Shivaji University, Kolhapur
Revised Syllabus Structure of Third Year Engineering (TE) (w. e. f. 2015)
Electronics and Telecommunication Engineering Course
Scheme of Teaching and Examination

Semester-V

Sr. No.	Subject	Teaching Scheme(Hrs.)				Examination Scheme (Marks)				
		L	T	P	Total	Theory	TW	POE	OE	Total
1	Antenna and Wave Propagation	4	--	2	6	100	25	50	--	175
2	Control Systems	3	1	--	4	100	25	--	--	125
3	Signals & Systems	3	1	--	4	100	25	--	--	125
4	Power Electronics	4	--	2	6	100	25	--	--	125
5	Digital Communication	4	--	2	6	100	25	50	--	175
6	Simulation LAB	2	-	2	4	--	25	50	--	75
		20	**2**	**08**	**30**	**500**	**150**	**150**	**--**	**800**

Semester-VI

Sr. No.	Subject	Teaching Scheme(Hrs.)				Examination Scheme(Marks)				
		L	T	P	Total	Theory	TW	POE	OE`	Total
1	Digital Signal Processing	4	--	2	6	100	25	--	--	125
2	VLSI Design	3	--	2	5	100	25	50	--	175
3	Microprocessor and Microcontrollers	4	--	2	6	100	25	50	--	175
4	Optical Communication & Network	4	--	2	6	100	25	--	--	125
5	Industrial Management	3	--	--	3	100	25	--	--	125
6	Electronic System Design	2	--	2	4	--	25	--	50	75
		20	**--**	**10**	**30**	**500**	**150**	**100**	**50**	**800**

Note:-Industrial training for 15 days is mandatory during summer vacation (after TE-II) & the assessment of the same will be carried out in project phase-I, By project guide in BE-I

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication Engineering) Part- I (w. e .f July 2015)
Subject: Antenna and Wave Propagation

Teaching Scheme	Examination Scheme
Lectures : 4 hrs / week	**Theory :** 100 Marks
Practical: 2 hrs / week	**TW :** 25 Marks **POE:** 50 Marks

Course Objectives: The course aims :	
1	To make students aware of the fundamentals of Antenna system in order to reach the desire industry skills sets.
2	To introduce the students about various Antenna types to know their applications in various domains.
3	To prepare the students for Emerging Technologies hardware using fundamentals of design concepts.

Course Outcomes: Upon successful completion of this course, the student will be able :	
1	To realize the importance of basics of antenna systems to differentiate the applicability of each type of antenna.
2	To analyze the utilization of Antenna systems in wide areas like wireless communication, fixed line communication, computer communication etc.
3	To solve various problems on various parameters of antennas.

Unit No	Unit Contents	No. of Lectures
I	**Fundamentals of Antenna :** Basic antenna radiation mechanism (single & double wire), parameters- radiation resistance, pattern , beam area, radiation intensity, beam efficiency, directivity, gain and resolution, antenna aperture, effective height, radio communication link, field from oscillating dipole, field zones, shape impedance consideration. Array of two isotropic point sources, non-isotropic but similar point source and the principle of pattern multiplication, examples of pattern synthesis by pattern multiplication, non isotropic and dissimilar point sources, linear array of isotropic point source of equal amplitude and spacing, null directions for array of isotropic point sources of equal amplitude and spacing effect.	**10**
II	**Broadband & Frequency Independent Antenna:** Broadband basics, infinite and finite biconical antennas, directional biconicals, conicals, disk cones and bowties, the frequency-independent concept: rumesay's principle ,the Illinois story, the frequency independent planner log-spiral antenna, frequency independent conical-spiral antenna, the log periodic antenna, the composite yagi-uda corner-log-periodic array	**06**

III	**Antenna Measurements & Microstrip Antenna:** Antenna measurement: Antenna ranges, Radiation pattern, Gain measurements, Directivity measurements, Radiation efficiency, Impedance measurements, **MICROSTRIP Antenna** - Introduction, Basic characteristics, Feeding methods, basic types – rectangular, circular & transmission line model.	**08**
V	**Ground Wave Propagation:** Plane earth reflection, space wave and the surface wave, elevated dipole antennas above a plane earth, wave tilt of the surface wave, spherical earth propagation, troposphere wave.	**07**
V	**Ionospheric Propagation :** The ionosphere, effective permittivity and conductivity of an ionized gas, reflection and refraction of the waves by the ionosphere, regular and irregular variations of ionosphere, attenuation factor, sky wave transmission calculations, effect of earth magnetic field, wave propagation in ionosphere, Faraday rotation and measurement of total electron content, other ionosphere phenomena.	**10**
VI	**Radar System:** Fundamentals, RADAR performance factors, basic pulsed radar system, antennas and scanning, display methods, pulsed radar systems, moving target indication, radar beacons, CW Doppler radar, frequency modulated CW radar, phase array radars, planar array radars	**07**

Text Books:

Antenna for all Application-John D Kraus, third edition-TMH publication
Antenna Theory-Constantine A. Balanis -Third edition-Wiley Publication
Electromagnetic Waves and Radiation Systems- Jordan and Balmain PHI publication
Electronics Communication System – Kennedy Davis- 4thedition TMH publication

Reference Books:

Antennas and Wave Propagation–G. S. N. Raju (Pearson)
Foundations of Antenna Theory and Techniques – Vincent F. Fusco(Pearson)

List of Experiments : (Minimum 10 experiments should be conducted)

1	Calculation of beam width, front to back ratio & gain of simple dipole antenna.	9	Calculation of angle of refraction for varying angle of incidences.
2	Calculation of beam width, front to back ratio & gain of log periodic antenna.	10	Observe standing waves and measure the wavelength of microwave
3	Calculation of beam width, front to back ratio & gain of Yagi-Uda antenna.	11	Determination of velocity of object moving in RADAR range.
4	Calculation of beam width, front to back ratio & gain of Horn antenna.	12	Measurement of time & frequency of RADAR using moving pendulum.
5	Calculation of beam width, front to back ratio & gain of micro strip /patch antenna.	13	Measurement of characteristic/ Input Impedance /Attenuation of transmission line.
6	Performance comparison of simple dipole	14	Write a program to find radiation pattern of

	and folded dipole antenna		Broadside array antenna using MATLAB
7	To determine effect of varying distance between transmitter & receiver on received power.	15	Write a program to find radiation pattern of End fire array antenna using MATLAB
8	Calculation of angle of reflection for varying angle of incidences.	16	Write a program to compare radiation pattern of uniform linear array and non-uniform linear array using MATLAB

Note for paper setter: 40% theory and 60% numerical and Design

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication Engineering) Part- I (w. e. f July 2015)
2. Subject: Control Systems

Teaching Scheme	Examination Scheme
Lectures : 3 hrs / week	**Theory :** 100 Marks
Tutorial: 1 hrs / week	**TW :** 25 Marks

Course Objectives: The course aims :	
1	To provide an introduction and basic understanding of Control System
2	To develop time & frequency domain analysis
3	To analyze & compare different control systems
4	To understand the concept of stability & state space variables

Course Outcomes: After successful completion of this course, the student will be able to:	
1	Apply knowledge of mathematics, science, and engineering to design, analyze and control the different systems
2	Explain time & frequency domain analysis for different control systems
3	Demonstrate & compare different control systems
4	Describe state variables
5	Design model for control system

Unit No	Unit Contents	No. of Lectures
I	**Introduction** Need & classification of control system, Effects of feedback, Mathematical models – (Mechanical & Electrical systems) Differential equations, Transfer function – Armature & field control of DC servo motor, Block diagram algebra – Block diagram reduction, Representation by Signal flow graph – Reduction using Mason's gain Formula.	**08**
II	**Time Response Analysis** Standard test signals – Time response of first& second order systems –Design specifications of 2^{nd} order system & error compensation, Characteristic Equation of Feedback control systems, Transient response of second order systems – Time domain specifications, Steady state response – Steady state errors and error constants.	**06**
III	**Stability Analysis In S-Domain** The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability. Root Locus Technique**:** The root locus concept – construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root locus.	**06**

IV	**Frequency Response Analysis** Introduction, Frequency domain specifications-Bode plots, Determination of Frequency domain specifications and transfer function from the Bode Plot – Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots, Nyquist Stability Criterion, Nyquist plot & stability analysis.	**07**
V	**Classical Control Design Techniques** Compensation techniques –Lag, Lead, Lead-Lag Controllers design in frequency Domain, Design of PID control system.	**05**
VI	**State Variable Analysis and Design** Concept of state, state variable & state model, state model for linear continuous time systems, state variable & linear discrete time system.	**04**

Books:

Control Systems Engineering, I .J. Nagrath and M. Gopal, 5th Edition, Anshan Publishers.
Control System Engineering, Dr. Rajeev Gupta, Wiley Precise Publication
Feedback Control Dynamic system, Franklin Powel 5th Edition Pearson Education.
Kuo & Golnaraghi Automatic Control Systems, Kunche Sridhar, Wiley Publication
Modern Control Engineering, Eastern Economy, K. Ogata, 4th Edition.
Control System Principles and Design, M. Gopal, Tata McGraw Hill 3rd Edition.
Automatic Control Systems, S. Palani, Anoop K. jairath, Ane books pvt. Ltd.

Tutorials (Minimum 12), 2 Tutorials per unit

Note for paper setter: 50% theory and 50% Numerical, Design & Derivation

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication Engineering) Part- I (w. e. f July 2015)
3. Subject: Signals & Systems

Teaching Scheme	Examination Scheme
Lectures : 3hrs / week	**Theory :** 100 Marks
Tutorial : 1 hr / week	**Term Work :** 25 Marks

Course Objectives: The course aims :	
1	To describe basic signals mathematically and understand how to perform mathematical operations on signals.
2	To understand systems classification, properties & apply skills to solve problems.
3	To know the Fourier series & Transforms for representation of periodic and a periodic signals.
4	To analyze the systems in time & frequency domain by applying knowledge of Fourier & Z-Transforms.
Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	define CT signals mathematically & solve problems related to operations on signals.
2	classify different systems & learn its properties.
3	understand Fourier series & Transforms and represent different signals using these techniques.
4	apply different tools like Z-transform, Fourier Transform to analyze the systems.

Unit No	Unit Contents	No. of Lectures and
I	**Introduction :** A) **Signals and Classification of Signals:** Continuous time signals & discrete time, analog & digital, even &odd signals, periodic &non-periodic, deterministic &non-deterministic, energy &power, Basic CT & DT signals: unit impulse, unit step, unit ramp, complex exponential &sinusoidal, Basic operations on signals. B) **System and Classification of Systems:** System Representation, continuous time Systems & discrete Systems, system with and without memory, causal and noncausal system, linear and nonlinear system, Time invariant and time variant system, Stable system, properties of systems.	**07**

II	**Linear time-invariant systems:** The representation of signals in term of impulses, discrete time LTI systems, continuous time-LTI systems, properties of CT- LTI and DT-LTIsystems, **Convolution:** Convolution integral & its properties, convolution sum & its properties, Systems described by differential, difference equations, block diagram representation of LTI systems described by differential difference equations, Singularity functions.	**06**
III	**Sampling:** Representation of continuous time signals by its samples, The sampling theorem, Reconstruction of signals from its sample s using interpolation, The effect of under sampling, aliasing, Discrete time processing of continuous time signals, Sampling in the frequency domain.	**04**
IV	**Z transform:** 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, Parsevals theorem, initial value & final value theorem. Inverse Z-transform: long division method, PFE method, residue method. Transfer function (Poles & Zeros),stability and causality. Representation of system via difference equation and solutions.	**06**
V	**Fourier Series for Continuous Time & Discrete Time Signals:** Continuous time Fourier series: Trigonometric and exponential Fourier series, Relation between trigonometric and exponential Fourier series. Discrete time Fourier Series, properties of Fourier series.	**06**
VI	**Continuous Time Fourier Transform:** From Fourier series to Fourier Transform, Fourier Transform pair, Fourier Spectra, Convergence of FT, **Properties of Fourier transform:** linearity, time shifting, frequency scaling, time scaling, time reversal, duality, differentiation in time domain and frequency domain, Integral in time domain, multiplication, and convolution and Parsevals relation.	**07**

Text Books:

1.	H.A HSU, 'Signals & system' (Schaum's out lines), Tata McGraw Hill
2.	Alan V. Oppenheim, Alan S. Wilsky, S. Hamid Nawab -'Signals & system' -IInd Edition - Pearson Education.
3.	Ramesh Babu 'Signals & system' , SciTech Publication.

Reference Books:

1.	Michael J. Roberts.-'Fundamentals of signals & systems'- Tata McGraw Hill, 2007.
2.	Simon Haykin, Barry Van Veen- 'Signals & system' - IInd Edition Wiley publication
3.	Continuous and Discrete Time Signals and Systems by Mandal and Asif, Cambridge University Press
4.	Signals and Systems by Dr.D.D.Shaha and Dr.A.C.Bhagali, MPH.
5.	Signals and Systems by S. Palani, Ane Books Pvt. Ltd

6.	Signals and Systems by Krishnaveni and Rajeswari, Wiley India
7.	Signals Systems and Communication By B. P. Lathi, BS Publications

***Termwork shall consist of minimum 8 tutorials from entire syllabus.**

***Note for paper setter:** 40% theory and 60% numerical and Design from entire syllabus.

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication Engineering) Part- I (w. e. f July 2015)
4. Subject: Power Electronics

Teaching Scheme	Examination Scheme
Lectures : 4 hrs / week	**Theory :** 100 Marks
Practical: 2 hrs / week	**TW :** 25 Marks

Course Objectives: The course aims to:	
1	make students aware of semiconductor power devices with its firing circuits.
2	get aware with Thyristors and allied applications.
3	prepare students to get acquaint with inverters using MOSFET/ IGBT's
4	prepare students to emerging technologies in power electronics viz PLC and SCADA
5	Prepare students to design and simulate Controlled rectifier circuits.

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	Understand power electronics DC Drives, devices and its firing circuits.
2	Analyze the allied applications of Power Electronics.
3	Describe the PLC/SCADA and other miscellaneous applications.

Unit No	Unit Contents	No. of Lectures
I	**SemiconductorPowerDevices:-** Characteristics of power diodes, power transistors, power MOSFET, IGBT, SCRs, TRIAC, DIAC and GTO. Rating of power devices, series and parallel connections of SCRs, static & dynamic equalizing circuits, String efficiency, De-rating factor, SCR protections- dv/dt, di/dt, over voltage and over current protection. **Numerical based on string efficiency and de-rating factor are expected**	**09**
II	**Firing Circuits:-** **(**Turn ON Methods-study of single phase firing circuits using UJT, PUT, Diac,Triac, Turn OFF Methods-Forced commutation circuits -Parallel Capacitance, resonant turnoff, external pulse commutation, auxiliary thyristors/IGBT/MOSEFT and load commutation (Class A to F)	**07**

III	**ControlledRectifierCircuits:-** **a) SinglePhase: -**Half wave, fullwave, half controlled and full controlled converters with R & RL Load, effect of Freewheeling Diode. Calculations of performance parameters expected. **Numerical based on Single phase are expected** **b) ThreePhase:-**Halfwave, fullwave, fullycontrolledconverterswithResistiveLoadonly.	**09**
IV	**Inverters using MOSFET/IGBT's:** Single phase bridge inverters, principle and operation of three phase inverters, Voltage control techniques, harmonic elimination methods -PWM Technique IGBT MOSFET based (Analytical treatment not expected)	**07**
V	**Choppers and its Applications: -**Basic principles of chopper, time ratio control and current limit control techniques, voltage commutated chopper circuit, Jones chopper, Morgan's chopper, step-up chopper and AC chopper. Speed control of DC series motors using chopper, speed control of DC shunt motor using phase controlled rectifiers,	**08**
VI	**Applications : -** **a)** Static circuit breakers, over voltage protectors, zero voltage switch, integral cycle triggering, time delay method, soft start method. Non-drive applications such as induction heating and Dielectric heating, Switched mode power supply (SMPS), Uninterrupted power supply (UPS). **b)** Introduction to PLC fundamentals, block diagram of PLC, Ladder diagram with examples, PLC programming –physical components vs. program components. Introduction to SCADA, Architecture and its applications	**08**

Text Books:

1.P.S.Bhimbra :Power Electronics
2. P.C.Sen: Power electronics; MGH publication
3. M.D. Singh &Khanchandani : Power Electronics McGraw Hill publication
4. FederickD.Hackworth:ProgrammableLogicControllers; PearsonEducation
Reference Books
1.Ned Mohan: Powerelectronics; WileyPub. 3rd Edition
2. Dr. Ramachandran: Mechatronics; Wiley Pub. (For SCADA)
3. Frank D.Petruzella : ProgrammableLogicControllers MGH publication
4. Mohammad Rashid : Power electronics 3rd edition Pearson Publication

List of Experiments:

Exp. No.	Name of Experiment
1.	Study of V-I Characteristics of SCR TRIAC, DIAC.
2.	Study of V-I Characteristics of MOSFET/IGBT/GTO
3.	Study of Firing circuits using TRIAC, DIAC
4.	Study of Firing circuits using UJT as relaxation oscillator/RAMP- Pedestal Circuit
5.	Study of Half controlled Bridge rectifier
6.	Study of Fully controlled Bridge rectifier
7.	Study of Jones chopper and Morgan's chopper
8.	Speed control of DC motor using single phase controlled rectifiers,

9.	Study of Single phase Inverter
10.	Study of SMPS
11.	Study of UPS
12.	Study of PLC/SCADA(If possible 1 to 3 days Workshop on PLC/SCADA should be taken in this semester)

Note:-Any 08 experiment should be conducted out of 12 experiments.
Question Paper Contains 20% numerical on 1st and 3rd chapter and 80% theory on entire syllabus

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication) Part- I (w. e. f July 2015)
5. Subject: Digital Communication

Teaching Scheme	Examination Scheme
Lectures : 4 hrs / week	**Theory :** 100 Marks
Practical: 2 hrs / week	**TW :** 25 Marks **POE:** 50 Marks

Course Objectives: The course aims to:	
1	describe the random signal theory with its mathematical analysis base.
2	explain the information theory in detail with different coding theorems.
3	elaborate the different source coding techniques with the help of their block diagrams and function.
4	explain the different digital modulation techniques.
5	describe the baseband transmission system.
6	describe the different channel coding methods available

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	realize and solve the problems related to random signals and also the related issues like power spectral density.
2	work with the information availability and code the information in different formats.
3	acquire knowledge of different source coding techniques available with their pros and cons.
4	understand the baseband transmission with optical receiver operation and working.
5	describe the channel coding techniques with error handling methods.

Unit No.	**Unit Contents**	**No. of Lectures**

I	**Probability Theory:** Introduction to digital communication system, probability and sample space, Bayes‟ rule, Joint & conditional Probability, PDF & CDF, Statistical averages, Random Processes, Time average, Ergodicity, Power Spectral density of Stationary random processes	**09**
II	**Information Theory:** Measure of Information, Entropy, Information Rate, Shannon's encoding theorem, communication channels –Discrete & Continuous, Shannon–Hartley theorem, Huffman's coding & Shannon-Fanno Coding techniques.	**08**
III	**Source Coding:** Quantization–Uniform, Non-Uniform. Study of PCM, DPCM, ADPCM, DM, ADM, CVSD	**08**
IV	**Baseband Transmission and Reception:** Line codes: Unipolar, Bipolar, NRZ, RZ, RZ-AMI, Manchester Baseband pulse Shaping, Duo binary, M-ary Signaling, eye diagram, ISI, scrambler, Unscramble. Optimum Receivers-Matched Filters, Correlation receivers, Optimum detection using ML criteria.	**08**
V	**Bandpass Modulation Techniques:** ASK, FSK, PSK, DPSK, QPSK, & QAM. Coherent, Non- Coherent detection. Introduction to Spread Spectrum techniques: DSSS, FHSS.	**07**
VI	**Error Control Coding:** TypesofErrors&codes, Linearblock codes: Encoding-Decoding using Syndrome, error detection & correction, Hamming codes. Cyclic codes: Encoding and syndrome decoding. Convolution codes: Encoders, Decoders, Code tree	**08**

Books:

Text Books
1)K. Sam Shanmugam–Digital & Analog Communication (John Wiley)
2)Simon Haykin – Digital Communication(Wiley)
3)Communication Systems, Singh Sapre, TMH
Reference Books:
1)Bernard Sklar, Pabitra Kumar Ray –"Digital Communications"-2nd Edition-Pearson
2) Taub-Schilling-Saha -"Principals of Communication systems",-3rd Edition-McGraw Hill
3) Lathi B P, and Ding Z -"Modern Digital and Analog Communication Systems,"- Oxford University Press, Forth Edition,
4)Ha Nguyen,Ed Shwedyk-A First Course in Digital Communication-Cambridge Uni.Press

List of Experiments (Minimum 10):

1	Study of PCM–TDM.
2	Study of Compander.
3	Study of DPCM.
4	Study of ADPCM.
5	Study of DM
6	Study of ADM.

7	Study of CVSD.
8	Study of ASK,FSK&PSK.
9	Study of QPSK.
10	Study of Spread Spectrum techniques.
11	Measurement of bit error rate.
12	Study of Hamming Code.
13	Study of generation of cyclic codes.
14	Study of Eye Diagram using oscilloscope
15	Study of any digital modulation scheme using Matlab communication tool
16	Experiments on random signals using Matlab/Scilab software's. (Study of Continuous Random Variable-probability, variance)
17	Experiments on digital modulation techniques using Matlab/Simulink Software.

Note For Paper Setter: 50% Theory And 50% Numerical From Entire Syllabus.

SHIVAJI UNIVERSITY, KOLHAPUR
T. E. (Electronics and Telecommunication) Part- I (w. e. f. July 2015)
6. Subject: Simulation Lab

Teaching Scheme	Examination Scheme
Lectures : 2 hrs / week	**TW :** 25 Marks
Practical: 2 hrs / week	**POE:** 50 Marks

Course Objectives: The course aims :	
1	To understand the different MATLAB functions and tools.
2	To do effective programming using different functions and commands

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	use the different commands, functions required for programming in MATLAB
2	calculate and perform various operations using MATLAB.
3	analyze and simulate the various systems.

Unit No	Unit Contents	No. of Hours
I	Matlab basics variables, arrays Multidimensional sub arrays, Special values, displaying output data, data files, scalar and array operations, Hierarchy of operations built-in Matlab functions, introduction to plotting, Debugging Matlab programs.	**05**
II	Branching, Statements and logical datatype, Branches, write & for loop logical arrays and vectorization	**04**
	User-defined & i/o functions, introduction to Matlab functions, Variable passing in Matlab, 3 optional arguments, Sharing data using global memory, Preserving data	**02**

III	between calls to a function, functions, sub functions ,	
IV	Private functions, Nested functions . complex data , string functions , textread function, load and save commands, an introduction to Matlab 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	**03**
V	Handle graphics & GUI , the Matlab 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	**03**
VI	Simulink basics introduction, simulink, modeling, solvers, simulating model using variables from matlab, data import/export , state space modeling & simulation, creation of subsystems & Mass subsystem.	**03**

Books:

Text Books
MATLAB programming for engineers
MATLAB & its application in engineering Rajkumar Bansal, Ashok kumar Good, Manojkumar Sharma
MATLAB & Introduction with application Amos Gilt
Reference Books
MasterinMATLAB-7DuaneHanselman,BruceLittlefiele-PersonEducation
MATLAB programming manual by Mathworks Inc
MATLAB&simulinkIntroductiontoapplications.-ParthaS.Mallick-Scitechpublications

List of Experiments:

1	Program using branching statement
2	Program using looping statement
3	Program of rmatrix 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

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication Engineering) Part- II (w. e. f July 2015)
1. Subject: Digital Signal Processing

Teaching Scheme	Examination Scheme
Lectures : 4 hrs / week	**Theory :** 100 Marks
Practical: 2 hrs / week	**TW :** 25 Marks

Course Objectives: The course aims:	
1	To understand DTFT and DFT.
2	To understand, analyze and design FIR and IIR filters.
3	To understand realization of FIR and IIR Filters.
4	To understand its hardware implementation using DSP Processor.

Course Outcomes:

Upon successful completion of this course, the student will be able to:	
1	apply DFT as an analytical tool.
2	analyze LTI Systems using FFT algorithms.
3	design FIR and IIR systems.
4	implement FIR and IIR Systems.
5	implement various DSP Systems on DSP Processor.

Unit No	Unit Contents	No. of Lectures

I	**Discrete Time Fourier Transform.** DTFT, Properties and symmetrical properties of DTFT, Introduction to DSP Systems [BD], Convergence of DTFT: Gibb's Phenomenon.	**06**
II	**Discrete Fourier Transform** Frequency Domain Sampling and Reconstruction of Discrete Time Signal. DFT, Properties of DFT, Circular Convolution and Circular Co-relation using DFT and IDFT ,Analysis of LTI System using Circular Convolution, Linear Convolution using Circular Convolution, Fast Convolution. Overlap Save and Overlap add algorithm. Relationship between DTFT, DFT and ZT. FFT Algorithms – Radix 2: DIT-FFT and Radix 2: DIF, Goertzel FFT algorithm and Chirp-Z transform FFT algorithm.	**12**
III	**FIR Filter Design.** Characteristics of FIR Filters. Properties of FIR Filters.FIR Design using Windowing Technique [Rectangular Window, Hamming Window and Hamming Window]FIR Design using Kaiser Window.FIR Design using Frequency Sampling Technique.	**08**
IV	**IIR Filter Design.** Introduction to IIR Filters, IIR Filter Designing using Impulse Invariant method and Bilinear Transformation method, Butterworth Filter approximation, Frequency Transformation.	**08**
V	**Realization of FIR and IIR Filters.** Introduction, Basic realization blocksdiagram.FIR realization- Direct Form (Non-linear phase and Linear phase), Cascade and Parallel realization.IIR realization- Direct form I and II, Cascade and parallel realization.	**08**
VI	**DSP Processors.** Introduction, Architecture of DSP Processor, TMS320C67XX, Specifications, Comparison between general purpose and DSP Processors.	**06**

Text Books:

Digital Signal Processing Principles, AlgorithmsandApplication – By John G Prokis, Manolakis, Pearson Education publication
Digital Signal Processing Salivahanam, A Vallavaraj, C. Guanapriya, TMH
Digital Signal Processing, Tarun Kumar Rawat (Oxford)

Reference Books

Digital Signal Processing P. Ramesh Babu, Scitech publication
Digital Signal Processing Sanjeet Mitra, MGH
Digital Signal Processing- E.C.Ifeachor, Barrie W. Jervis
Digital Signal Processing- Dr. A. C. Bhagali,MPH
Digital Signal Processing-Ashok Ambardar ,(Cengage learning)
Texas Instruments DIP Processor data sheet.
Digital Signal Processing- A. Anand Kumar.(PHI Publications)

Minimum 10 experiments

(Minimum 7 among the below list + 3 based on above syllabus):

List of Experiments:

1	Generation of DT signals
2	Convolution and correlation of signals
3	Computation of DFT & IDFT using standard formula
4	Computation of DFT using FFT algorithms
5	Computation of circular convolution using DFT and IDFT.
6	Analysis of LTI System using FFT and IFFT.
7	Design of FIR LPF, HPF, BPF, BRF filter using frequency sampling method
8	Design of FIR filter using Kaiser window
9	Design of IIR LPF, HPF ,BPF, BRF filter using impulse invariance method
10	DesignofFIRLPF,HPF,BPF,BRFfilterusingbilineartransformationmethod
11	Design of IIR filter using placement of poles & zeros.
12	Hardware Implementation of DSP system on TMS320C67XX platform.

Note for paper setter: 40% theory and 60% numerical and Design

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication Engineering) Part- II (w. e. f July 2015)
2. Subject: VLSI Design

Teaching Scheme	Examination Scheme
Lectures : 3hrs / week	**Theory :** 100 Marks
Practical: 2 hrs / week	**TW :** 25 Marks **POE:** 50 Marks

Course Objectives: The course aims:	
1	To Explain the need of Hardware Description Languages (HDL) to design & implement digital circuits (combinational & sequential) using VHDL and Verilog HDL.
2	To Provide an introduction to VLSI Design flow for implementing Behavioral/RTL/gate level architectures on programmable logic devices such as FPGAs & CPLDs.
3	To Explain the features & capabilities of HDL to simulate, synthesize and test digital logic modules.
4	To Develop combinational & sequential logic / FSM design skills using HDLs and verify their performance by simulation for functionality, speed & power using EDA tool.
5	To Explain the basics of MOS device.

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	Implement & Demonstrate HDL codes of digital designs using FPGA/ CPLD based technology.
2	Explain the difference between VHDL and Verilog HDL.
3	Model combinational circuits like Adder, Subtractor, Decoder, encoder, multiplexer, parity

	generator, Parity checker, comparator using different styles of modeling in VHDL&/or Verilog and implement in FPGA/ CPLD using suitable EDA tool.
4	Construct FSM, Model sequential logic circuits like counter & sequence detector and simulate it for functional verification.
5	Describe the features & internal architectures of CPLD (XC 9572) & Spartan IIIE FPGA (XC3S 500E).
6	Demonstrate practical skills in simulating & testing digital modules.

Unit No	Unit Contents	No. of Lectures
I	**Introduction to VHDL:** Level of abstraction. Need of HDL,VLSI Design flow, Features and capabilities of VHDL, Elements of VHDL (Entity Architecture, Library, Package, and Configuration), Identifiers, literals, data types, operators and Attributes (type, signal ,signal value, array, block).	**08**
II	**Combinational logic design using VHDL** Adder, subtractor, decoder, encoder, tristatebuffer, multiplexer, parity generator, Parity checker, comparator, using Concurrent& Sequential statements.	**07**
III	**FSM Design Using VHDL** Wait statement, delays, inertial delay, Transport delay, VHDL implementation of counter, sequencedetector, Design of content addressablememory CAB.	**06**
IV	**Introduction to Verilog** Basic verilog naming conventions, verilog operators, data types, assignment statements, control statements, behavioral modeling in verilog HDL, combinational logic design using verilog.	**05**
V	**MOS Transistor theory** Physical structure of MOS transistor, MOS transistor under static conditions, Introduction to CMOS inverter and its V-I characteristics.	**05**
VI	**PLD Architectures and Testing** Xillnx9500series, CPLD (XC9572), Spartan III EFPGA (XC3S500E), Testing: Fault models, path sensitizing random test design for testability, Built - in self test and Boundary scan.	**05**

Text Books:

FundamentalsofDigitalLogicwithVHDLdesign,Tata–McgrawHill-StephenBrownandZvonkoVranesic (For Unit - 1, 2, 3, 6)
"Digital integrated circuits- A design perspective", Jan Rabaey, Anantha C, 2nd edition, PHI (For Unit - 5)
"VLSI Design", Debaprasad Das, Oxford University press. (For Unit - 4)

Reference Books

"Design Through Verilog HDL", TR Padmanabhan, B. Bala Tripura Sundari, Wiley Publications.
Xilinx synthesis tool details- xst.pdf

"Introduction to VLSI Systems", Carver Mead – Lynn Conway, BS Publications
"VLSI Design- Black Book", Dr. KVKK Prasad, Kattula Shyamala, Wiley-Dreamtech Press.
Principals of Digital System Design using VHDL, Cengage Learning-Roth John.

List of Experiments (Minimum 10):

Minimum 10experiments should be conducted based on following topics; out of which minimum 02 experiments using Verilog HDL and 02 experiments to be implemented on hardware board.

LAB Setup:

ISE Web pack/ EDA tool, Trainers for FPGA and CPLD

Experiments:

Combinational logic: comparator, adder, barrel shifter, encoder & decoder.

1. Sequential logic: Counters with sync/ async. Reset signal, universal shift registers, sequence detector, arbiter, LFSR.
2. Mini project (Max. 4 students in a group).

Note for paper setter: 30% marks for HDL codes and 70% for theory.

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication) Part- I (w. e. f July 2015)
3. Subject: Microprocessors & Microcontrollers

Teaching Scheme	Examination Scheme
Lectures : 4 hrs / week	**Theory :** 100 Marks
Practical: 2 hrs / week	**TW :** 25 Marks **POE:** 50 Marks

Course Objectives: The course aims to:	
1	To understand 8085 microprocessor architecture and programming.
2	To understand interrupts of 8085 and programs over interrupts.
3	To use the knowledge of interfacing of 8255with 8085.
4	To practice a program on 8085 simulator and hardware kit
5	To compare microprocessor and microcontroller.
6	To understand 8051 and PIC microcontroller architecture and programming.
7	To use the knowledge to interfacing of LED,LCD to 8051.
8	To practice a programs on 8051 simulator and hardware kit.

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	know the architecture of 8085.
2	write programs over 8085 microprocessors.
3	interface 8255, 8279, 8155, DAC to 8085.
4	write programs on simulator of 8085.

5	know architecture and instruction set of 8051 and PIC microcontrollers.
6	use the knowledge of instruction set to perform practical over 8051 and PIC microcontrollers.
7	interface LED and LCD to 8051.
8	use simulators and down load the programs in Hardware kit.

Unit No	Unit Contents	No. of Lectures
I	**Introduction to 8085 Microprocessor:** CPU Architecture, Register Organization, 8085 Instruction Set, Addressing modes. Stack &Subroutines, Instruction Cycle, Interrupts of 8085(Hardware and software).	**08**
II	**Interfacing:** Memory interfacing, I/O interfacing, Memory mapped I/O, I/O mapped I/O, Peripheral Interfacing – Programmable I/O-8255 Interface, ADC – 0809, DAC – 0808, Seven segment LED, 4 x 4 Matrix keyboard , stepper motor	**08**
III	**Introduction to MCS51** Introduction toMCS51Family, Architecture, Functional Pin out diagram, Programming Model, Memory Organization, Addressing Modes, Instruction Set: Classification, Reset Circuit, Machine Cycle, Oscillator Circuit, Introduction to Assembly Language Programming.	**08**
IV	**Hardware overview:** Input / Output Ports, Counters & Timers, Serial Communication, Interrupt. **Note:** Structure of Above, Related S.F.R, Instruction, Associated Programs.	**08**
V	**Interfacing & Application** Interfacing: RAM ROM, LCD, ADC, DAC, Keyboard, stepper motor Minimum System Design &Application: Interfacing of Temperature Sensor (LM35) 8051 Connection to RS232.	**08**
VI	**Embedded 'C' Programming for 8051:** Data types and time delay, I/O Programming, Logic operations, Data conversions, accessing code ROM space, Data serialization.	**08**

Text Books:
RameshSGaonkar-'MicroprocessorsArchitecture,Programmingandapplicationswith8085A
The 8051 Microcontroller & Embedded Systems By Muhammad Ali Mazidi & Janice Gillispie Mazidi Pearson Edition L. P .E.

Reference Books:
Kenneth L Short –'Microprocessors and Programmed logic'
Douglas V Hall-'Microprocessors and Digital Systems"
The 8051 Microcontroller By Ayala 3rd Edition

List of Experiments (Minimum 08): Note: Assembly Language Programming to be done using standard IDE Simulator

1. Arithmetic& Logical operations using 8085

2. Data transfer & Exchange using 8085
3. Data conversions using 8085
4. Interface Stepper motor using 8085
5. Interface ADC& DAC using 8085
6. Interface keyboard using 8085
7. Arithmetic & Logical operations using 8051
8. Data transfer & Exchange using 8051
9. Data conversions using 8051
10. Interface Stepper motor using 8051
11. Interface DAC using 8051
12. Timer & counter operation in 8051 using Embedded C
13. Interface LCD to 8051 using Embedded C
14. Serial Communication with 8051 using Embedded C

Note for paper setter: 30**% programming.**

SHIVAJI UNIVERSITY, KOLHAPUR

T.E. (Electronics and Telecommunication Engineering) Part- II (w. e. f July 2015)

4. Subject: Optical Communication & Network

Teaching Scheme	Examination Scheme
Lectures: 4 hrs/Week	**Theory:**100 Marks
Practical: 2 hrs / week	**TW :** 25 Marks

Course Objectives: The course aims to:	
1	describe the basics optical communication along with simulation and modeling the same with blocks.
2	optical fiber structure and light propagating mechanisms in detail.
3	analyze the signal degradation mechanisms and the methods of limiting the same.
4	explain the construction and working of optical sources and detectors.
5	describe the optical receiver operation in detail.
6	describe the wavelength division multiplexing and optical network in

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	elaborate the basic optical communication along with the simulation and modeling tools.
2	differentiate the different types of optical fiber structures and light propagating mechanisms.
3	acquire knowledge of signal degradation mechanism in optical fiber.
4	understand the construction of and working of optical sources and detectors.
5	describe the optical receiver operation, WDM and optical network in detail.

Unit No	**Unit Contents**	**No. of Lectures**

I	**Overview of Optical Fiber Communication** Motivation for lightwave communication, Basic Network Information Rates, The evolution of Optic System, Elements of Optical Fiber Transmission Link, optical spectral band, The nature of Light, Basic Optical Laws and Definitions, Single Mode Fibers, Graded Index fiber structures.	**08**
II	**Optical Fibers: Structures, Wave guiding and Fabrication** Optical Fiber Modes and Configurations, Mode theory for waveguides, Fiber Materials, Fiber Fabrication, Fiber Optic cables.	**08**
III	**Transmission characteristics of optical fibers.** Attenuation, material absorption losses, scattering losses, bending losses, dispersion, polarization, nonlinear effects.	**08**
IV	**Optical Sources** Semiconductor Physics, Light-Emitting Diodes (LEDs),Laser Diodes, Light Source Linearity, Modal, Partition and Reflection Noise, Reliability Considerations.	**07**
V	**Optical Receiver** Physical Principal of Photodiodes, Photodetector Noise, Detectors Response Time, Avalanche Multiplication Noise, Structure for InGaAsAPDs, Temperature effect of Avalanche Gain, Comparison of Photodetectors , Fundamental Receiver Operation, Digital Receiver Performance, Detailed PerformanceCalculations	**09**
VI	**Optical Networks** Operational Principles of WDM, Passive Components, Tunable Sources, Tunable Filters, Basic Networks, SONET/SDH, Broadcast-and–Select WDM Networks, Wavelength Routed Networks, Nonlinear Effects on Network Performance, Performance of WDM+EDFA Systems, optical CDMA.	**08**

Text Books:

Optical Fiber Communication–Gerd Keiser. Fifth Edition(TMH)

Reference Books:

Optical Communication–Senior
Optical Fiber Communication–Agarwal (Wiley)-3rd edition
Optical Networks- Ramaswamy(ELSEVIERINDIA)
Fiber optics and optoelectronics-R. P. Khare(Oxford university)
Optical fiber and laser principles and applications by Anuradha New Age Publications.
Fiber optic communication systems by Dr .R .K .Singh,Willey India.

List of Experiments (Minimum 10):

1	Study of optic fiber communication system.
2	Transmission and reception of analog signal using optical fiber.
3	Transmission and reception of digital signal using optical fiber.

4	Frequency modulation using optic fiber link.
5	Calculation of bending loss in the optic fiber link.
6	Study of numerical aperture.
7	Study & calculation of attenuation loss in optic fiber link.
8	PC to PC communication by using optical cable
9	Study of characteristics of LED.
10	Study of characteristics of LASER.
11	Frequency modulation by using voice link.
12	Study of Pulse width modulation using optic fiber.
13	Two experiment based on simulation.
14	Study of coupling light into fiber.

Note for Paper Setter:70% Theory and 30% Numerical And Design

SHIVAJI UNIVERSITY, KOLHAPUR
T.E. (Electronics and Telecommunication Engineering) Part- II (w. e. f July 2015)
5. Subject: Industrial Management

Teaching Scheme	Examination Scheme
Lectures : 3hrs / week	**Theory :** 100 Marks
	TW : 25 Marks

Course Objectives: The course aims:	
1	To understand various functions of Management-planning.
2	To study and understand the actual predictions made in organization in profit making process and various activities to be performed.
3	To know the staffing procedure in an organization and their performance analysis process.

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	demonstrate that how a person is get selected in a company, how the performance of employee is evaluated.
2	Analyse the methods of performance appraisal and find the best out of them.
3	define both marketing and selling concept.
4	understand the techniques used for selling the product.

Unit No	Unit Contents	No. of Lectures
I	**Management** Concept, functions, importance, levels of management, forecasting-concept and importance, Organization Importance and Principles, Staffing Procedure of staffing, performance appraisal methods. Directing Leadership –definition and concept, styles/types, qualities of leader, Motivation-concept, objective, Theories- Maslows, Herzberg's, McGreqors. Communication-concept, Process, types, Barriers and Remedies.	**06**
II	**Marketing** Marketing and selling concept, marketing mix, Advertising- concept, need, types, advantages and limitations. Material Management– concept, function, Purchase management-concept, objectives, functions, importance, policies and procedure, Five Rs of purchasing. Inventory Control- Inventory costs, EOQ analysis, ABCanalysis.	**06**
III	**Costing** Elements of cost, cost estimation procedure, Entrepreneurship-importance, Qualities, function of entrepreneur, small scale industries procedure of starting SSI unit, Difference Schemes for SSI. Forms of Business Organization -Single, partnership, Joint stock, co-operative and state and central Govt., Social responsibilities and business ethics-introduction.	**06**
IV	Operations Research Definition, methodology, Scope and limitations. Linear programming Concept, Formulation of LPP, Graphical method, Simplex Method	**06**
V	Assignment Problems Introduction Balanced, Unbalanced, Prohibitivetype of assignments, Hungarian methods Transportation Problems For finding basic feasible solution by Northwest corner method, Least cost method and Vogets Approximation method.	**06**
VI	Project Management Programmed Evaluation and review technique, CPERTI, critical path method (CPM), Network Analysis, Identifying critical path, Probability of completing the project within the given time.	**06**

Reference Books: Industrial management

O.P. Khanna, Indusrial Engineering and Management, Dhanpat Rai Publication.
Nandkumar K. Hukeri, Industrial Management and Operations Research, Electrotech Publications
Essentials of Management-Harold Koontz, Heinz Weihrich-seventh edition
N. V. S.Raju, Industrial Engineering and Management, Cengage Learning.

Reference Books: Operation Research

Anand Sharma, Operation Research
S. D. Sharma, Operations Research, KedarNath Ram Nath pub.
Problems in OR Hiraand Gupta
Panneerselvam, Operation Research, PHI Learning

SHIVAJI UNIVERSITY, KOLHAPUR
T. E. (Electronics and Telecommunication Engineering) Part- II (w. e. f July 2015)
6. Subject: Electronics System Design

Teaching Scheme	Examination Scheme
Lectures : 2hrs / week	**TW :** 25 Marks
Practical:2 hrs / week	**POE:** 50 Marks

Course Objectives: The course aims :	
1	To understand basic concepts of electronics system design.
2	To understand and design an electronics systems by using different sensors.
3	To Design microcontroller based systems.
4	To implement mini projects based on knowledge of designing of electronics systems

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	understand and design simple electronics systems.
2	apply the knowledge of sensors in designing different electronics systems.
3	perform and design electronics systems based on microcontrollers.
4	use these skills to implement mini projects.
5	understand and design simple electronics systems.

Unit No	Unit Name	No. of Lectures
I	**DIGITAL VOLTMETER:** Design of 4-digit numeric display circuit, Design of 3½ digit DVM, Study of IC7107/7106.	**03**
II	**PHASE LOCKED LOOP:** Design of digital phase locked loops (cd4046 & 565), It's use in frequency synthesizer, frequency & phase demodulation, Amplitude modulation.	**03**
III	**AUDIO &VIDEO AMPLIFIERS:** Audio amplifier: audio op-amp applications mike pre-amplifier with tone control, study of LM 386 Video amplifier: Theory, voltage gain, NE592, filter applications	**05**
IV	**TIMERS:** Fundamentals of IC timers, timer & 2240 Binary Programmable Timer/counter, use of timers for event or interval timing, design of frequency counter using IC 74C926 for the time &event Counting.	**05**
V	**Sensor Signal Conditioning:** For sensors to get output in standard range 1)Temperature–RTD, Thermocouple, Semiconductor LM35,AD549	**05**

	and1N4148 2)Strain gauge type transducers of 350ohm/120ohm bridge configuration 3)V to I and I to V converters for std input and output Standard input output ranges– 0to2V(DVM),0to5V(Microcontroller),4 to20mA(Industrial) 4) Optical encoder process controllers using above transducers ON/OFF proportional PID controller. Algorithm implementation only for any 8-bit Microcontroller based process controllers.	
VI	**SWITCHED MODE POWER SUPPLY:** Introduction to SMPS, IC LM3524, Design of SMPS using LM3521,Step up, Step down,Invert mode. **Micro Controller Based Design:** Design of process controllers ON-OFF ,Proportional,PID	**03**

Text Books:

Industrial Control Electronics:-Mickel Jacob. Prentice Hall (forch,5) (Applications and Design)
Intersil Data Manual–(forCh1&4)
Electronic System Design–B. S. Sonde(Ch1)
Operation Amplifier & LIC–Ramakant Gaikwad, Pearson(ch2)
LinearDataManual–National(Ch6),

Reference Books

Electronics Design–Goyal Khetan, Khanna Publications

List of Experiments (Minimum 08 out of 13 & Experiment 14 is compulsory.):

1.	Designof3½digitDVMusingTTLIcs.
2.	Studyof7107/7106.
3.	Designoffrequencysynthesizerusing565PLL.
4.	DesignoffrequencysynthesizerusingCD4046PLL.
5.	Frequencymeasurementusing74C926
6.	Intervalmeasurementusing74c926.
7.	Studyofproportionalcontroller
8.	Studyofmicrocontrollerbasedcontroller.
9.	StudyofLM3524SMPS
10.	Studyofaudio&videoamplifiers
11.	StudyofPIDController
12.	Study&ItoV&VtoIconverters.
13.	Designexperimentsshouldbeconductedas 1) DesignofHardware2) SimulationoftheCircuits
14.	**Mini project should be based on above chapters.(compulsory)**

Shivaji University, Kolhapur
Revised Syllabus Structure of Third Year Engineering (TE) (w. e. f. 2015)
Electronics and Telecommunication Engineering Course

Subject Equivalence

Serial Number	New Subject	Old Subject
1	Antenna and Wave Propagation	Antenna and Wave Propagation
2	Control Systems	New
3	Signals & Systems	Signals & Systems
4	Power Electronics	Industrial Power Electronics
5	Digital Communication	Digital Communication
6	Simulation LAB	Programming Techniques (Matlab)
7	Digital Signal Processing	Digital Signal Processing
8	VLSI Design	VLSI Design
9	Microprocessor and Microcontrollers	Microcontrollers
10	Optical Communication & Network	Optical Communication & Network
11	Industrial Management	Industrial Management &Operational Research
12	Electronic System Design	Electronic System Design