

SANDIP UNIVERSITY, SIJOUL, MADHUBANI

Scheme of Teaching and Examinations for

I SEMESTER DIPLOMA IN MECHANICAL ENGINEERING

Skill Based Diploma in Engineering Course

THEORY

| Sr. No. | SUBJECT | SUBJECT CODE | TEACHING SCHEME | EXAMINATION-SCHEME | | | | | | | |
|-----------------|--------------------------------|--------------|------------------|--------------------|-----------------------------------|-------------------------|----------------------------------|---------------------|----------------|---------------------------|---------|
| | | | Periods per Week | Hours of Exam. | Teacher's Assessment (TA) Marks A | Class Test (CT) Marks B | End Semester Exam. (ESE) Marks C | Total Marks (A+B+C) | Pass Marks ESE | Pass Marks in the Subject | Credits |
| 1. | Applied Mathematics | ME101T | 04 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 03 |
| 2. | Mechanical Engineering Drawing | ME102T | 03 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 03 |
| 3. | Mechanics of Solids | ME103T | 02 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 02 |
| 4. | Engineering Mechanics | ME104T | 03 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 03 |
| 5. | Electrical Engineering | ME105T | 02 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 02 |
| Total :- | | | 14 | | | | 350 | 500 | | | |

PRACTICAL

| Sr. No. | SUBJECT | SUBJECT CODE | TEACHING SCHEME | EXAMINATION-SCHEME | | | | | |
|-----------------|-----------------------------|--------------|------------------|--------------------|-----------------|-------------|-------------------|---------------------------|---------|
| | | | Periods per Week | Hours of Exam. | Practical (ESE) | | Total Marks (A+B) | Pass Marks in the Subject | Credits |
| | | | | | Internal(A) | External(B) | | | |
| 6. | Mechanics of Solids Lab. | ME106P | 02 | 03 | 15 | 35 | 50 | 20 | 01 |
| 7. | Electrical Engineering Lab. | ME107P | 02 | 03 | 15 | 35 | 50 | 20 | 01 |
| 8. | Workshop Practice | ME108P | 04 | 06 | 15 | 35 | 50 | 20 | 03 |
| Total :- | | | 08 | | | | 150 | | |

TERM WORK

| Sr. No. | SUBJECT | SUBJECT CODE | TEACHING SCHEME | EXAMINATION-SCHEME | | | | |
|---|--------------------------------|--------------|------------------|--------------------------------|--------------------------------|-------------------|---------------------------|-----------|
| | | | Periods per Week | Marks of Internal Examiner (X) | Marks of External Examiner (Y) | Total Marks (X+Y) | Pass Marks in the Subject | Credits |
| 9. | Mechanical Engineering Drawing | ME109P | 05 | 15 | 35 | 50 | 20 | 02 |
| 10. | Automobile Servicing | ME110P | 03 | 07 | 18 | 25 | 10 | 02 |
| 11. | Engineering Graphics | ME111P | 03 | 07 | 18 | 25 | 10 | 02 |
| Total :- | | | 11 | | | 100 | | |
| Total Periods per week Each of duration One Hour | | | | 33 | Total Marks = 750 | | | 24 |

Text/Reference Books:-

| Titles of the Book | Name of Authors | Name of the Publisher |
|---|------------------------|--------------------------------------|
| Mathematics for polytechnic | S. P. Deshpande | Pune Vidyarthi Griha Prakashan, Pune |
| Calculus: single variable | Robert T. Smith | Tata McGraw Hill |
| Advanced Mathematics for Engineers and Scientist | Murray R Spiegel | Schaum outline series McGraw Hill |
| Higher Engineering Mathematics | B. S. Grewal | Khanna Publication, New Dehli |
| Introductory Methods of Numerical analysis | S. S. Sastry | Prentice Hall Of India New Dehli |
| Numerical methods for Engg. 4 th ed. | Chapra | Tata McGraw Hill |
| Numerical methods for scientific & engineering computations | M. K. Jain & others | Wiley Eastern Publication. |
| Rajendra Pal, S.N. Malik | Applied Mathematics | Foundation Publishing |

MECHANICAL ENGINEERING DRAWING

| | | | | | | | | |
|--------------------------------|--------------------------------|----------|------------|-------------------|----------|------------|----------------------------|--|
| Subject Code ME102T | Theory | | | | | | Credits 03 | |
| | No. of Periods Per Week | | | Full Marks | : | 100 | | |
| | L | T | P/S | ESE | : | 70 | | |
| | 03 | — | — | TA | : | 10 | | |
| | — | — | — | CT | : | 20 | | |

CONTENTS : THEORY

| | Name of the Topic | Hours | Marks |
|---------|---|-------|-------|
| UNIT-01 | Auxiliary views: - Study of auxiliary planes, Projection of objects on auxiliary planes. Completing the regular views with the help of given auxiliary views (Use first angle method of projection). | 08 | 12 |
| UNIT-02 | Intersection of solids:- Curves of intersection of the surfaces of the solids in the following cases (a) Prism with prism, Cylinder with cylinder, Prism with Cylinder When (i) the axes are at 90° and intersecting (ii) The axes are at 90° and Offset (b) Cylinder with Cone When axis of cylinder is parallel to both the reference planes and cone resting on base on HP and with axis intersecting and offset from axis of cylinder | 08 | 10 |
| UNIT-03 | Developments of Surfaces. Developments of Lateral surfaces of cube, prisms, cylinder, pyramids, cone and their applications such as tray, funnel, Chimney, pipe bends etc. | 08 | 10 |
| UNIT-04 | Conventional Representation:- 1. Standard convention using SP – 46 (1988) (a) Materials C.I., M.S, Brass, Bronze, Aluminum, wood, Glass, Concrete and Rubber (b) Long and short break in pipe, rod and shaft. (c) Ball and Roller bearing, pipe joints, cocks, valves, internal / external threads. (d) Various sections- Half, removed, revolved, offset, partial and aligned sections. (e) Knurling, serrated shafts, splined shafts, and chain wheels. (f) Springs with square and flat ends, Gears, sprocket wheel (g) Countersunk & counterbore. (h) Tapers | 04 | 08 |
| UNIT-05 | Limits, Fits and Tolerances:- 1. Characteristics of surface roughness- Indication of machining symbol showing direction of lay, roughness grades, machining allowances, manufacturing methods. 2. Introduction to ISO system of tolerancing, dimensional tolerances, elements of interchangeable system, hole & shaft based system, limits, fits & allowances. Selection of fit. 3. Geometrical tolerances, tolerances of form and position and its geometric representation. 4. General welding symbols, sectional representation and symbols used in Engineering practices | 04 | 08 |

| | | | |
|---------|---|----|----|
| UNIT-06 | Details to Assembly 1. Introduction- 2. Couplings – Universal couplings & Oldham’s Coupling 3. Bearing – Foot Step Bearing & Pedestal Bearing 4. Lathe tool Post 5. Machine vice & Pipe Vice 6. Screw Jack 7. Steam Stop Valve | 08 | 12 |
| UNIT-07 | Assembly to Details 1. Introduction – 2. Pedestal Bearing 3. Lathe Tail Stock 4. Drilling Jig 5. Piston & connecting rod 6. Gland and Stuffing box Assembly 7. Valve – Not more than eight parts 8. Fast & loose pulley | 08 | 10 |
| | Total | 48 | 70 |

| Text/ Reference Books: | | |
|---|--|--|
| Titles of the Book | Name of Authors | Name of the Publisher |
| Machine Drawing | N.D.Bhatt | Charotar Publication, Anand |
| Code of practice for general engineering drawing. | IS Code SP 46 (1988) | Engineering Drawing Practice for School and colleges |
| Production Drawing | L.K.Narayanan, P.Kannaich, K.VenkatReddy | New Age International Publication |
| Machine Drawing | P.S.Gill | S.K.Kataria and Sons |
| Engineering Graphics (For Topic on Auxiliary Views) | M.L.Dabhade | -- |
| Machine Drawing | Sidheshwar | Tata McGraw Hill |
| Engineering Drawing | D.Jolhe | Tata McGraw Hill |
| Mechanical Engineering Drawing | Bishwajeet Ranjan, Deepak Kumar | Foundation Publishing |

MECHANICS OF SOLIDS

| | | | | | | | |
|--------------------------------|--------------------------------|----------|------------|-------------------|----------|------------|----------------|
| Subject Code ME103T | Theory | | | | | | Credits |
| | No. of Periods Per Week | | | Full Marks | : | 100 | |
| | L | T | P/S | ESE | : | 70 | |
| | 02 | — | — | TA | : | 10 | |
| | — | — | — | CT | : | 20 | |

CONTENTS :THEORY

| | Name of the Topic | Hours | Marks |
|---------|---|-------|-------|
| UNIT-01 | <p>Mechanical Properties of Materials, Simple stresses & Strains Types of loads, Simple stresses & strains viz. tensile, compressive, Shear, Crushing, Thermal stresses, Hoop stresses & corresponding strains, Volumetric Strain, Bulk modulus, Hook's law, Young's modulus, Modulus of Rigidity, stress-strain curves for ductile & brittle materials, Poisson's ratio. Concept of stresses & strains in thin cylindrical & spherical shells subjected to internal pressure. Concepts of Buckling – Rankine's & Euler's formulae for buckling load for columns / shafts under compression, concepts of equivalent length for various end conditions. Concepts of Deflection & slope of beams – relation between bending moment & slope. Deflection of simply supported beams and cantilever beams subjected to point load. (No derivation) (Problems on compressive & tensile stresses, Thermal stresses, butt & lap riveted joints, simple cases of buckling).</p> | 10 | 18 |
| UNIT-02 | <p>Strain Energy Concept, derivation & use of expression for deformation of axially loaded members under gradual, sudden & impact load. Strain energy due to self-weight.</p> | 03 | 04 |
| UNIT-03 | <p>Bending Moment & Shear Force Shear force, bending moment & relation between them. Shear force & bending moment diagrams for simply supported beam & cantilevers subjected to point loads & Uniformly distribution load, concept of Uniformly varying load & couples acting on beam Location of point of contraflexure. (Problems to be based on simply supported & cantilever beams with point load & UDL only)</p> | 08 | 12 |
| UNIT-04 | <p>Moment of Inertia Definition of Moment of inertia, Moment of inertia of different laminae, radius of gyration. Parallel & perpendicular axis theorem. Moment of inertia of rectangular, circular, semicircular. Triangular, Hollow Rectangular, symmetrical I - Section, Channel section, Tee- section, angle section about centroidal axis. Polar moment of inertia.</p> | 03 | 06 |
| UNIT-05 | <p>Bending & Shear stresses Theory of simple bending, equation of bending. Assumptions in the theory of bending, moment of resistance, section modulus & neutral axis. Shear stresses – concepts of direct & transverse shear stress.</p> | 06 | 06 |

| | | | |
|----------|---|----|----|
| UNIT-06 | <p>Combination of Bending & Direct stresses Axial load, eccentric load, direct stresses, bending stresses maximum & minimum stresses. Application of the above concepts for machine parts such as offset links, C-clamp, Bench vice, Drilling machine frame, stresses at base of a short column, condition for no tension at extreme fibres, total stress variation diagrams. (Simple problems on above applications)</p> | 08 | 10 |
| UNIT-07 | <p>Principal Planes & Principal Stresses Definition of principal plane & principal stresses. Expression for normal and tangential stress, maximum shear stress. Stresses on inclined planes. Position of principal planes & planes of maximum shear. Graphical solution using Mohr's circle of Stresses.</p> | 06 | 08 |
| UNIT- 08 | <p>Torsion Concept of Pure Torsion, Torsion equation for solid and hollow circular shafts. Assumptions in theory of pure Torsion. Comparison between Solid and Hollow Shafts subjected to pure torsion (no problem on composite and non homogeneous shaft)</p> | 04 | 06 |
| | Total | 48 | 70 |

Text /Reference Books:

| Titles of the Book | Name of Authors | Name of the Publisher |
|----------------------------------|----------------------------------|---|
| Strength of Material | Andrew Pytel Fedrinand L. Singer | Addison-Wesley An imprint of Addison Wesley Longman, Inc. Forth edition |
| Strength of Material | G.H.Ruder | ELBS with Macmillan third edition |
| Strength of Material | B.K.Sarkar | Tata McGraw hill New Delhi |
| A Text Book strength of Material | Dr. R. K.Bansal | Laxmi Publication New Delhi |
| Strength of Material | S Ramamrutham | Dhanpat Rai & Publication New Delhi |
| Strength of Material | R.S.Khurmi | S.Chand Company Ltd. Delhi |
| Materials Science | G.K.Narula K.S.Narula | Tata McGraw hill New Delhi |
| Mechanics of Solids | Roshan Sinha, Pradeep Kumar | Foundation Publishing |

ENGINEERING MECHANICS

| | | | | | | | |
|--------------------------------------|--------------------------------|----------|------------|--------------------------------------|----------|-----------|---------------------------------|
| Subject Code ME104T | Theory | | | No of Period in one session : | | | Credits 03 |
| | No. of Periods Per Week | | | Full Marks | | | |
| | L | T | P/S | ESE | : | 70 | |
| | 03 | - | — | TA | : | 10 | |
| | — | — | — | CT | : | 20 | |

| Contents | | Hrs/week | Marks |
|-----------------|--|-----------------|--------------|
| Unit -1 | <p>Force</p> <p>a. Fundamentals: - Definitions of mechanics, statics, dynamics. Engineering Mechanics, body, rigid body, mass, weight, length, time, scalar and vector, fundamental units, derived units, S.I. units.</p> <p style="padding-left: 40px;">b: - Definition of a force, unit force, Newton, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility.</p> <p>c. Resolution of a force: Definition, Method of resolution, Types of component forces, Perpendicular components and Non-perpendicular components.</p> <p>d. Moment of a force: - Definition, measurement of moment of a force, S. I. unit, geometrical meaning of moment of a force, classification of moments according to direction of rotation, sign convention, law of moments Varignon's theorem of moment and it's use, couple – definition, S.I. unit, measurement of a couple, properties of couple.</p> <p>e. Force system: - Definition, classification of force system according to plane and line of action</p> <p>f. Composition of Forces: - Definition, Resultant force, methods of composition of forces,</p> <p>I – Analytical method:– (i) Trigonometric method (law of parallelogram of forces) (ii) Algebraic method (method of resolution),</p> <p style="padding-left: 40px;">II – Graphical method: - Introduction, space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent, non-concurrent and parallel force system by analytical and graphical method.</p> | 12 | 15 |

| | | | |
|-----------------|---|-----------|-----------|
| Unit -2 | Equilibrium: 2.1 Definition, conditions of equilibrium, analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. 2.2 Lami's Theorem – statement and explanation, Application of Lami's theorem for solving various engineering problems. 2.3 Equilibrant – Definition, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. 2.4 Beams – Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged, roller), classification of loads, point load, uniformly distributed load. Reactions of a simply supported and over hanging beam by analytical and graphical method. | 10 | 15 |
| Unit – 3 | Friction: 3.1 Definition of friction, force of friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction angle of repose and coeff. Of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages of friction. 3.2 Equilibrium of bodies on level plane –external force applied horizontal and inclined up and down. 3.3 Equilibrium of bodies on inclined plane – external forces is applied parallel to the plane, horizontal and incline to inclined plane. 3.4 Ladder friction, Wedge and block. | 08 | 15 |
| Unit – 4 | Centroid and Centre Of Gravity: 4.1 Centroid: Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure. 4.2 Center of gravity: Definition, center of gravity. Of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids. | 08 | 10 |
| Unit – 5 | Simple Machines: 5.1 Definitions of simple machine, compound machine , load , effort , mechanical advantage , velocity ratio , input on a machine ,output of a machine ,efficiency of a machine , expression for mechanical advantage , velocity ratio and efficiency of a machine. Ideal machine, ideal effort and ideal load, friction in machines, effort lost in friction and frictional load. 5.2 Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self locking machine. 5.3 Study of simple machines : Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, pulleys : First, second and third system of pulleys, gear train, hoist mechanism. | 10 | 15 |
| Total | | 48 | 70 |

Text/Reference Books :-

| | Titles of the Book | Name of Authors. | Name of the Publisher |
|-------|--|-------------------------|------------------------------|
| (i) | Engineering Mechanics | Beer-Johnson | Tata McGraw Hill, Delhi |
| (ii) | Engineering Mechanics | Basu | Tata McGraw Hill, Delhi |
| (iii) | Vector Mechanics for Engineers Vol. - I & II | Josph F. Shelley | Tata McGraw Hill, Delhi |
| (iv) | Engg. Mechanics | Ram Manohar Pandey | Foundation Publishing House |

ELECTRICAL ENGINEERING

| | | | | | | |
|--------------------------------|--------------------------------|----------|------------|-------------------|----------|------------|
| Subject Code ME105T | Theory | | | Credits | | |
| | No. of Periods Per Week | | | Full Marks | : | 100 |
| | L | T | P/S | ESE | : | 70 |
| | 02 | — | — | TA | : | 10 |
| | — | — | — | CT | : | 20 |

CONTENTS : THEORY

| | Name of the Topic | Hours | Marks |
|--------------|---|-----------|-----------|
| UNIT-01 | Introduction to Electrical power supply system Generation, Transmission, Distribution & Utilization. AC supply & DC supply | 02 | 02 |
| UNIT-02 | AC Fundamentals: cycle, frequency, phase, period, max, average, r.m.s. value. Concept of current, voltage, power & energy in R, L, & C circuits | 03 | 06 |
| UNIT-03 | Three phase supply: Star & Delta circuit, Line & Phase relationship, power equation. | 03 | 06 |
| UNIT-04 | Measuring Instruments: Introduction to construction, operation and use of AC & DC ammeter, voltmeter, Electrodynamic Wattmeter, energy meter & digital multimeter, Clip on meter. | 04 | 06 |
| UNIT-05 | DC Motor: Construction and principle of operation. Speed torque characteristics. Types, specifications & ratings and applications. Types of insulation used. | 06 | 07 |
| UNIT-06 | A. C .Machines : Transformer: Construction and principle of operation. EMF equation and transformation ratio. Load test, efficiency and regulation. Specifications & rating. Auto transformer & 3 phase transformer concept only. Applications of transformers. | 06 | 09 |
| | AC motor: Construction and principle of operation of 3 phase induction motor. Speed torque characteristics, slip, speed control (VFD), reversal of rotation, starters. Single phase motor, universal motor, stepper motor & servo motor. Motor specification & ratings. Applications of these motors in various fields. Testing of motors. | 06 | 10 |
| | Alternator: Construction, principle of operation & applications. Self and separate excitation. Synchronous Motor:- Construction, principle of operation, methods of starting & applications | 03 | 04 |
| UNIT-07 | Utilisation of Electrical Energy | | |
| | Industrial applications: Classification of drives, factors for selection of motor for different drives, Enclosures & Mountings | 02 | 05 |
| | Electric heating & welding: Working principle & types selection of system, specifications & rating | 02 | 03 |
| | Electrometallurgical & Electro Agro Systems: Concept & principle used in electroplating, Electrical machines used in electro-agro systems (irrigation pumps) | 02 | 03 |
| UNIT-08 | Electric wiring & Illumination: Simple Electric Installations with 2 sockets,2 fans, 2 lamps, fuses. Introduction to different accessories like MCCB, ELCB, wires & cables. Different types of lamps their specifications, | 04 | 04 |
| UNIT-09 | Electric safety, tariff & power conservation, necessity of Earthing, types safety tools, first aid measures, types of tariff, pf improvement only methods, energy conservation & audit, fire extinguishing methods adopted in electrical engineering. | 05 | 05 |
| Total | | 48 | 70 |

Text/Reference Books:

| Titles of the Book | Name of Authors | Name of the Publisher |
|-----------------------------------|-----------------|-----------------------|
| Electrical Technology | E. Hughes | ELBS |
| Electrical Technology | H. Cotton | Pitman |
| Electrical Technology Vol I To IV | B. L. Theraja | S. Chand |
| Electrical Engineering | K.D. Joshi | Foundation Publishing |

MECHANICS OF SOLIDS LAB

| | | | | | | | |
|--------------------------------------|--------------------------------|----------|------------|-------------------|----------|-----------|----------------|
| Subject Code ME106P | Practical | | | | | | Credits |
| | No. of Periods Per Week | | | Full Marks | : | 50 | 01 |
| | L | T | P/S | ESE | : | 50 | |
| | — | — | 02 | Internal | : | 15 | |
| | — | — | — | External | : | 35 | |

CONTENTS :PRACTICAL

Skills to be developed:

Intellectual Skill:

- 1 Identification of different parts of machine and their function.
- 2 Interpretation failure patterns of different metal under different action.
- 3 Extrapolating test result or observation during test.
- 4 Testing different metals and comparison of experimental result.

Motor Skill:

- 1 Sketch of standard specimen, arrangement for test on respective machines.
- 2 Measurement of different parameters.
- 3 Handling Instrument.
- 4 Observing behavior of different metal during test.

| <i>List of Practical:</i> | |
|---------------------------|---|
| 1. | Study & demonstration of Extensometer. |
| 2. | Tension Test on mild steel, Aluminium & compression test on cast iron on Universal Testing Machine. |
| 3. | Direct Shear Test of mild steel on Universal Testing Machine. |
| 4. | Brinell Hardness Test on Mild Steel. |
| 5. | Rockwell hardness Test on Hardened Steel. |
| 6. | Izod & Charpy - Impact tests of a standard specimen. |
| 7. | Torsion Test on Mild steel bar. |
| 8. | Term Work :- Drawing sheet on shear force & bending Moment diagrams for a given loading (At least four problems.) a) Estimation of principal stresses and maximum shear strain for a given combined loading by analytical & Mohr's circle method. (At least two problems.) |

ELECTRICAL ENGINEERING LAB

| | | | | | | | |
|--------------------------------------|--------------------------------|----------|------------|-------------------|----------|-----------|----------------|
| Subject Code ME107P | Practical | | | | | | Credits |
| | No. of Periods Per Week | | | Full Marks | : | 50 | 01 |
| | L | T | P/S | ESE | : | 50 | |
| | — | — | 02 | Internal | : | 15 | |
| | — | — | — | External | : | 35 | |

CONTENTS :PRACTICAL

Skills to be developed:

Intellectual skills:

1. Identify and select suitable electrical instruments for measurement.
2. Identify and give specifications of electrical motors and transformers.
3. Interpret wiring diagrams for various applications.
4. Identify safety equipments required.
5. Decide the procedure for setting experiments.

Motor skills:

1. Draw wiring diagram
2. Make wiring connections to connect electrical equipments and instruments.
3. Measure electrical power, earthing resistance and other electrical quantities.
4. Calibrate electrical instruments.
5. Use of safety devices while working.

Prepare energy consumption bill with present tariff structure.

A) List of Practical:

- 1) For a given resistive & inductive series & parallel circuit, select ammeter, voltmeter & wattmeter. Make the connections and measure current, voltage and power drawn by the circuit. Measure it by clip on meter & compare it.
- 2) For a given DC Shunt/Series motor, select suitable meters, make connections as per diagram, check the connections and run the motor. Take the meter readings to draw speed torque characteristics. Make suitable changes in the connections to reverse the direction of rotation.
- 3) For the above given motor prepare a circuit to control its speed above & below normal, plot its graph.
- 4) List specifications of given single phase transformer. Perform no load test on the transformer to find transformation ratio.
- 5) Connect an electronic energy meter to a load, take reading & prepare energy consumption bill with present tariff structure
- 6) Prepare actual wiring on a board to study and operate one lamp controlled by one switch, staircase wiring, go down wiring using casing capping.

B) Field work:

- 7) Observe Electric wiring of main building in your campus list the accessories used and draw a general layout
- 8) Observe earthing of your laboratory, measure its resistance & list its significance

C) Mini project:

- 9) Prepare a simple electric wiring circuit comprising of 2 lamps, 2 sockets, 1 fan with a fuse & check it.
- 10) Prepare trouble-shooting chart of above motors and identify the faults of a motor or a transformer

WORKSHOP PRACTICE

| | | | | | | | |
|--------------------------------------|--------------------------------|----------|------------|--------------------------------------|----------|-----------|---------------------------------|
| Subject Code ME108P | Term Work | | | No of Period in one session : | | | Credits 02 |
| | No. of Periods Per Week | | | Full Marks | | | |
| | L | T | P/S | ESE | : | 50 | |
| | - | — | 04 | Internal Exam. | : | 15 | |
| | — | — | — | External Exam. | : | 35 | |

| Details of Practical | | Hrs/week |
|-----------------------------|---|-----------------|
| Unit -1 | <p>CARPENTERY SHOP:</p> <ul style="list-style-type: none"> Any one composite job from the following involving different joint, turning and planning, surface finishing by emery paper, varnishing etc. like square stool, tea table, center table, chaurang, table lamp bed sofa-set, book rack. Cabinet, notice board, shows cases, tables chairs etc. <p>Note: 1] One job of standard size (Saleable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.</p> | |
| Unit -2 | <p>WELDING SHOP</p> <ul style="list-style-type: none"> Any one composite job from involving butt joint lap joint welding process, from the following like Grill, door, window frame, waste paper basket, Chappel stand, Corner flower stand chair, table frame (square pipe 25 mm) cooler frame (folding type) <p>Note: 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work . 3] Job allotted should comprise of 6-8 hours of actual working operations. 4] Student shall calculate the cost of material and labor required for their job from the drawing.</p> | |
| Unit – 3 | <p>SMITHY SHOP</p> <ul style="list-style-type: none"> Demonstration of different forging tools and Power Hammer. Demonstration of different forging processes, likes shaping, caulking fullering, setting down operations etc. One job like hook peg, flat chisel or any hardware item. <p>Note: 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Job allotted should comprise of 4-6 hours of actual working operations. 3] Student shall calculate the cost of material and labor required for their job from the drawing.</p> | |
| Unit – 4 | <p>PLUMBING SHOP :</p> <ul style="list-style-type: none"> Demonstration of PVC pipe joint with various fittings. Exercise for students on preparing actual pipeline layout for G.I. Pipe or PVC pipe. Preparing actual drawing and bill of material. <p>Note: 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 6-8 hours of actual working 4] Student shall calculate the cost of material and labor cost for their job from the drawing.</p> | |

| | | |
|-----------------|--|-----------|
| Unit – 5 | <i>SHEET METAL SHOP</i> <ul style="list-style-type: none"> • One composite job from the following: Letter box, Trunk, Grain Container, Water-heater Container, Bucket, Waste Paper Basket, Cooler Tray, Water-draining Channel, etc. (including soldering and riveting) <p>Note: 1] One job of standard size (Saleable/marketable article shall be preferred) 2] Batch size should be selected depending on volume of work. 3] Job allotted should comprise of 4-6 hours of actual working ions. 4] Student shall calculate the cost of material and labor cost required for their job from the drawing.</p> | |
| Unit – 6 | Demonstration of power tools and practice of utility items. <ul style="list-style-type: none"> • Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories. • Making of electrical switchboard with 2 sockets and piano buttons and with electrical wiring. • Any other item as per the requirement of college/Deptt./ | |
| | Total | 64 |

MECHANICAL ENGINEERING DRAWING - TW

| | | | | | | | |
|---------------------------------------|--------------------------------|----------|------------|-------------------|----------|-----------|----------------|
| Subject Code ME109TW | Term Work | | | | | | Credits |
| | No. of Periods Per Week | | | Full Marks | : | 50 | |
| | L | T | P/S | Internal | : | 15 | 02 |
| | — | — | 05 | External | : | 35 | |

CONTENTS : TERM WORK

List of Term Work :-

(Use first angle method of projection)

1. Intersection of Solids

- (i) One Sheet containing atleast two problems.
- (ii) Atleast four problems for home assignment in sketchbook.

2. Development of surfaces

Any two problems on development of surfaces of different objects. (one Sheet)

3. Auxiliary views

One sheet containing two problems

At least two problems as home assignment in sketch book

4. Conventional Representation as per SP – 46 (1988) - onesheet

5. Limit, Fit, Tolerances and Machining Symbols – one sheet

6. Assembly to detailed drawings of components including conventional representation of tolerances and surface finish symbols:

One sheet covering any one assembly and its details

At least two problems as home assignment in sketch book.

7. Details to Assembly

Draw One sheet covering any one assembly and its details.

Solve at least two problems as home assignment in sketchbook.

8. Two problems on assembly drawings using any CAD Package

(Assembly containing maximum 6 to 7 components-minimum 12 hours)

AUTOMOBILE SERVICING

| | | | | | | | |
|---------------------------------|--------------------------------|----------|------------|-------------------|----------|-----------|----------------------------|
| Subject Code ME110TW | Practical | | | Full Marks | : | 50 | Credits 01 |
| | No. of Periods Per Week | | | ESE | : | 50 | |
| | L | T | P/S | Internal | : | 15 | |
| | - | — | 02 | External | : | 35 | |

Contents: Practical

Intellectual skill:

1. Identify concepts applied.
2. Identify parts like clutch, gear box, universal joints, propeller shaft, final drive, wheels & tyres.
3. Classify the system according to their application.
4. Detect fault by observation & trial.
5. Take reading from various instruments like chassis dynamometer.

Motor skill:

1. Sketch the different devices.
2. Handle tools, equipment, and instrument.
3. Observe the behaviors of various system under various parameters.

List of Practical/ Assignments:

1. Draw various vehicle layouts for- two wheelers, three wheeler and four wheelers and compare them.
2. Open a single plate dry clutch assembly and sketch exploded view.
3. Open a multi-plate clutch used in two wheelers, observe the operating linkages and sketch the system.
4. Open any two types of gear boxes observe gear shifting, gear ratio and sketch the system & compare them.
5. Open & observe automatic transmission devices such as torque converter, various drive.
6. Open & observe universal joints such as Hooks universal joint.
7. Open the differential, sketch the unit with bearing locations.
8. Assembly & disassembly of any one type of rear axle.
9. Open any two types of tyres, wheels and rims, observe and sketch.

ENGINEERING GRAPHICS

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|--|--------------------------------|----------|------------|--------------------------------------|----------|-----------|---------------------------------|
| Subject Code ME111 TW | Term Work | | | No of Period in one session : | | | Credits 02 |
| | No. of Periods Per Week | | | Full Marks | | | |
| | L | T | P/S | ESE | : | 20 | |
| | - | — | 04 | Internal Exam. | : | 06 | |
| | — | — | — | External Exam. | : | 14 | |

| | Skills to be developed | |
|---|---|---|
| | Intellectual skills | Motor Skills |
| 1. Introduction to graphics - (1 Sheet) Draw the following using CAD 1.1 Rectangle with given dimensions 1.2 Circle with given dimensions and hatch 1.3 Pentagon with line command 1.4 Hexagon with given dimensions 1.5 Draw one figure containing circle tangent, arc and dimensioning. | 2. To develop ability to solve problems on geometrical constructions. | 3. To develop ability to draw the geometrical constructions by computer. |
| 2. Engineering curves & Loci of points - (1 Sheet) i) Three different curves are to be draw using any one method. ii) Draw locus of point on any one mechanism | 1) To develop ability to differentiate between conic and curves. 2) To develop ability to identify the type of locus from the nature of surface and the position of generating circle. 3) Able to interpret the given mechanisms and locus of points. | 1. To develop ability to draw different types of curves. |
| 3. Orthographic projections - (Total 2 Sheets) Two objects by first angle projection method – (1 Sheet) Redraw the same sheet using CAD – (1 Sheet) | 1) Develop ability to interpret first angle projection method. 2) To interpret and able to solve problem on orthographic projection of given object. | 4. Develop ability to draw orthographic projections by first angle projection method |
| 4. Isometric projection - (Total 2 sheets) Two objects one by true scale and another by isometric scale. (simple objects) - (1 sheet) Redraw the same sheet using CAD - (1 sheet) | 1) Develop ability to differentiate between isometric view and isometric projections. 2) To differentiate between Isometric scale and true scale. | 1. Develop ability to draw isometric views and isometric projections from given orthographic views of an object using computer. |
| 5. Projections of line and planes. – (1 Sheet) Two problems on Projection of lines and two problems on Projection of Planes. | 1) To develop ability to differentiate between true length and apparent length. 2) To interpret the position lines and plane with reference plane. | 1) Able to draw Orthographic Projections of line and planes. |

List of Practice Oriented Projects: -

- 1) To draw layout of visited Industry, College using CAD
- 2) To draw orthographic projection of given machine element using CAD

