

SCHEME OF INSTRUCTION & EXAMINATION

B.E II YEAR (REGULAR)

(INSTRUMENTATION ENGINEERING)

SEMESTER - II

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions		Scheme of Examination		
			Periods per Week	L/T D/P	Duration in Hrs	Maximum Marks	Univ. Exam Sessi- onals
THEORY							
1.	CE 222	Solid Mechanics	4	-	3	75	25
2.	EE 255	Signals & Systems	4	-	3	75	25
3.	EE 256	Electrical Machines	4	-	3	75	25
4.	EE 257	Transducer Engineering	4	-	3	75	25
5.	EC 271	Electronic Engineering – II	4	-	3	75	25
6.	ME 272	Thermodynamics & Fluid Mechanics	4	-	3	75	25
PRACTICALS							
1.	ME 292	Mechanical Technology Lab	-	3	3	50	25
2.	EC 291	Electronic Engg – II Lab	-	3	3	50	25
TOTAL			24	6	-	550	200

EE 255

SIGNALS AND SYSTEMS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT – I

Defination and Classification of signals and systems: Continuous time Unit-step, Unit-impulse, exponential and sinusoidal, Discrete time unistep, unit impulse exponential and sinusoidal Linear time invariant systems, properties of LTI system, impulse response, convolution sum, convolution integral. Systems described by difference and differential equations.

UNIT – II

Signal representation by a discrete set of orthogonal functions, orthonormality and completeness. Trigonometric and exponential Fourier series, convergence, Dirichlets conditions, Discrete spectrum, symmetry conditions.

UNIT – III

Signal representation by continous exponentials – The direct and inverse Fourier transform continuous spectrum, Properties of Fourier transform, singularity function, “Parserval” theorem.

UNIT – IV

Singnal representation by exponentials – The Laplace Transform, Properties of Laplace transform – Initial and Final value theorems, Laplace transform of periodic function, waveform synthesis, partial fraction expansiion. Solution of networks by Laplace transform method.

UNIT – V

Discrete time signals, Sampling of continuous time signals. Sampling theorem, reconstruction of the signal from its samples, Analysis, discrete time systems. Z-transform, its properties, inverse Z-transform. Difference equations, simple problems using Z-transforms.

Suggested Reading:

1. B.P. Lathi – Signals Systems and Communication – John Wiley, 1967.
2. A.V. Oppenheim, A.S. Willsky, I.J. Young - Signals and Systems – Prentice Hall of India, NJ 1983.

EE256

ELECTRICAL MACHINES

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks

Sessional

25 Marks

UNIT – I

D.C. Generators and Motors: Principle of energy conversion, generator action, Constructional features of D.C. Machines, Functions of various parts. Methods of excitation. Elementary ideas of Armature winding, Armature reaction, Commutation. Characteristics of shunt, series and compound generators. D.C. Motor. Principle of operation, Back E.M.F., Torque equation, characteristics of shunt, series and compound motors. Losses and efficiency calculations. Applications of D.C. Motors, Motor starters, speed control of D.C. shunt motors.

UNIT – II

Single phase transformer: EMF equation, No-load and on load operation. Open and short circuit tests. Equivalent circuit, regulation and efficiency calculations. Auto transformer. 3 phase transformer connections. Conversion of 3-phase to two phase scott connection calculations.

UNIT – III

Synchronous Generator: Construction and principle of operation. EMF equation. Armature reaction. Determination of regulation by synchronous impedance method. **Synchronous motor:** Theory of operation, Phasor Diagram. Variation of current and power factor with excitation. Synchronous condenser and P.F. improvement.

UNIT – IV

Polyphase Induction Motor: Constructional Features – Principle of operation – rotating magnetic field theory. Torque equation. Torque slip characteristics, starting and speed control. Kramer method. Slip power recovery, variable frequency method. Performance characteristics.

UNIT – V

Single phase Induction Motor: Principle of operation of shaded pole. Single phase and capacitor motors and their characteristics. Single phase series motor-compensated and uncompensated - Load characteristics – Sepper Motors – Micro motors.

Suggested Reading:

1. Nagrath I.J. and Kothari D.P. – Electrical Machines – Tata McGraw Hill, 1995.
2. Dr. P.S. Bimbhra – Electrical Machinery – Khanna Publishers, 1997.

EE 257

TRANSDUCER ENGINEERING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT – I

Basic Methods of Measurements – A generalized measurement system configuration – Basic characteristics of measuring devices – Accuracy, Precision, Error, Linearity – Hysteresis – threshold, Repeatability, Reliability and maintainability – Span – Calibration.

UNIT – II

Performance characteristics of Instrumentation system – Generalised Mathematical model of system – Transfer function representatin Sinusoidal transfer function – Zero, first and second order instruments, impluse, step, ramp and frequency responses of avove instruments specification and testing of Dynamic response.

UNIT – III

Transducer – definition – electrical transducers – Classification – Basic requirment of transducers – variable Resistance Transducers – Construction and characterisitics of Potentiometers – Application – electrical strain gauge – Theory of operation of resistance strain gauge – Gauge factor – Types of Electric Strain gauges – wire gauges - Materials for Strain Gauges – Instrallation of strain gauges – Strain measuring circuits – Related problems.

UNIT – IV

Resistive type temperature measuring transducers – platinum resistance transducer - thermistor – Thermocouples – Types of Thermocouples – variable inductance and capacitance transducers – construction details of different types of inductance transducers – LVDT – application – induction Potentiometers – Types of variable capacitive transducers – Applications.

UNIT – V

Other Transducers – Piezo electric transducers – characteristics – Hall effect sensors – Eddy current sensors – Digital Transducers – Fibre optic sensors – Electro optic transducers – Semiconductor sensors.

Suggested Reading:

1. C.S. Rangan, G.R. Sarma and V.S.V. Mani – Instrumentation Devices & Systems - Tata McGraw Hill Publications – 1983.
2. D.V.S. Murthy – Transducers and Instrumentation – Prentice hall of India (p) Ltd.

EC 271

ELECTRONIC ENGINEERING – II

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT – I

Feedback amplifiers: Concept of Feedback, Feedback amplifier, Configurations, Circuits, Advantages of negative feedback, Analysis of simple feedback amplifiers using BJTs and FETs.

UNIT – II

Oscillators: Brakhausen Criterion: RC oscillators, Weinbridge, phase shift, LC Hartley and Colpritts oscillators, Crystal controlled oscillators (Analysis of oscillators using BJTs only) stability of oscillators.

UNIT – III

D.C. Amplifiers: Problems of dc amplifiers, drift compensation techniques, differential amplifiers, importance of CMRR, high CMRR, Differential Amplifiers.

UNIT – IV

Power Amplifiers: Classification of power amplifiers, analysis of class A and B power amplifiers, Distortion in amplifiers, push pull amplifiers, complementary symmetry.

UNIT – V

Wave shaping Circuits: RC low pass and high pass circuits: response to step, pulse, Ramp and Square wave inputs – differentiating and integrating circuits using diode, clipping circuits for single level and two levels, clamping circuits.

Suggested Reading:

1. Jacob Millman & Christos C.Halkias-Integrated Electronics-McGraw Hill, 1991.
2. Jacob Millman & Christos C.Halkias-Electronics Devices and Circuits-McGraw Hills, 1991.
3. Jacob Millman & Taub-Pulse Digital and Switching Wave forms-McGraw Hill, 1985.

ME 272

THERMODYNAMICS AND FLUID MECHANICS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT – I

Zeroth Law, First Law of Thermodynamics, Concept of Internal Energy and Enthalpy, Applications to closed and open loop systems. Second Law of Thermodynamics, Concept of Entropy, Clausius inequality and principles of increase in entropy in irreversible process.

I.C. Engines: Concept of Air standard cycles, Otto, Diesel and Dual combustion cycles, Working of Four Stroke and Two stroke, Petrol and Diesel Engines, Valve timing diagram, Calculation of Indicated Power, Brake power, Specific fuel consumption, Mechanical and Thermal efficiencies.

UNIT – II

Reciprocating Air Compressors: Single and Multi stage compressors, Workdone, Efficiency of multistage compressors, Effect of clearance volume.

Stream Turbines: Classification of steam turbines. Velocity diagram for single stage impulse and reaction turbine. Problems on workdone, blade angles, power output and thermal efficiency of turbines.

Gas Turbines: Classification of gas turbines, constant pressure combustion, open cycle, closed cycle and constant volume combustion gas turbine. Uses of Gas turbine and fuels used. Calculation of efficiencies.

UNIT – III

Properties of Fluid: Definition of fluid and concept of continuum, Fluid properties pressure, Density, Specific weight, specific volume, dynamic and kinematic viscosity.

Fluid Kinematics: General concepts of path line, stream line, stream tube, Classification of fluid flow - steady and unsteady flow, uniform and non-uniform flow, one, two and three dimensional flows. Definition and properties of stream function and velocity potential function. Concept of continuity and continuity equation in three dimensions.

UNIT – IV

Measurement of fluid flow: Devices used for measurement of pressure, velocity and discharge and derivation of relevant formulae.

Fluid Dynamics: Derivation of Euler's and Bernoulli's equations and their applications. Impulse momentum equation and its applications.

UNIT – V

Laminar and Turbulent flow through pipes: Distinction between Laminar and Turbulent flow, Reynolds number and its significance. Critical Reynolds number, Laminar and Turbulent flow in circular pipes. Hagen Poiseuille equation, friction losses in pipes. Darcy's equation, Estimation of Darcy's friction factor 'f'. Empirical formulae and Moody's Chart Development of Laminar and turbulent boundary layer on a Flat plate Dimensional analysis and dynamic similarity.

Suggested reading:

1. J.F. Mahew and K.S.Rogers-Thermodynamics-Longman, 1986.
2. S.Nagaratnam-Fluid Mechanics- Khanna Publishers, 1987.
3. R.K.Bansal-Fluid Mechanics & Hydraulic Machines-Laxmi Publications, 1998

ME 292

MECHANICAL TECHNOLOGY LAB (For Instrumentation Engineering)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

List of Experiments:

1. Determination of absolute Kinematic viscosity of lubricants
2. Determination of Flash and Fire point of fuels and lubricants
3. Valve Timing diagram of IC Engine
4. Performance test on multi cylinder petrol/diesel Engine
5. Performance test on reciprocating air compressor
6. Study and calibration of pressure gauges
7. Measurement of velocity by pitot tube
8. Measurement of velocity by hot wire anemometer
9. Measurement of discharge by venturimeter
10. Measurement of discharge by Orifice meter/Rotameter
11. Determination of thermal conductivity of metal rod
12. Determination of thermal conductivity of composite wall

EC 291

ELECTRONIC ENGINEERING – II LAB
(Common for EEE and IE)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

List of Experiments:

1. Voltage series feedback amplifier
2. Voltage shunt feedback amplifier
3. Current series feedback amplifier
4. Current shunt feedback amplifier
5. Hartley Oscillator
6. Colpitt's Oscillator

7. RC phase shift Oscillator
8. Weinbridge Oscillator
9. Linear wave shaping - Integrator & Differentiator
10. Nonlinear wave shaping – Clipping
11. Class-B-Power Amplifiers
12. Clamping Circuits (Diode)
13. Difference Amplifier (Op.Amplifier)