PN sequence generation
10. Study of any modulation technique using MATLAB/SCILAB
11. Study of CDF & PDF for Random signals using MATLAB/SCILAB
12. Study of Standard Random Variables Density Distribution Function

T.E. (Electronics Engineering) Part-I Semester –V (Revised) with effect from July 2015

6. Programming Lab-II

Teaching Scheme	**Examination Scheme**
Lectures : 1 Hour/Week	**Term work : 25 Marks**
Practical: 2 Hrs/Week	**OE : 50 marks**

UNIT- I **(5 Hrs.)**

basics variables, arrays , Multidimensional subarrays , Special values, displaying output data, data files, scalar and array operations, Hierarchy of operations built-in functions, introduction to plotting, Debugging programs.

UNIT- II **(4 Hrs.)**

Branching, Statements and logical data type, Branches, write & for loop logical arrays and vectorization.

UNIT- III **(5 Hrs.)**

User-defined & I/O functions, introduction to functions, Variable passing , Three optional arguments, Sharing data using global memory, Preserving data between calls to a function, function functions, subfunctions, Private functions, Nested functions, complex data , string functions , textread function, load and save commands, an introduction to file processing, file opening and closing , binary I/O functions, formatted I/O functions, comparing formatted and binary I/O function, file positioning and status functions.

UNIT- IV **(3 Hrs.)**

Handle graphics & gui , the graphics system, Object handles, examining and changing object properties, Using set to list possible property values, user-defined data, finding objects, selecting objects with the mouse, creating and displaying a graphical user interface, object properties, graphical user interface components, dialog boxes, menus.

UNIT- V **(3 Hrs.)**

Simulation basics: introduction, modeling, solvers, simulating model using variables, data import/export, state –space modeling & simulation, creation of subsystems, & Mass subsystem.

Note: Programming Lab-II is a high-level technical computing language and interactive environment such as **SCILAB or MATLAB or SIMILAR OPEN SOURCE SOFTWARE LANGUAGE .**

List of programs:

1) Program using branching statement

2) Program using looping statement

3) Program for matrix manipulation

4) Program using user defined function

5) Program for handling complex data

6) Program for File handling & string manipulation (Any two)

7) Program for creating & Displaying GUI (Any two)

8) Mini project based on any Engineering applications.(It should be completed within Two or Three Practical Turns)

Shivaji University, Kolhapur

Revised Structure & Syllabus of S.E., T.E. & B.E. (Electronics Engg) course w.e.f. July 2014-15

T.E.(Electronics Engg.) Part-II Semester VI (Revised) with effect from July 2015

1. DIGITAL SIGNAL PROCESSING

Teaching Scheme	**Examination Scheme**
Theory: 4 Hrs/Week	**Theory: 100 Marks**
Practical: 2 Hrs/Week	**Term Work: 25 Marks**

Unit I : Discrete Fourier Transform & FFT Algorithms: (7hrs)

Overview of DFT , Fast Fourier transform algorithms – Radix -2 DIT , DIF , Filtering of long duration sequences using overlap-Add and Overlap-save algorithm.

Unit II :- wavelet Transform : (9 hrs)

Fourier Transform and its limitations , short time Fourier transform, continuous wavelet Transform , Discretization of the continuous wavelet Transform, Multiresolution Approximations ; wavelet and Scaling function coefficients, Orthonormality of compactly supported wavelets , Bi-orthogonal decomposition , harr wavelets , the daubechies wavelets construction , denoising using wavelets , perfect reconstruction filter bank design using walelets.

Unit III :- FIR Filter Design : (8hrs)

Characteristic of FIR filter , properties of FIR filter , type of FIR filter Fourier series method, frequency sampling , Fourier series & windowing method.

Unit IV :- IIR Filter Design (8hrs)

Analog filters approximations Butterworth filters, Chebyshev filters mapping of s-plare to 2-plare ,filter stability, characteristics of discreate time IIR filter , Design of IIR using Impulse Invariance Method , Bilinear Z- Transform method, Placement of poles & zeros , Freqency Transformation.

Unit V : - Realization of filter (11hrs)

FIR and IIR filter realization in cascade form and parallel form , effect of finite word lenth on redirection of filter. Introduction toDSP proessor 67XX:Introduction, TMS320C67XX Architecture, Functional Units, pipelining, Registers, Addressing modes.

Unit VI : - Multirate digital signal processing (5 hrs)

Need of Multirate digital signal processing , decimation by facter D, two stage decimater, interpolation by facter I , two stage Interpolator , sampling rate conversion by intional facter I by D, application of multirate signal processing

NOTE :- Minimum twelve experiments are to be performed out of which few to be performed using DSP processor kit.

T.E. (Electronics Engineering) Part-II Semester –VI (Revised) with effect from July 2015

2. VIDEO ENGINEERING

Teaching Scheme	**Examination Scheme**
Lectures : 3 hours/week	**Theory :100 marks**

Practical : 2 hour/week **Term work : 25 marks**
POE : 50 marks

Unit I : Elements Of A Television System (5 Hrs.)

Picture and sound transmission and reception, CCIR-B standards , aspect ratio, horizontal and vertical resolution, video bandwidth and interlaced scanning , composite video, signal, H & V sync details, VSB transmission and channel bandwidth(Numerical treatment required),Modulation of picture and sound signals, positive and negative modulation.

Unit II : Colour Signal Transmission And Reception (8 Hrs.)

Composite color signals, compatibility considerations, frequency interleaving process, Low level IF modulated color TV transmitter block diagram & Color TV receiver ,color mixing theory, luminance, hue and saturation, color difference signals,chromaticity diagram , color signal transmission bandwidth and modulation of color difference signals, coder and decoder of NTSC , PAL – D & SECAM

Unit III: Audio & Video Systems (6 Hrs)

Principle of different camera tubes, Solid-state image scanners, Elements of a picture tube , Trinitron, optical recording, & reproduction, microphone, loudspeakers Mono, stereo & Quad multiplexing, equalizer & mixer.

UNIT IV: Digital TV & HDTV (7hrs)

Merits of Digital technology, Digital TV signals, Digitized video parameters ,digital Transmission and reception, codec Functions ,ITT Digit 2000 IC system, Component coding ,MAC signals , D2-MAC/Packet signals, Advantages of MAC signals HDTV systems, HDTV standards & compatibility, the MUSE system, the HD MAC family.

UNIT V: Advanced Display Systems (6 Hrs)

LCD TV System: LCD Technology, LCD Matrix types & operations, LCD screen for TV. Plasma TV: Plasma TV System: Plasma & conduction of charge, Plasma TV screen. Construction & working of LED.

UNIT VI: Advanced TV System (6 Hrs)

Satellite TV, DTH receiver, CATV, CCTV, IR remote control, Block converter.

TEXT & REFERENCE BOOKS :

1. R.R. Gulati,**"Modern Television Practice – Principles, Technology and Service",** New Age International Publication, III rd Edition.
2. R.R. Gulati,**"Monochrome and Color TV"**, New Age International Publication.
3. S.P. Bali,**" Color Television Theory and Practice"**, Tata mc-Graw Hill Publication.
4. A.M. Dhake,**"Television and Video Engineering"**, IInd Edition.Tata mc-Graw Hill Publication.
6. S.P. Bali,**"Consumer Electronics"Pearson Publication**
7. A Veera Lakshmi & R Srivel **Television & Video Engineering** Ane's book Pvt. Ltd publishers & Distributors.
8. B. Grob and C.E. Herndon,**"Basic Television and Video Systems"**, McGraw Hill Publication.

TERM WORK : LIST OF PRACTICALS :
(Minimum 12 Experiment based on following TV Sections)

1. Study of Microphone & PA System.
2. Study of circuit diagram of color TV receiver
3. CCVS for different test patterns
4. RF tuner
5. Video IF & detector
6. Video Amplifier
7. Sync separators (V & H)
8. Sound IF
9. Horizontal section
10. Vertical section
11. Trouble shooting of color TV
12. DTH
13. Plasma TV
14. LCD TV
15. CCTV
16. CATV

T.E. (Electronics Engineering)-II Semester VI (Revised) with effect from July 2015

3. Power Electronics

Teaching Scheme	**Examination Scheme**
Lectures: 4 Hours/Week	**Theory: 100 Marks**
Practical's: 2 Hours/Week	**Term work : 25 Marks**
	POE : 50 Marks

COURSE OBJECTIVES:

1. To understand fast switching semiconductor devices with their construction, working, characteristics and there fast control facility
2. To describe the need and function of different types of converter and topology such as ac-ac,dc-dc techniques
3. To provide the basis for further study of power electronics circuits and systems
4. Design, analyze, model, build and test the operation of simple power electronic circuits in a lab environment

COURSE OUTCOMES:

1. Analyze and build simple Power Electronic circuits.
2. Categorize the various power electronic devices and power converters for various applications
3. Ability to design and conduct experiments.
4. Proper understanding of various converters could be used with multidisciplinary aspects

UNIT-I: Study of Power Devices (10Hrs.)

Construction- **: V-**I Characteristics, Dynamic Characteristics during turn on, turn off, gate triggering Characteristics of SCR, SCR Turn off method: Class A, Class B, Class C, Class D, Class E, & Class F, dv/dt & di/dt protection circuits.

Construction, working, & V-I Characteristics, of Diac, Triac, GTO, MOSFET, IGBT.

UNIT-II: Firing Circuits of SCR (6 Hrs.)

Turn On methods of SCR, UJT triggering circuit with design, PUT triggering circuit, Cosine based firing circuit and Microprocessor based firing circuit for bridge controlled converter. Need of Isolation. Pulse transformer & Opto-coupler based isolation techniques.

UNIT-III: 1 Φ Controlled Converter (8 Hrs.)

Derivations of V_{dc} & V_{rms} are expected for following configuration:

1 Φ Half Wave Controlled Rectifier with R & RL load. Midpoint converter with RL load. Bridge converter with R ,bridge converter with RL and RLE load for continuous current mode of operation with and without freewheeling diode, Semi converter with RL load, Fourier analysis of source current with single phase full control converter with RL load for continuous current mode operation.Numericals based on performance parameters of converter

UNIT-IV: Chopper Circuits (8 Hrs.)

Introduction to Choppers. Step down chopper with R & RL load . Analysis of load ripple current with RL load. Step up chopper with R & RL load . Voltage control technique of Chopper (frequency modulation & TRC.) Classification and quadrant operation of chopper (class A to class F). Numerical based on voltage controlled techniques.

UNIT-V: 1 Φ Inverters. (8 Hrs.)

Principle and operation of half bridge and full bridge inverters. Harmonic reduction techniques of inverter : Quasi square wave ,Multiple PWM and sine wave PWM .Harmonic analysis is expected .Numerical based on above .

UNIT-VI: Industrial applications (8 Hrs.)

Block diagram of online and offline UPS, SMPS,Single phase preventer , battery charger , light dimmer using triac and diac , Induction heating, A.C. voltage stabilizer –Relay type , Servo type , constant voltage transformer.

Note: Industrial Visit is compulsory & Visit report is expected.

Text Books:

1.M.H. Rashid, “Power Electronics”, 3rd Edition, Pearson.

2. M.D. Singh, K.B. Khanchandani, “Power Electronics”, 2nd Edition, Tata- McGraw Hill.

Reference Books:

1. Mohan, Undeland, Riobbins, “Power Electronics” 3rd Edition, Wiley.

2. Power Electronics by L.Umanand Wiley India
3.G.E. SCR Manual.

Practical List:
1.Study of ratings and specifications of SCR.
2. Study of VI Characteristics of SCR.
3. Study of VI characteristics of MOSFET / IGBT.
4 Design and implementation of UJT firing circuit for SCR.
5. Study of single phase half wave controlled rectifier.
6. Study of single phase full wave controlled rectifier.
7.Study of single phase half controlled converter.
8. Study of step up /step down chopper
9. Study of Jones Chopper
10. Study of single phase bridge inverter.
11. Study of light dimmer using TRIAC.
12. Study of UPS.
13. Study of microprocessor based firing circuit for bridge converter.
14. Study of cosine firing circuit.

Note:1st experiment is compulsory and minimum 8 experiment excluding 1st experiment based on above are expected.

T.E. (Electronics Engineering) Part-II Semester –VI (Revised) with effect from July 2015

4. COMPUTER ARCHITECTURE AND OPERATING SYSTEM

Teaching Scheme — **Examination Scheme**
Lectures : 4 Hours/Week — **Theory : 100 Marks**
Term work : 25 Marks

Course Objectives:

1. To design and implement various blocks of Arithmetic Logic Unit.
2. To design and implement control unit and processor.
3. To give a complete overview of O.S.
4. To study the process management and issues.
5. To understand Classical IPC problems and solutions.
6. To understand the various memory management schemes.

Course Outcomes:

1. Student should be able to design and implement various blocks of Arithmetic Logic Unit.
2. Student should be able to design and implement control unit and processor.
3. Student should be able to give a complete overview of O.S.

4. Student should be able to study the process management and issues.
5. Student should be able to understand Classical IPC problems and solutions.
6. Student should be able to understand the various memory management schemes.

UNIT-I: Arithmetic Unit Design. (8 Hrs.)

Fixed point arithmetic: Byte and word , Adders, Subtracters, Multipliers: Booth's algorithm, Robertson's algorithms, combinational array multiplier. 32/64 bit floating point arithmetic: (IEEE 754 format), introduction to pipeline processing.

UNIT-II: Processor Design (6 Hrs.)

Introduction, Hard wired control, , GCD processor Design, Design of
Control unit for accumulator based CPU, DMA controller, Two's compliment Multiplier control unit design, , Micro programmed control ,Micro Instruction format

UNIT III : FUNDAMENTALS OF OS AND SYSTEM SOFTWARE (4 Hrs.)

Overview of all system software Operating system- I/O Manager- Assembler- Compiler- Linker- Loader, OS services and components, multitasking, multiprogramming, time sharing, buffering, spooling

UNIT II : PROCESS AND THREAD MANAGEMENT (6 Hrs.)

Concept of process and threads , process states process management context switching , interaction between processes and OS , multithreading.

UNIT III : CONCURRENCY CONTROL (7 Hrs.)

Concurrency and race conditions, mutual exclusion requirements , s/w and h/w solutions, semaphores, monitors, classical IPC problem and solutions, Dead locks -characterization , detection ,recovery, avoidance and prevention.

UNIT IV : MEMORY MANAGEMENT (6 Hrs.)

Memory partitioning , swapping, paging, segmentation, virtual memory - Concepts, Overlays, Demand paging, Performance of demand paging , page replacement algorithm, Allocation algorithms

Text Books/:

1. J.P. Hayes "Computer Architecture and Organization" McGraw Hill publication.
2. Silberschatz & Galvin,**" Operating System Concepts",**VIII th Wiley 2014.

Reference Books:

1. William Stallings ,**"Operating System: Internals & Design Principles'**, Prentice Hall of India.
2. Milman Milenkovic," **Operating systems, concept &design"**
3. "Dr.M.Usha ,T.S.Srikanth" Computer System Architecture and Organization" Wiley

5. Electronic System design

Shivaji University, Kolhapur

Revised Structure & Syllabus of S.E., T.E. & B.E. (Electronics Engg) course w.e.f. July 2014-15

Teaching Scheme
Lectures : 4 Hours/Week
Practical : 2 Hours/Week

Examination Scheme
Theory : 100 Marks
Term work : 25 Marks
POE : 50 Marks

Unit 1: (7 Hrs)

Electronic system classification: Consumer, Industrial, Military, System reliability: Bath tub curve, majors taken to improve reliability at component and product level. Important characteristics and performance parameters of Op-amp, TTL and CMOS Integrated circuits and interfacing with each others. Design of analog and digital system for emission control and immunity

Unit 2: Analog hardware design (9 Hrs)

Design of signal conditioning circuits: V to I (4-20 ma current loop), I to V (4-20ma to 0 to 4 Vol.), Gain offset circuit, Analog signal conditioning for RTD, Thermocouple, Load cell, Pressure sensor, flow sensor, Accelerometer (Design of instrumentation amplifier error budget analysis for above signal conditioners of On-Off, Proportional and PID controller, PID controller tuning method.

Unit 3: Digital hardware design (8 Hrs)

Interpretation of important specification of ADC-DAc, Interfacing of Serial (SPI/i2C) ADC (SA,ΣΔ), Design of antialiasing filter for ADC , DAC , Consideration for selecting Vref for ADC-DAC, seven segment LED static-dynamic, LCD display alphanumeric, factors affecting choice of microcontroller, Touch screen interface: capacitive touch, Interfacing of pneumatic –hydraulic actuators and relays and contactors

Unit 4: Design of biomedical system: (8 Hrs)

Specification development, signal conditioning and interfacing of 1 ECG, 2Pulse-oximeter, 3Blood sugar measurement, 4Drug delivery system to microcontrollers, signal filtering and suppression, equipment shielding theory and practices

Unit 5: Design of switch mode power supply (8 Hrs)

SMPS topologies step down step up, push-pull, negative flyback, high frequency ferrite core transformer design, selection of ferrite core, SMPS controller ICs: 3524, TL494, 3845, Design of SMPS for industrial applications: battery charger, microcontroller power supply (+5, + - 12V, +24V), design should include selection of power devices and filter design

Unit 6: EMI EMC legislation and standards (8 Hrs)

Introduction to EMC, compatibility, scope of EMC, EMF and human health, EMC directives, emission measuring instruments, equipment layout and grounding, PCB layout

Text books:

TTL Manual- Fairchild
CMOS manual-Philips
Electronic Product design- Kaduskar, Wiley, 2nd edition

Instrumentation - Rangan
Linear integrated circuits- Sergio franco
EMC for product designers- Tim Williams, Elsevier, fourth edition
Switching and linear power supply, Power converter design- Abraham pressman, Hayden book company

Reference books

Analog signal processing by Pallas- Areny Wiley india
Medical instrumentation application and design Webster wiley india 3rd edition
Introduction to electromagnetic compatibility Clayton R Paul, Wiley, 2nd Edition
Fundamentals of industrial instrumentation Barua, Wiley india, 1st edition
Instrumentation for engineers and scientists John D Terner, Matyn Hill Oxford University, 1st edition

T.E. (Electronics Engineering) Part-II Semester –VI (Revised) with effect from July 2015

6. Mini Project

Teaching Scheme
Practical : 2 Hours/Week

Examination Scheme
Term work : 25 Marks
OE : 50 Marks

Mini project work should consist of following steps.

1. Students should propose project ideas & finalize the project idea in consultation with guide.
2. Students should submit implementation plan in the form of PERT/CPM chart. Which will cover weekly activity of project report.
3. Problem definition and specification development in the form of synopsis.
4. Design of circuit with calculation & should include a) Analog part b) digital part c) Power supply d) Test strategy if firmware is required produce flow chart.
5. Simulation of design using tools like OrCAD, Matlab, etc.
6. Design of enclosure & PCB.
7. Fabrication & assembly of PCB & enclosure.
8. Testing & calibration. 9. Measurement of specifications.

Note:-

1. Project report should include report of all above steps and conclusion.
2. Project group should demonstrate and deliver seminar on project.
3. A mini project should not exceed three students per group.

Guidelines for selection of project ideas:-

1. Battery charger: Voltage & current indication Specification like a) Over voltage protection b)Charging current rating c) Accuracy d) With all annunciations

2. Capacitance meter: Specifications a) Ranges b) Resolution c) Accuracy
3. Temperature indicator / ON-OFF controller: Specifications a) Sensor selection b) Range c) Resolution d) Accuracy
4. Angular displacement measurement using rotary encoder: Specifications a) Range b) Resolution c) Accuracy
5. Resistance meter (milliohms): Specifications a) Range b) Resolution c) Accuracy
6. DC motor speed controller using power devices with indicator: Specifications a) Range b) Resolution c) Accuracy
7. FSM based digital design Development of timing diagram & Design of FSM using MSI, LSI PLDs ROM for application like sequence detector, sequence generator, counters, glass scale, industrial timers
a) Sequence generator: A typical PN sequence generator, Six stage MLS counters using shift register (maximum length sequencer),Gray code generator
b) Sequence detectors: A combinational lock, Flag detection in synchronous communications, ASM based digital design: ASM technique- vending Machine, Lift controller, traffic controller, Washing machine & Micro oven, Automatic bottle filling plant.
8. Micro controller Based Data Acquisition System: Temperature measurement systems, Flow measurement system, Level Measurement System, Design a Microcontroller based weigh scale using load cell, Design an alarm annunciator for pressure measurement system, Design an ECG amplifier with 1 mV calibration facility.

References: Students are advised to refer Application Notes, research publications & data sheet of various electronics devices. from Motorola, National Semiconductors, Analog devices, Texas instruments, Fairchild, Cypress Semiconductors, Microchips, International Rectifiers, ST Microelectronics, Maxim, Philips, NXP, IEEE.

Minimum 08 Practicals of Mini Project will be based on ESD Syllabus. Mini Project designed developed and demonstrated by a batch of 2 to 3 students at the time of Oral.

Note for T.E. (Electronics Engineering) Part-I &II Semester –V & VI (Revised)

A) Term Work Assessment Scheme: The term work of concerned subjects shall be assessed on the basis of Tutorials (if applicable), assignments, class tests and practical performance of the student.

B) Guidelines for Nature of Question Paper for T.E (Electronics) Part-I & II.

1. There shall be total six questions in each paper, all being compulsory with internal options.

2. Duration of each paper shall be of Three Hours Carrying of Maximum 100 Marks.

C) Industrial Visits: At least two visits and study reports are expected to local Industries or MNCs to study the 'PRODUCT' design, development and manufacturing processes.

Shivaji University, Kolhapur

Revised Structure & Syllabus of S.E., T.E. & B.E. (Electronics Engg) course w.e.f. July 2014-15

EQUIVALANCE FOR OLD SYLLABI SUBJECTS TO NEW SYLLABUS SUBJECTS

SEMESTER	OLD SUBJECT	NEW SUBJECT	REMARK
V	Signal & Systems	Signal & Systems	
	Microcontroller	Microcontroller	
	Electromagnetic Engineering	Electromagnetic Engineering	
	VLSI Design	VLSI Design	
	Digital Communication	Digital Communication	
	Programming Language-II	Programming Lab-II	
VI	Digital Signal Processing	Digital Signal Processing	
	Video Engg.	Video Engg.	
	Power Electronics	Power Electronics	
	Operating system	Computer Architecture & Operating system	New subject
	--	Electronic System Design	New subject
	Mini Project	Mini Project	