

ELECTROMAGNETIC THEORY (EE-208-E)

Week	Theory	
	Lecture Day	Topic (Including Assignment/Test)
1 st	1	Coulomb's Law,
	2	Gauss's Law
	3	Potential function
	4	Field due to a continuous distribution of charge
2 nd	5	Equi-potential surfaces
	6	Gauss's Theorem, Poisson's equation
	7	Laplace's equation
	8	Method of electrical images, capacitance
3 rd	9	C, boundary conditions,
	10	The electro-static uniqueness theorem for field of a charge distribution
	11	Dirac-Delta representation for a point charge
	12	Dirac-Delta representation an infinitesimal dipole
4 th	13	Faraday Induction law
	14	Ampere's Work law in the differential vector form
	15	Ampere's law for a current element
	16	Magnetic field due to volume distribution of current
5 th	17	Dirac-delta function
	18	Ampere's Force Law
	19	Magnetic vector potential
	20	Vector potential (Alternative derivation),
6 th	21	Far field of a current distribution
	22	Equation of continuity
	23	Equation of continuity for time varying fields
	24	Problems and Solutions
7 th		-----1 st Minor-----
8 th	25	Maxwell's field equations and their interpretation
	26	Solution for free space conditions
	27	Assignment
	28	Electromagnetic waves in a homogeneous medium
9 th	29	Propagation of uniform plane-wave
	30	Relation between E & H in a uniform plane-wave
	31	Wave equations for conducting medium
	32	Maxwell's equations using phasor notation
10 th	33	Wave propagation in a conducting medium
	34	Conductors, dielectrics
	35	Wave propagation in good conductor and good dielectric
	36	Depth of penetration Polarization
11 th	37	Reflection of plane waves at the surface of a perfect conductor
	38	Refraction of plane waves at the surface of a perfect conductor
	39	Reflection of plane waves at the surface of perfect dielectric (both normal incidence as well as oblique incidence)
	40	Refraction of plane waves at the surface of perfect dielectric (both normal incidence as well as oblique incidence)
12 th	41	Brewster's angle
	42	Total internal reflection
	43	Reflection at the surfaces of a conductive medium
	44	Surface impedance
13 th	45	Transmission-line analogy
	46	Poynting theorem,
	47	Interpretation of $E \times H$; power loss in a plane conductor
		Problems and Solutions
14 th	48	-----2 nd Minor-----
15 th	49	Transmission line as a distributed circuit
	50	Transmission line equation, travelling ,standing waves
	51	Characteristic impedance, input impedance of terminated line
	52	Reflection coefficient, VSWR, Smith's chart and its applications.

Lesson Plan

SKILLS AND INNOVATION LAB

	Practical	
Week	Practical Day	Topic
1 st	1	Clarifying Aims and Capability
2 nd	2	Building Team For research related Topics
3 rd	3	Distribution of research topics to the various groups
4 th	4	Literature Survey For Research Related Topics
5 th	5	Discussions & problems solution related to topics
6 th	6	Studying the techniques Used in research Topics
7 th	1st Minor Test	
8 th	7	First Viva voice
9 th	8	Studying the Software used in research related topics
10 th	9	Discussion and Problems Solution related to software and technique
11 th	10	Preparation of ppt. Related to topics
12 th	11	Presentation on topics given to various groups
13 th	12	Preparation of report
14 th	2nd Minor Test	
15 th	13	2 nd viva voice & Submission of Report

ELECTRONICS MEASUREMENTS & INSTRUMENTATION AND EMI LAB

Week	Theory		Practical	
	Lecture Day	Topic (Including Assignment/Test)	Practical Day	Topic
Unit-I : Introduction to Basic				
1 st	1	Introduction of Measurement, Precision & Accuracy.	1	To study the front panel controls of storage CRO.
	2	Characteristics of Instruments		
	3	Measurement of Freq., phase, time-interval, impedance.		
	4	Problems and Solutions		
2 nd	5	Measurement of Power, Energy and distortion	2	To analyze analog and digital multimeter for various measurement.
	6	Errors in Measurement, Classification of Errors, Remedy to Eliminate/Reduce Errors		
	7	Instruments for Measurement of Voltage, current and other circuit parameters.		
	8	Problems and Solutions		
3 rd	9	Q-meters, R.F. power measurements	3	Measurement of displacement using LVDT.
	10	Analog and Digital meters, Block diagram of Pulse Generator, function generators		
	11	Wave analyser		
	12	Problems and Solutions		
4 th	13	Distortion analyser ,Spectrum analyser,	4	Measurement of distance using LDR
	14	Harmonic analyser and Power analyser.		
	15	Problems and Solutions		
	16	Problems and Solutions		
Unit-II : Generation & Analysis of Waveforms				
5 th	17	Block diagram of Signal Generators, Introduction to C.R.O using Block Diagram	5	Measurement of temperature using R.T.D
	18	Specification, Controls, Sweep Modes, Role of Delay Line in CRO		
	19	Single and Dual Beam Dual Trace CROs, Chop and Alternate Modes.		
	20	Problems and Solutions		
6 th	21	Measurement of Voltage , Freq using Oscilloscope	6	Measurement of temperature using Thermocouple.
	22	Measurement of Rise Time, Fall Time and Phase Difference		
	23	Lissajous figures in Detection of Freq. and phase		
	24	Problem and Solution		
7 th	1st Minor Test			
8 th	25	Digital Storage Oscilloscope(DSO), Features like roll, refresh	7	Measurement of pressure using Strain Gauge.
	26	Storage Mode and Sampling rate, Application of DSO		
	27	Problems and Solutions		
	28	Assignment 1		
Unit-III : Basics of Transducer/Sensors				
9 th	29	Introduction & Characteristics of Transducer	8	Measurement of pressure using Piezo-Electric Pick up.
	30	Requirement of Transducer, Classification of Transducer		
	31	Selection Criteria of Transducer, Transducer types :-RLC, photocell, thermocouples		
	32	Problems and Solutions		
10 th	33	Displacement, Velocity and Acceleration measurement basic scheme.	9	Internal Viva-Vice-1
	34	Strain, Pressure, Liquid level & temperature		

		measurement.		
	35	Digital Transducer, Digital displacement Transducers, Digital Tachometers.		
	36	Problems and Solutions		
Unit- :IV Data Acquisition and advances in Instrumentation Systems				
11 th	37	Analog and Digital Data Acquisition Systems	10	Measurement of distance using Capacitive Pick-up
	38	Multiplexing		
	39	Spatial Encoders, Telemetry		
	40	Problems and Solution		
12 th	41	Components of Analog and Digital Data Acquisition Systems	11	Measurement of distance using Inductive Pick-up
	42	Types of Multiplexing System		
	43	Uses of Data Acquisition Systems		
	44	Problems and Solutions		
13 th	45	Use of Recorders in Digital Systems	12	Measurement of speed of DC Motor using Magnetic Pick up.
	46	Modern Digital Data Acquisition Systems		
	47	Problems and Solutions		
	48	Revision of Data Acquisition Systems		
14 th	2ndMinor Test			
15 th	49	Problems and Solutions of 1 st Unit	13	Internal Viva-Vice-2
	50	Problems and Solutions of 2 nd Unit		
	51	Problems and Solutions of 3 rd Unit		
	52	Assignment-II		

ANALOG COMMUNICATION

Week	Theory		Practicals	
	Lecture Day	Topic (Including Assignment/Test)	Practical Day	Topic
1 st	1	Terminologies in Communication Systems, EM Spectrum and Applications	1	Familiarization with the control panel and various measurements using CRO and function Generator
	2	Concept of Electrical Communication, Modes of Communication	1	Familiarization with the control panel and various measurements using CRO and function Generator
	3	Medias of Communication Systems	1	Familiarization with the control panel and various measurements using CRO and function Generator
	4	Elements of Communication System, Need For Modulation	1	Familiarization with the control panel and various measurements using CRO and function Generator
2 nd	5	Theory and Mathematical expression of AM Wave, Modulation Index	2	Study of Amplitude Modulation & demodulation and Determination of Modulation index
	6	Power Relations in AM, Types of AM	2	Study of Amplitude Modulation & demodulation and Determination of Modulation index
	7	Problems & Solution	2	Study of Amplitude Modulation & demodulation and Determination of Modulation index
	8	Generation of AM :1) Square law Modulation 2) Switching Modulator	2	Study of Amplitude Modulation & demodulation and Determination of Modulation index
3 rd	9	3) Transistor Modulator	3	Study of AM using Software Tool
	10	4) Balanced Modulator	3	Study of AM using Software Tool
	11	SSB Generation Filter & Phase Shift Method	3	Study of AM using Software Tool
	12	Third Method ,QAM	3	Study of AM using Software Tool
4 th	13	Theory of FM & PM, Modulation Index, Relation Between FM & PM	4	Study of Frequency Modulation & Demodulation
	14	Frequency spectrum of FM wave	4	Study of Frequency Modulation & Demodulation
	15	Narrow & WideBand FM	4	Study of Frequency Modulation & Demodulation
	16	Noise in FM, Pre-emphasis & De-emphasis	4	Study of Frequency Modulation & Demodulation
5 th	17	Comparison b/w AM & FM, Generation of FM :Direct Method-Reactance Modulator	5	Study of FM using Software Tool
	18	Varactor Diode Modulator, Stabilized Reactance Modulator,	5	Study of FM using Software Tool
	19	Indirect Method: Armstrong Method	5	Study of FM using Software Tool
	20	Radio Transmitter: AM, SSB	5	Study of FM using Software Tool
6 th	21	Radio Transmitter: FM	6	Vivo-Vice-1
	22	TRF Receiver	6	Vivo-Vice-1
	23	Superhetrodyne Receiver	6	Vivo-Vice-1
	24	Frequency Changing & Tracking, Intermediate Frequency	6	Vivo-Vice-1
7 th	1st Minor Test			
8 th	25	Discussion of Minor Test Question	7	Study of Pulse amplitude modulation and Demodulation
	26	Image Frequency Amplitude Limiting	7	Study of Pulse amplitude modulation and Demodulation
	27	Envelop Detector SSB Reception with pilot carrier	7	Study of Pulse amplitude modulation and Demodulation
	28	FM Demodulator slope detector, balanced slope detector	7	Study of Pulse amplitude modulation and Demodulation
9 th	29	Foster Sealy Discriminator, Ratio Detector	8	Study of PAM using Software Tool
	30	PLL Detector	8	Study of PAM using Software Tool
	31	Sampling theorem for low and bandpass signal	8	Study of PAM using Software Tool
	32	Time division multiplexing	8	Study of PAM using Software Tool
10 th	33	Frequency Division Multiplexing	9	Study of Pulse width modulation and Demodulation

	34	Pulse amplitude modulation and Demodulation	9	Study of Pulse width modulation and Demodulation
	35	Pulse Time modulation and Demodulation	9	Study of Pulse width modulation and Demodulation
	36	Pulse code modulation	9	Study of Pulse width modulation and Demodulation
11th		Minor Test		
12th	37	Discussion of Minor Test Question	10	Study of PWM using Software Tool
	38	Companding ,Quantization Error	10	Study of PWM using Software Tool
	39	Differential PCM	10	Study of PWM using Software Tool
	40	Delta Modulation	10	Study of PWM using Software Tool
13th	41	Adaptive Delta Modulation	11	Study of Pulse code modulation
	42	Problems & Solution	11	Study of Pulse code modulation
	43	Types of Noise	11	Study of Pulse code modulation
	44	Problems and Solutions	11	Study of Pulse code modulation
14th	45	Concept of SNR	12	Vivo-Vice-2
	46	Noise Figure & its Calculation	12	Vivo-Vice-2
	47	Problems & Solution	12	Vivo-Vice-2
	48	Mathematical representation of Noise	12	Vivo-Vice-2
15th	49	AM reception performance under noise	13	Final Submission of Record
	50	FM reception performance under noise	13	Final Submission of Record
	51	Noise in PCM system	13	Final Submission of Record
	52	Noise in Delta Modulation	13	Final Submission of Record