EE-301-E FIELD & WAVES

L	T	P		
3	1	0	**Sessional:**	**50 marks**
			Theory:	**100 marks**
			Total:	**150 marks**

UNIT – 1

Review of vector analysis, orthogonal co-ordinate systems, review of vector calculus in all the three coordinate systems: Line, surface & volume integrals, gradient, divergence & curl of vector & their physical significance, Divergence theorem, stokes theorem, soleniodal and irrotational fields.

Gauss Law in electrostatics & its applications, uniform line, surface & volume charge distributions, concept of electric field & electric potentials, electric field & potential due to a linear dipole, Spherical & cylindrical capacitor, energy density in electric field, method of images.

UNIT-II

Magnetrostatics: Magnetic flux density and magnetizing field intensity, Biot Savart's law, Amperes circuital law & its applications. Magnetic vector potentials, Magnetic filed energy, boundary conditions for both the electric & magnetic fields at the interface of various types of media. Laplace, Poisson's equation & continuity equation, displacement current density, conduction current density, Maxwell's equation in differential & integral forms, tine harmonic cases & their physical significance, retarded potentials.

UNIT- III

UPW: Plane waves & uniform plane waves and their properties , wave equations in various media, Polarization & its types, intrinsic impedance, propagation constant, reflection & refraction of uniform plane waves at the interface of conductor- dielectric & dielectric-dielectric (both normal and oblique incidence). Relaxation tine, skin effect, skin depth & surface impedance, Poynting vector theorem and its physical significance.

UNIT- IV

Transmission lines: Distributed parameters, circuit parameters, concepts of voltage & current flow on a transmission line, line equations, characteristics impedance. Reflection of transmission line, maxima & minima, standing wave ratio of a transmission line, impedance matching, Smith's chart & its applications, co0axial type transmission line

Introduction to Waveguide: (Qualititative study only) concept of wave guide and TE, TM, & TEM modes in rectangular and circular wave guides. Cut off and guide wave length, characteristic impedance, and dielectric wave guide.

Note: The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question form each unit

Reference Books:

1. Electromagnetic Fields & Wave by Sadiku (Oxford Univ. Press)
2. Field & Waves electromagnetic by D.K. Cheng. (Pearson Education)
3. Electromagnetic by J.D. Kraus.

EE-303-E Control Systems

L	T	P		
3	1	0	**Sessional:**	**50 marks**
			Theory:	**100 marks**
			Total:	**150 marks**

UNIT – 1

Introduction: The control system-open loop & closed loop, servomechamism.
Mathematical Models of Physical System: Differential equation of physical systems, transfer function, block algebra, signal flow-graphs, mason's formula & its application.
Feedback Characteristics of Control System: Feedback and non –feed back systems, effects of feedback on sensitivity (to parameter variations), overall gain stc.

UNIT- II

Time Response Analysis: Standard test signals, time response of first order and second order systems, steady – state errors and error constants, design specification of second-order-systems.
Stability: The concept of stability, necessary conditions for stability, Hurwitz stability criterion, Routh stability criterion, Relative stability analysis.
The Root locus Techniques: The Root Locus concept, construction / development of root loci for various systems, stability considerations.

UNIT- III

frequency Response & stability Analysis: Correlation between time and frequency response, Polar Plots, Nyquist plots, Bode plots, Nyquist stability criterion, Gainmargin & phase margin, relative stability using Nyquist criterion, frequency response specifications.

UNIT- IV

Compensation of control systems: Necessity of compensation, phase lag compensation, pahse lead compensation, phase lag lead compensation, feedback compensation.
State Variable Analysis: Concept of state, state variable and state model, state models for linear continuous time systems, dignolization solution of state equations, concept of controllability and observability.
Control Components: Working principles of synchros, AC & DC tacho-generators, servomotors, magnetic amplifiers, stepper motor.
Note: The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question form each unit.
Text Books:

1. Control Systems: R.S Chauhan (Umesh Pub).
2. Automatic Control Systems: B.C. Kuo; PHI
3. modern Control Engg: K.Ogata , PHI.

EE-305-E POWER ELECTRONICS - I

L	T	P		
3	1	0	**Sessional:**	**50 marks**
			Theory:	**100 marks**
			Total:	**150 marks**

UNIT – 1

INTRODUCTION:

Role of power electronics, review of construction and characteristics of power diode, Shottky diode, power transistor, power MOSFET, SCR, DIAC, Triac, GTO, IGBT and SIT.

Rating and protections, series and parallel connections, R, RC, and UJT firing circuit and other firing circuits based on ICs and microprocessors; pulse transformer and opto-coupler, communication techniques.

AC REGULATORS:

Types of regulators, equation of load current, calculation of excitation angle, output voltage equation, harmonics in load voltage and synchronous tap chager, three phase regulator.

UNIT – II

CONVERTORS:

One, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms, output voltage equation, continues and discontinuous modes of operation, input power factor of converter, reactive power demand effect of source inductance, introduction to four quadrant/ dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

UNIT- III

CYCLOCONVERTERS (A.C. to A.C CONVERTER):

Basic principles of frequency conversion, types of cycloconverters, non-circulating and circulating types of cycloconverters.

Classification, principle of operation of step up and step down cycloconverter, single phase to single phase cycloconverter with resistive and inductive load. Three phase to three phase cycloconverter. Output voltage equation of cycloconverter.

Note: The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question form each unit.

Text Books:

1. Power Electronics : MH Rashid; PHI

Referenced Books:

1. Power electronics: PC Sen; TMH.
2. Power Electronics: HC Rai; Galgotia
3. Thyristorised power Controllers: GK Dubey, PHI
4. Power Electronics: P.S Bhimbra.

EE-307-E ANALOG ELECTRONICS CIRCUITS

L	T	P		
3	1	0	**Sessional:**	**50 marks**
			Theory:	**100 marks**
			Total:	**150 marks**

UNIT – 1

REVIEW: Review fo working of BJT, JFET & MOSFET & their small signal equivalent circuits, Biasing of BJT, JFET, MOSFET circuits.

SINGLE AND MULTISTAGE AMPLIFIERS:

Classification of amplifiers, analysis of various single stage amplifier configuration, multistage amplifiers, distortion in amplifiers, frequency response of an amplifier, step response of an amplifier, pass-band of cascaded stages, effect of an emitter bypass capacitor on low frequency response, multistage CE amplifier.

UNIT –II

FEEDBACK AMPLIFIER:

Feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers, input resistance, output resistance, voltage series feedback, current series feedback, current shunt feedback. Voltage shunts feedback.

OSCILLATORS:

Sinusoidal oscillators, Barkhausen criteria, R-C phase shift oscillator, general form of oscillator circuit, Wien- bridge oscillator, crystal oscillator.

UNIT – III

POWER AMPLIFIERS:

Study of class A,B and C operations, Class A large signal amplifiers, higher order harmonic distortion, efficiency, transformer coupled power amplifier, class B amplifier: efficiency & distortion: Class A and Class B push-pull amplifiers; class C Power amplifier.

UNIT – IV

LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:

Review of op-amp, Scale changer, phase shifter, adder, voltage to current converter, current to voltage converter, DC voltage follower, Bridge amplifier AC coupled amplifier, AC voltage flower, integrator, and differentiator

NON-LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:

Comparators, sample & hold circuits, logarithmic amplifier, anti-log amplifier logarithmic multiplier, waveform generators, Miller & Bootstrap sweep generators, regenerators comparator (Schmitt Trigger), multivibrators, ADC.

Note: The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question form each unit.

Text books:

1. Integrated Electronics: Milman Halkias, TMH
2. Microelectronic Circuits: Sedra & Smith
3. Operational Amplifiers: Gaikwad
4. Electronics circuits Analysis & design (2nd edition) ; D.A. Neamen: TMH

EE-309-E ELECTRONIC MEASUREMENT & INSTRUMENTATION

L	T	P		
3	1	0	**Sessional:**	**50 marks**
			Theory:	**100 marks**
			Total:	**150 marks**

UNIT – 1

C.R.O: Introduction, Cathode Ray Tube(CRT), Electron Gun, Electrostatic Focussing, Electrostatic Deflection, limitation, Applications, sampling and storage C.R.O. Digital CRO

Amplifier Measurement: Amplifier Measurements, Measurements of Noise figure of Amplifier, Measurement of op-amp parameters.

Electronic Instruments: Instruments for measurement of voltage, current & other circuit parameters, R.F. power measurements, introduction to digital meters.

UNIT – II

DIGITAL INSTRUMENT: Digital Indicating instruments, comparison with analogs type digital display methods, theory and applications of digital voltmeters, Electronics Galvanometers, Q- Meters.

FREQUENCY MEASUREMENTS: Study of decade counting assembly(DCA), Measurements of frequency using cavity wave meter. Heterodyne frequency meter, Digital frequency meters.

UNIT – III

TRANSDUCERS: Classification types: Photocell, thernocouples etc. basic schemes of measurement of displacement, velocity, acceleration, stain, pressure, temperature, liquid level.

SIGNAL CONDITIONIGN & ACQUISITION SYSTEM: Signal conditioning, DC & AC signal conditioning A/D converter, D/A converter, Use of op-amp in signal conditioning, basic components of analog and digital data acquisition system.

UNIT – IV

INSTRUMENTS FOR SIGNALS GENERATION: Square wave and pulse generators, function generators, Random noise generators, frequency synthesizer.

Note: The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question form each unit.

Reference Books:

1. A Course in Electrical & Electronics Measurement & Instrumentation: by A.K.Sawhney.
2. Electronics Instruments & Measurements techniques: by Helffick & Cooler (PHI)
3. Instrumentation devices & Systems; by C.s. Rangan, G.R. Sharma & V.S. Mani.

EE-311-E MICROPROCESSORS & INTERFACING

L	T	P		
3	1	0	**Sessional:**	**50 marks**
			Theory:	**100 marks**
			Total:	**150 marks**

UNIT – 1

INTRODUCTION: Evaluation of microprocessors, technological trends in microprocessor development. The Intel family tree, CISC Versus RISC, Applications of Microprocessors

8086 CPU ARCHITECHTURE: 8086 Block diagram; description of data registers, address registers; pointer and index registers, PSW, Queue, BIU and EU. 8086 Pin diagram descriptions, Generating 8086 CLK and reset signals using 8284. WAIT state generation, microprocessor BUS types and buffering techniques, 8086 minimum mode and maximum mode CPU module.

UNIT – II

8086 INSTRUCTION SET: Instruction formats, addressing modes, Data transfer instructions, string instructions, logical instructions, arithmetic instructions, transfer of control instructions; process control instructions; Assembler directives.

8086 PROGRAMMING TECHNIQUES: Writing assembly language programs for logical processing, arithmetic processing, timing delays; loops, data conversions, writing procedures: data tables, modular programming, and macros.

UNIT – III

MIAN MEMORY SYSTEM DESIGN: Memory devices, 8086 CPU Read/Write timing diagrams in minimum mode and maximum mode. Address decoding techniques. Interfacing SRAMS; ROMS/PROMS. Interfacing and refreshing DRAMS. DRAM Controller – TMS4500.

UNIT – IV

BASIC I/O INTERFACE: Parallel and Serial I/O Port design and address decoding, Memory mapped I/O Vs Isolated I/O Intel's 8255 and 8251 – description and interfacing with 8086. ADCs and DACs, -types, operation and interfacing with 8086. Interfacing keywords, alphanumeric displays, multiplexed displays and high power devices with 8086.

INTERRUPT AND DMA: Interrupt driven I/O. 8086 interrupt mechanism; interrupt types and interrupt vector table. Intel's 8259. DMA operation. Intel's 8237. Microcomputer video displays.

Note: The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question form each unit.

Suggested Books:

1. D.V.Hall, Microprocessors and interfacing, McGraw Hill 2nd Edition.
2. J Uffenbeck, The 8086/8088 family, PHI.
3. liu, Gibson, Microcomputer Systems- The 8086/8088 family, (2nd ed- PHI).

EE–311–E CONTROL SYSTEM LAB

L	T	P		
0	0	2	**Sessional:**	**25marks**
			Theory:	**25marks**
			Total:	**50 marks**

LIST OF EXPERIMENTS:

1. Experiment to study D.C. position control system.
2. Experiment to study linear system simulator.
3. Experiment to study light intensity control using P & PI controller with provision for disturbance and transient speed control.
4. Experiment to study D.C. motor speed control.
5. Experiment to study the stepper motor characteristics and its control through microprocessor kit.
6. Experiment to study Temperature control system.
7. Experiment to study Compensation design.
8. Experiment to study relay control system.
9. Experiment to study Potentials metric Error Detector.
10. Experiment to study SC Position control system.
11. Experiment to study synchros.

Note: At least 7 experiments are to be performed form the above lost, other than this, two more experiments are to be performed depending upon the scope.

EE–313–E MICROPROCESSORS AND INTERFACING LAB

L	T	P	Sessional:	25marks
0	0	2	Theory:	25marks
			Total:	50 marks

Before starting with the experments, teacher should male the students conversant with the following theoretical concept:

A. i) Programming Modes of Intel's 8086.
   ii) Addressing Modes of Intel's 8086.
   iii) Instruction Formats of Intel's 8086.
B. Instruction Set of Intel's 8086.
C. Assembler, and Debugger.

LIST OF EXPERIMENTS:

I. a) Familiarization with 8086 Trainer Kit.
   b) Familiarization with Digital I/O, ADC anf DAC Cards.
   c) Familiarization with Turbo Assembler and Debugger S/Ws.

II. Write a program to arrange block of data in
   a) Ascending and b) Descending order.

III. i) Program for finding largest number from an array.
   ii) Program for finding smallest number from an array.

IV. Write a program to find out any power of a number such that $Z = X^N$
   Where N is programmable and X is unsigned number.

V. Write a program to measure to generate:
   (i) Sine Waveform (ii) Ramp Waveform (iii) Triangular Waveform using DAC Card.

VI. Write a program to measure frequency/Time period of the following functions:
   (i) Sine Waveform (ii) Square Waveform (iii) Triangular Waveform using DAC Card.

VII. Write a program to increase, decrease the speed of a stepper motor and reverse its direction of rotation using stepper motor controller card.

VIII. Write a programmable delay routine to cause a minimum delay = 2MS and a maximum delay = 20 minutes in the increments of 2MS.

IX. I) Use DOS interrupt to read keyboard string/character.
   ii) Use BIOS interrupt to send a string/character to printer.

X Write a program to :
   i) Create disk File
   ii) Open, write to and close a disk file
   iii) Open, Read from and close a disk file
   iv) Reading data stamp of a file using BIOS interrupt

XI i) Erasing UVPROMs and EPROM's
   ii) Reprogramming PROMs using computer compatible EPROM Programmer

XII Studying and Using 8086 In-Circuit Emulator.

XIII Write a Program to interface a two digit number using seven segment LEDs Using 8086 & 8255 PPI

Note: At least 7 experiments are to be performed form the above lost, other than this, two more experiments are to be performed depending upon the scope.

EE–315–E ELECTRONIC MEASUREMENT & INSTRUMENT LAB

L	T	P		
0	0	2	**Sessional:**	**25marks**
			Theory:	**25marks**
			Total:	**50 marks**

LIST OF EXPERIMENTS:

1. Experiment to measure displacement using LVDT.
2. Experiment to study & display parameter (Liquid flow etc.) using LDR.
3. Experiment to measure temperature coefficient of material using thermocouple.
4. Experiment to measure temperature using RTD.
5. Experiment to measure pressure using strain gauge.
6. Experiment to measure the distortion in amplifiers using distortion meter.
7. Experiment to study Op-Amp as instrumentation amplifier.
8. Experiment to study Op-Amp as half wave & full wave precision rectifier.
9. To study & analyze CRO sampling & storage CRO, digital CRO.
10. Experiment to study Op-Amp as AD/DA converter.
11. To study Nixie tubes, LED, LCD, discharge devices & familiarize with digital frequency meter, frequency synthesizers.
12. Experiment to measure the speed of D.C motor using magnetic pick-up.
13. Experiment to measure the seed of D.D motor using Photo-electric pick-up.
14. To study Q-meter digital data acquisition systems random noise generator.

Note: At least 7 experiments are to be performed form the above lost, other than this, two more experiments are to be performed depending upon the scope

EE–317–E ELECTRONIC MEASUREMENT & INSTRUMENT LAB

L	T	P		
0	0	2	**Sessional:**	**25marks**
			Theory:	**25marks**
			Total:	**50 marks**

LIST OF EXPERIMENTS:

1. Experiment to study characteristics of diode, thyristor and triac.
2. Experiment to study characteristics of transistor and MOSFET.
3. Experiment to study R and R-C firing circuits
4. Experiment to study UJT firing circuit.
5. Experiment to study complementary voltage commutation using a lamp flasher.
6. Experiment to study thyristorised D.C circuit breaker.
7. Experiment to study thyristorised A.C phase control.
8. Experiment to study full wave converter.
9. Experiment to study series inverter.
10. Experiment to study DC chopper.
11. Experiment to study of bridge inverter.
12. Experiment to study of single phase cycloconvertor.

Note: At least 7 experiments are to be performed form the above lost, other than this, two more experiments are to be performed depending upon the scope