DEPARTMENT OF MECHANICAL ENGINEERING

Scheme of Instruction and Syllabus of

B.E. II YEAR
MECHANICAL ENGINEERING
(With effect from 2012-2013)

UNIVERSITY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Osmania University,
Hyderabad–500 007. (A.P.)
## SCHEME OF INSTRUCTION & EXAMINATION
### B.E. II-YEAR (MECHANICAL ENGINEERING)
#### SEMESTER-I

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<thead>
<tr>
<th>Sl. No.</th>
<th>Syllabus Ref. No.</th>
<th>Subject</th>
<th>Scheme of Instruction</th>
<th>SCHEME OF EXAMINATION</th>
<th>Credits</th>
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<td>1.</td>
<td>ME 201 UE</td>
<td>Metallurgy &amp; Material Science</td>
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<tr>
<td>2.</td>
<td>ME 202 UE</td>
<td>Machine Drawing</td>
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<td>3.</td>
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<td>Thermodynamics</td>
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<td>4.</td>
<td>CE 222 UE</td>
<td>Mechanics of Materials</td>
<td>4</td>
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<td>5.</td>
<td>EE 223 UE</td>
<td>Electrical Circuits and Machines</td>
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<td>Mathematics -III</td>
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#### PRACTICALS

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<td>Metallurgy Lab.</td>
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| Total: |                  |                                   | 22             | 10               | 550        | 200     | 28      |
## SCHEME OF INSTRUCTION & EXAMINATION

### B.E. II- YEAR

### SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

#### SEMESTER- I

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<td>1.</td>
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ME 201 UE

METALLURGY AND MATERIAL SCIENCE

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

Objectives:
1. To understand the basic concepts of metallurgy of metals and alloys
2. To know the fundamentals of fatigue, fracture, creep and diffusion
3. To familiarize the principles of heat treatment

UNIT - I


UNIT - II


UNIT - III


UNIT - IV


Composites: Classification, preparation and applications

UNIT - V


Suggested Reading:
ME 202 UE  

MACHINE DRAWING

Instruction  
Duration of University Examination  
University Examination  
Sessional  
Credits

6 Periods per week  
3 Hours  
75 Marks  
25 Marks  
4

Objective:
1. To understand format of drawing sheet, angle of projections and practice of simple machine elements
2. To practice free hand sketching of machine elements
3. To understand assembly drawings of typical machine parts such as Connecting rod, Eccentric, Cross head, Machine vice, Screw jack, Non-return valves, Safety valves, Bearings, Tail stock etc.

UNIT I
Standard Drawing Practices
Format of drawing sheet, title block, conventions of drawing lines and dimensions. First and third angle projections, convention for sectional views. Views of simple machine elements from the given pictorial and orthographic views.

UNIT II
Machine Elements: Free hand sketching of the following machine elements
Screwed Fastenings: Screw thread nomenclature, thread series, designation, thread profiles, multi start threads, coupler nut, representation of threads, bolted joints, studded joint, eye bolt, Machine Screws and cap screws, and foundation bolts.
Keys, Cotter and Pin Joints: Introduction, saddle keys, sunk keys, round keys, cotter joint with sleeve, cotter joint with socket and Spigot ends, cotter joint with a Gib and knuckle joint.

UNIT III
Assembly Drawings
Assembly drawings from given details of component drawings and working description of the assembly. Ability to supply additional views. The exercises will be drawings of typical machine parts, assemblies e.g., Connecting rod, Eccentric, Cross head, Machine vice, Screw jack, Non-return valves, Safety valves, Bearings, Tail stock etc. These are only examples and actual exercise or examination may include any assembly.

Case studies: Study of industrial drawings pertaining to automobile industry, Aero-space and general engineering industries (Each two drawings).

Suggested Reading:
ME 203 UE  

THERMODYNAMICS

Instruction  
4 Periods per week

Duration of University Examination  
3 Hours

University Examination  
75 Marks

Sessional  
25 Marks

Credits  
4

Objectives
1. To understand the basic concepts of thermal engineering.
2. To study the concepts of thermodynamics useful in thermal design of devices/machines employed in industries/other applications.
3. To lays the groundwork for subsequent studies in fields such as Fluid mechanics, Heat transfer, Refrigeration and Air Conditioning, Turbo machinery, Automobile Engineering and Gas Dynamics.
4. To gain the knowledge to effectively apply thermodynamics in the practice of engineering.

UNIT-I


UNIT-II


UNIT-III

Compressors
Thermodynamic analysis of Air Standard Cycles- Otto, Diesel, Dual and Joule/ Brayton.

UNIT-IV

UNIT-V

Suggested Reading:
CE 222 UE  

MECHANICS OF MATERIALS  
(For Mechanical Engineering)  

Instruction  
Duration of University Examination  
University Examination  
Sessional  
Credits  

4 Periods per week  
3 Hours  
75 Marks  
25 Marks  
4

Objectives:  
- To understand the basic concept of stress and strains for different materials  
- To know the mechanism of the development of shear force and bending moment in beams  
- To know the theory of simple bending, direct & bending stress and distribution of shear stress  
- To study the deflections and its applications  
- To analyze and understand shear stress, torsional stress and spring applications

Unit – I  
Simple stresses and strains: Types of stresses and strains. Hook’s Law, Stress-Strain curve for ductile materials, moduli of elasticity. Poisson’s ratio, linear strain, volumetric strain, relations between elastic constants. Bars of varying sections, bars of uniform strength, compound bars and temperature stresses, change in length.

Unit-II  
Shear Force and Bending Moment: Relation between intensity of loading. Shear force and bending moment, shear force and bending moment diagrams for cantilever and simply supported beams with and without overhanging for point loads, uniformly distributed loads, uniformly varying loads and couples.  
Compound Stresses: Stresses on oblique planes, principle stresses and principle planes. Mohr circle of stress and ellipse o stress.

Unit-III  
Theory of simple bending: Assumptions derivation of basic equation: \( M/I = \sigma/\gamma = E/R \)  
Modulus of section, Moment of resistance, determination of flexural stresses.  
Direct and Bending Stresses: Basic concepts, core of sections for rectangular, solid and hollow circular and I sections.  
Distribution of shear stress: Equation of shear stress, distribution across rectangular, circular, diamond, T and I sections.

Unit-IV  
Deflections: Deflections of cantilever and simply supported beams including overhanging beams for point loads and uniformly distributed loads by double integration and Maualay’s method.  
Strain Energy: Strain energy in bars due to gradually applied loads, sudden loads, impact loads and shock loads.

Unit-V  
Torsion: Theory of pure torsion- derivation of basic equation \( T/J = y/R = G\theta/L \) and hollow circular shafts, strain energy- Transmission of power, combined bending and torsion.  
Springs: Close and open coiled helical springs subjected to axial loads and axial couples, strain energy in springs- carriage springs.

Suggested Readings:  
EE 223 UE

ELECTRICAL CIRCUITS AND MACHINES
(For Mechanical Engineering)

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

Objectives:
1. To acquire knowledge in electrical circuits.
2. To be able to understand the basic principle operation and performance of electrical machines

UNIT I
DC Circuits: Ohm’s law, Network elements, Kichhoff’s laws, Power in DC circuits, Series & parallel resistances, Thevinin’s and Norton’s theorems.
AC Circuits: Sinusoidal sources, Phasor representation of sinusoidal quantities, Average and RMS values, Form factor, Analysis of RLC circuits to sinusoidal inputs, Power factor, Active & reactive powers, energy stored in inductance and capacitance, Mutual inductance.

UNIT II
Three-Phase Circuits: Production of 3-phase voltages, balanced star and delta connections, Measurement of power by Two-wattmeter method.

UNIT III

UNIT IV
Three-Phase Induction Motors: Production of rotating magnetic field, Construction and principle of Induction motors, Torque-slip characteristics, Star delta and Autotransformer starters, Speed control by Stator voltage and Rotor resistance methods.

UNIT V
Single-Phase Motors: Capacitor start and Capacitor run motor, Universal motors.
Three - Phase alternators: Construction, emf equation, Regulation by synchronous impedance method.

Suggested Reading:
MT 201 UE  
MATHEMATICS - III  
(Common to All Branches)

Instruction  
Duration of University Examination  
University Examination  
Sessional  
Credits

4 Periods per week  
3 Hours  
75 Marks  
25 Marks  
4

Objectives:
1. To introduce Laplace transforms, Functions of Complex Variables, the power series expansions, bilinear transformation and conformal mapping.
2. To introduce and discuss various numerical methods like solving of Algebraic and Transcendental equations, interpolation, numerical differentiation, and solutions of ordinary differential equations.
3. To introduce Normal and \( \chi^2 \) distributions, and the tests of significance, i.e t-test, F-test and \( \chi^2 \) test.

UNIT- I  
**Laplace transformation**: Introduction of Laplace transforms, sufficient condition for existence of Laplace transform, Laplace transform of Derivatives, Laplace transform of integrals, Translation theorems (I & II shifting theorems), Differentiation of Laplace transform ( Multiplication by t), Integration of Laplace transform (Division by t ), convolution theorem, Solving initial value problems using Laplace transform.

UNIT-II  
**Functions of Complex Variables**: Limits and continuity of function, differentiability and analyticity, necessary & sufficient conditions for a function to be analytic, Cauchy- Reimann equations in polar form, harmonic functions, complex integration, Cauchy’s integral theorem, extension of Cauchy’s integral theorem for multiply connected regions, Cauchy’s integral formula, Cauchy’s formula for derivatives and their applications.

UNIT-III  
Power series, Taylor’s series, Laurent’s series, zeros and singularities, residues, residue theorem, evaluation of real integrals using residue theorem, bilinear transformation, conformal mapping.

UNIT-IV  

UNIT-V  
**Probability and Statistics**: Introduction to distributions, Normal and \( \chi^2 \) distributions, Tests of significance, t-test, F-test, \( \chi^2 \) test.

Suggested Reading:
7. Probability and Statistics by Dr. M. Venkata Krishna.
8. Calculus of finite differences and Numerical Analysis by Dr. P.P. Gupta and Dr. G.S. Malik, Krishna prakasham Media.
ME 231 UE

METALLURGY LABORATORY

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks
Credits 2

Objectives:
1. To familiarize the procedure for specimen preparation
2. To prepare different metal specimen for identification
3. To study the microstructure of metals and alloys
4. To understand the heat treatment procedures
5. To study the microstructure after heat treatment

List of Experiments:
1. Study of: Metallurgical Microscope
   Iron-Iron Carbide diagram
   Procedure for specimen preparation
2. Metallographic Study of Pure Iron
3. Metallographic Study of Low carbon steel
4. Metallographic Study of Medium carbon steel
5. Metallographic Study of Eutectoid steel
6. Metallographic Study of Hyper Eutectoid steel
7. Metallographic Study of Wrought iron
8. Metallographic Study of Grey cast iron
9. Metallographic Study of White cast iron
10. Metallographic Study of Black heart Malleable cast iron
11. Metallographic Study of white heart Malleable cast iron
12. Metallographic Study of Brass and Bronze
13. Study of microstructure after hardening, normalizing and annealing of steel specimen.

Note: At least ten experiments should be conducted in the Semester
CE 241 UE

MECHANICS OF MATERIALS LABORATORY

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks
Credits 2

Objectives:

- To know and understand the experiments on various materials to assess their behavior/limitations.
- To know the brittle and ductile material failure patterns etc., by conducting experiments
- To understand shear force, bending moment and deflections for different types of beams
- To know the rigidity modulus by conducting spring and torsion test.

Cycle – I

1. Direct tension test on metal bars
2. Young’s modulus of metal specimen
3. Harness tests: Brinell and Rockwell
4. Compression test on bricks
5. Impact test
6. Shear force and bending moment tests

Cycle – II

7. Spring test
8. Torsion test
9. Bending test on simply supported beam
10. Bending test on continuous beam
11. Bending test on fixed beam
12. Curved beam

Note: At least ten experiments should be conducted in the Semester
ME 221 UE

SECTION - B
MECHANICAL TECHNOLOGY

Instruction 2 Periods per week
Duration of University Examination 1½ Hours
University Examination 38 Marks
Sessional 12 Marks
Credits 2

Objectives
1. To know the working principle of earth moving equipment
2. To study types and working principle of conveying and hoisting equipment
3. To understand the working principle of concrete producing, concrete screening and concrete mixing equipment
4. To know the principle of pneumatic equipment and tools

UNIT-I
General Description, Operation and Selection of the following: Earth moving and Excavation Equipment - Shovels, Dragline, Clam shell, Cable Excavator, Bucket Wheel Excavator, Tractor, Bull dozer, Scraper, Earth compactors.

UNIT-II

UNIT-III
Aggregate and Concrete Producing Equipment: Crushers, Jaw, Gyratory, Hammer and Roll crushers; Screens: Stationary, Revolving, Shaking and Vibrating screens. Concrete mixers, Concrete pump. Pneumatic Equipment: Reciprocating air-compressor.
Construction of pneumatic tools: Jack hammer, Paving breaker, Concrete vibrator.

Suggested Reading:
# SCHEME OF INSTRUCTION & EXAMINATION

## B.E. II-YEAR (MECHANICAL ENGINEERING)

### SEMESTER-II

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<td>D / P</td>
<td>Duration in hrs.</td>
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<td>Applied Thermodynamics</td>
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<td>Kinematics of Machines</td>
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<td>ME 253 UE</td>
<td>Manufacturing Processes</td>
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<td>Mathematics-IV</td>
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### PRACTICALS

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Total: 24 + 1 6 550 200 28
### SCHEME OF INSTRUCTION & EXAMINATION

**B.E. II- YEAR**

**SERVICE COURSES OFFERED TO OTHER DEPARTEMNTS**

#### SEMESTER- II

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<td>Prime Movers and Pumps</td>
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ME 251 UE

APPLIED THERMODYNAMICS

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

Unit-I

Reciprocating Air Compressors: Classification and applications. Ideal and actual P-V diagrams, work input and efficiency relations for single and multi stage compressors. Effect of clearance volume on work input and efficiency. Inter cooling and after cooling concepts.

Unit-II


Unit-III


Unit-IV


Unit-V

Steam power plant cycles: Carnot and Rankine cycles of operation and their efficiencies. Analysis of Rankine cycle with reheating and regeneration. Steam Nozzles: Flow of steam through convergent - divergent nozzles, velocity of steam flowing through the nozzle, mass of steam discharge through the nozzle, condition for maximum discharge, critical pressure ratio and nozzle efficiency. Super saturated expansion of steam through nozzles. General relationship between area, velocity and pressure in Nozzle flow.

Suggested Reading

ME 252 UE  

KINEMATICS OF MACHINES

Instruction 4+1 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks
Credits 4

Objectives
1. To understand the basic elements of machinery and their motion characteristics
2. To know the kinematic properties of mechanisms and machines
3. To understand basic machine elements
4. To know classification and applications of cams, gears and gear-trains

UNIT-I
Definitions of link, pair, chain mechanism, degrees of freedom, Kutzbach’s and Grubblers criterion, Grashof’s Law, Inversions of four bar mechanisms with all revolute joints, single and double slider crank mechanisms. Instantaneous Centre, Space Centrodre and Body Centrodre, Kennedy Theorem. Definitions and scope of Type, Number and Dimensional Synthesis. Pantograph and Geneva mechanisms. Ackerman and Davis steering gear mechanisms and Hooke's Joint. Peaucellier, Hart, Scott-Russel, Watt and Tchebicheff mechanisms.

UNIT-II
Analytical method to find velocities and accelerations in mechanisms. Velocities in mechanisms by instantaneous centre method, velocity and acceleration of mechanisms by using relative velocity method including Coriolis component of acceleration.

UNIT-III

UNIT-IV
**Brakes and Dynamometers:** Block or shoe, band, band and block, internal expanding shoe brakes. Rope brake and Belt transmission, Dynamometers. Types of Cams and followers, motion of the follower, follower displacement diagram, Cam profile for specified follower motion and Cams with specified contours.

UNIT-V

**Gear Trains:** Simple, Compound, Reverted and Epicyclic gear trains. Differential of an Automobile.

Suggested Reading:
ME 253 UE

MANUFACTURING PROCESSES

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

Objectives
1. To know the various manufacturing processes
2. To understand the basic concepts of casting and welding
3. To understand the manufacturing of plastics and composites
4. To familiarize the forming processes and forming load estimation.
5. To understand the principle of high energy rate forming processes

UNIT-I

UNIT-II
Processing of Plastics: Blow molding, Injection molding, Reaction injection molding, Rotational molding and Extrusion. Processing of Composites: Hand lay-up, Filament winding, Compression moulding. Introduction to MEMS.

UNIT-III

UNIT - IV
Powder Metallurgy: Powder production methods, steps in powder metallurgy processes, cold and hot isostatic pressing, typical industrial applications.

UNIT-V

Suggested Reading:
CE 271 UE

FLUID DYNAMICS
(For Mechanical Engineering)

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

Objectives:
1. To know various fluid properties, concept and method of fluid pressure measurement.
2. To understand the basic concepts of fluid motion.
3. To study different equations of fluid motion and fluid dynamics
4. To analyze different flow characteristics of laminar and turbulent flows
5. To study the motion of gases for different conditions of expansion

UNIT-I

Fluid Kinematics: Fundamentals of fluid flow – types of fluid flow, description of flow pattern, basic principles of fluid flow, continuity equation, acceleration of a fluid particles.

UNIT-II
Fluid Statics: Fluid pressure at a point, variation of Pressure in a fluid, measurement of Pressure-simple manometers, differential manometers.

Fluid dynamics: Introduction, forces acting on a fluid in motion, Euler’s equation of motion, Bernoulli’s equation, application of Bernoulli’s equation – venturimeter, pilot tube. Impulse momentum equation, application of impulse momentum equation – Forces on a pipe bend.

UNIT-III

UNIT-IV
Boundary layer theory: Introduction, thickness of boundary layer, boundary layer along a flat thin plate and its characteristics. Laminar and turbulent boundary layer, laminar sub layer, separation of boundary layer and its control.


UNIT-V
Flow of compressible fluids: Introduction, concepts of compressible flow, continuity and energy equation, propagation of elastic waves due to compression of fluid, velocity of sound, Mach number and its significance, propagation of elastic waves due to disturbance of fluid stagnation properties, area velocity relationship for compressible flows.
Suggested Reading:
EC 273 UE

APPLIED ELECTRONICS
(For Mechanical Engineering)

Instruction 4 periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessionals 25 Marks
Credits 4

Objectives:
1. To understand the characteristics of diodes and transistor configurations
2. To understand the design concepts of biasing of BJT and FET
3. To understand the design concepts of feedback amplifiers and oscillators
4. To study the design concepts of OP Amp and data converters

Unit I
Characteristics of PN Junction: Half wave rectifier, Full wave rectifier, filters, ripple, regulation, TIF and efficiency, Zener diode and Zener diode regulators. CRT construction and CRO applications

Unit II
Bipolar and Field Effect Transistors: Biasing FET, small signal model, h-parameter equivalent circuits, basic amplifier circuits-CB,CE,CC configurations of BJT and CG,CS and CD configurations of FETs, RC-coupled amplifier and its frequency response.

Unit III
Feedback Concepts: Types of negative feedback-modification of gain, bandwidth, input and output impedances-applications; Oscillators: RC phase shift, Wienbridge, LC and Crystal Oscillators.

Unit IV
Operational Amplifier: Characteristics, applications, Differential amplifiers, logic gate circuits-Introduction to Digital Systems-AND,NAND,NOR,XOR gates, Binary half wave adder, full adder, Multi-vibrators-Bi-stable, Mono-stable and Astable Multi-vibrators (Qualitative treatment only)-Schmitt trigger.

Unit V

Suggested Reading:
MT 251 UE

MATHEMATICS-IV
(ECE, CSE and ME)

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

Objectives:
1. To introduce the student, the expansion of periodic functions, and their applications.
2. To introduce the methods of forming and solving Partial differential equations, Also Z-Transforms
3. To introduce basic statistical methods like curve fitting, correlation and regression.

UNIT –I
Fourier series and Fourier transforms: Fourier series, Fourier series expansions of even and odd functions, convergence of Fourier series, Fourier half range series, Fourier transforms, inverse Fourier transforms, Fourier cosine & sine transforms.

UNIT –II
Partial differential equations: Formation of first and second order partial differential equations, solution of first order equations, Lagrange’s equation, Nonlinear first order equations, Charpit’s method, higher order linear equations with constant coefficients.

UNIT-III
Application of Fourier series to linear partial differential equations: Classification of linear second order partial differential equations, separation of variables method (Fourier method), Fourier series solution of one dimensional heat equation, one dimensional wave equation, Laplace’s equation.

UNIT –IV

UNIT-V
Curve fitting by method of least squares, correlation and regression, types of correlations, scatter diagram, Karl Pearson’s coefficient of correlation, Spearman’s rank correlation coefficient, equal ranks, correlation factor, equations to the lines of regression.

Suggested Reading:
& sons, New Delhi.
5. Probability and Statistics by Dr. M. Venkata Krishna
EE 241 UE

ELECTRICAL ENGINEERING LAB
(For Mechanical Engineering)

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks
Credits 2

Objectives:
1. To learn practical electric AC & DC circuits.
2. To learn operation and performance characteristics of electrical machines by conducting various tests

List of Experiments:
1. Verification of Kirchhoff’s Laws.
2. Verification of Thevinin’s and Norton’s Theorems.
3. Study of Three-Phase Balanced Circuits.
5. Study of Single-Phase RLC Series Circuits.
6. Magnetization Curve of a Separately Excited DC Generator.
7. Load Characteristics of Shunt Generator.
9. Speed Control of DC Shunt Motor.
11. Load Test on Single-Phase Transformer.
12. Load Test on Three-Phase Induction Motor.

Note: At least ten experiments should be conducted in the Semester.
EC 292 UE

APPLIED ELECTRONICS LAB
(For Mechanical Engineering)

Instruction 3 periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessionals 25 Marks
Credit 2

Objectives:
1. To understand the characteristics of diodes and transistor configurations
2. To understand the design concepts of biasing of BJT and FET
3. To understand the design concepts of feedback amplifiers and oscillators
4. To study the design concepts of OP Amp and data converters

List of Experiments:

2. Characteristics of Semiconductors diode (Ge, Si and Zener)
3. Static Characteristics of BJT-Common Emitter
4. Static Characteristics of BJT-Common Base
5. Static Characteristics of FET
6. RC-Phase Shift Oscillator
7. Hartley and Colpitts Oscillators
8. Common Emitter Amplifier
9. Astable Multivibrator
10. Full-wave rectifier with and without filters using BJT
11. Operational Amplifier Applications
12. Strain Guage Measurement
13. Analog-to-Digital and Digital to Analog Converters

Suggested Reading:
ME 271 UE

PRIME MOVERS AND PUMPS
(For Electrical Engineering)

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

Objectives
1. To know basics of fluid mechanics and governing equations
2. To understand the working principle of hydraulic turbines and pumps
3. To understand the working principle of steam and gas power plants

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT -V

Suggested Reading:
ME 291 UE

PRIME MOVERS AND PUMPS LABORATORY
(For Electrical Engineering)

Instruction: 3 Periods per week
Duration of University Examination: 3 Hours
University Examination: 50 Marks
Sessional: 25 Marks
Credits: 2

Objectives
1. To gain knowledge on working principle of petrol and diesel engines
2. To understand the working principle of hydraulic turbines and pumps
3. To study performance and characteristic curves of turbines and pumps
4. To gain the knowledge of various flow meters and the concept of fluid mechanics

a) Thermal Engineering Laboratory:

1. Determination of flash point.
2. Determination of fire point.
3. To conduct performance test on diesel engine
4. To determine the valve timing diagram of a I.C (gas) engine
5. To conduct performance test on multi-cylinder petrol engine.
6. To conduct heat balance test on diesel engine.

b) Hydraulic Machinery Laboratory:

7. Performance & characteristics curves of Pelton wheel.
8. Performance & characteristics curves of Francis turbine.
10. Performance & characteristics curves of Turbo wheel.

Note: At least ten experiments should be conducted in the Semester