Level-2 Term-II (Common to all)

Sl. No	Course Number	Course Name	Contact Hours per Week	Credit Hour
1	EEE 205	Energy Conversion II	3.0	3.0
2	EEE 206	Energy Conversion laboratory	3.0	1.5
3	EEE 207	Electronic Circuits II	3.0	3.0
4	EEE 208	Electronic Circuits II Laboratory	3.0	1.5
5	EEE 209	Engineering Electromagnetics	3.0	3.0
6	ME 267	Mechanical Engineering Fundamentals	3.0	3.0
7	ME 268	Mechanical Engineering Fundamentals Sessional	3.0	1.5
8	MATH 357	Probability and Statistics	3.0	3.0
		Total	**24.0**	**19.5**

EEE 205 Energy Conversion II

3 Credit Hours, 3 Contact Hours per Week

Synchronous generator: construction, armature (stator) and rotating field (exciter), excitation system with brushes and brushless excitation system, cooling, generated voltage equation of distributed short pitched armature winding, armature winding connections and harmonic cancellation in distributed short pitched winding, equivalent circuit, synchronous impedance, generated voltage and terminal voltage, phasor diagram, voltage regulation with different power factor type loads, determination of synchronous impedance by tests, phasor diagram, salient pole generator d-q axes parameters, equivalent circuit, generator equations, determination of d-q axes parameters by tests, equation of developed power and torque of synchronous machines (salient and non salient pole motor and generator). Parallel operation of generators: requirement of parallel operation, conditions, synchronizing, effect of synchronizing current, hunting and oscillation, synchronoscope, phase sequence indicator, load distribution of alternators in parallel, droop setting, frequency control, voltage control, house diagrams.

Synchronous Motors: construction, operation, starting, effect of variation of load at normal excitation, effect of variation of excitations, V curves, inverted V curves and compounding curves, power factor adjustment, synchronous capacitor and power factor correction.

DC motors: principle of operation, constructional features, back emf and torque equations, armature reaction and its effect on motor performance, compensating winding, problems of commutation and their mitigations, types of dc motors and their torque speed characteristics, starting and speed control of dc motors, applications of different types of dc motor.

Single Phase Induction Motor: operation, quadrature field theory, double revolving field theory, split phasing, starting methods, equivalent circuit, torque-speed characteristic and performance calculation.

Introduction to photovoltaic systems.

EEE 206 Energy Conversion Laboratory

1.5 Credit Hours, 3 Contact Hours per Week

This course consists of two parts. In the first part, students will perform experiments to verify practically the theories and concepts learned in EEE 203 and EEE 205. In the second part, students will design simple systems using the principles learned in EEE 203 and EEE 205.

EEE 207 Electronic Circuits II

3 Credit Hours, 3 Contact Hours per Week

Ideal operational amplifier and op-amp circuits;

Op-amp applications: inverting amplifier, non-inverting amplifier, summing amplifier, differential amplifier, logarithmic amplifier, operational transconductance amplifiers exponential amplifier, differentiator, integrator, voltage to current converter, voltage follower, and other applications.

Non-ideality of op-amp: Non-ideal op-amp characteristics and its effects.

Integrated circuit biasing and active loads: BJT current sources, FET current sources, small signal analysis of active loads, design applications: an NMOS current source; differential and multistage amplifiers: BJT differential amplifier, FET differential amplifier, differential amplifier with active load, BiCMOS circuits, gain stage and simple output stage, BJT operational amplifier circuit,

Frequency response of amplifiers: Poles, zeros and Bode plots, amplifier transfer function, techniques of determining 3 dB frequencies of amplifier circuits, frequency response of single-stage and cascade amplifiers, frequency response of differential amplifiers;

Feedback and stability: Basic feedback concept, feedback topologies: voltage(series-shunt) amplifiers, current (shunt-series) amplifiers, transconductance (serie-series) amplifiers, transresistance (shunt-shunt) amplifiers, loop gain, stability of feedback circuit, frequency compensation;

Applications and Design of Integrated Circuits: Active filter, Oscillators, Schmitt trigger Circuits, Nonsinusoidal oscillators and timing circuits, integrated power amplifier, voltage regulator, Design application: An active Band-pass filter.

555 Timer IC and its Applications

Introduction to power amplifier classes: class A, class B, class AB, class C operation.

EEE 208 Electronic Circuits II Laboratory

1.5 Credit Hours, 3 Contact Hours per Week

In this course students will perform simulation study and experiments to verify practically the theories and concepts learned in EEE 207.

ME 267 Mechanical Engineering Fundamentals

3 Credit Hours, 3 Contact Hours per Week

Introduction to sources of energy: Steam generating units with accessories and mountings; steam turbines.
Introduction to internal combustion engines and their cycles, gas turbines.
Refrigeration and air conditioning: applications; refrigerants, different refrigeration methods.

Fluid machinery: impulse and reaction turbines; centrifugal pumps, fans, blowers and compressors.

Basics of conduction and convection: critical thickness of insulation.

ME268 Mechanical Engineering Fundamentals Sessional

1.5 Credit Hours, 3 Contact Hours per Week

Sessional based on ME 267.

MATH 357 Probability and Statistics

3 Credit Hours, 3 Contact Hours per Week

Introduction. Sets and probability. Random variable and its probability distributions. Treatment of grouped sampled data. Some discrete probability distributions. Normal distribution. Sampling theory. Estimation theory. Tests of hypotheses. Regression and correlation. Analysis of variance.