N.G.PATEL POLYTECHNIC, ISROLI-AFWA

MECHANICAL ENGINEERING DEPARTMENT

Subject:-Basic Engineering Drawing -3300007-(SEMESTER 1)

Sr. No	*Practical Exercises*
1	Use of Drawing Instruments.
2	Geometric Construction.
3	To draw Engineering Curves (Ellipse, Parabola, Hyperbola, Involutes).
4	To draw Engineering Curves (Spirals and Cycloids).
5	To draw Projections of Points and Lines of given problems.
6	To draw Projections of Plane of given problems.
7	To draw Orthographic Projections of given problems.
8	To draw Isometric Drawings and Isometric Projections of given problems.
9	Problem Based Learning.
10	School Within School.

Subject**:-**Engineering Workshop Practice -3301901-(SEMESTER 1)

Sr. No	*Practical Exercises*
1	Prepare carpentry and fitting shop layout.
2	Demonstrate use of different fitting tools.
3	Prepare one simple and another male-female type fitting jobs as per given drawings.
4	Demonstrate use of different tin smithy tools.
5	Prepare one tin smithy job as per drawing having shearing, bending, joining and riveting.
6	Demonstrate use of different carpentry tools.
7	Prepare two wooden joints as per given drawings.
8	Demonstrate use of different pipe fitting tools.
9	Prepare pipe fitting jobs as per drawings-two jobs.
10	Demonstrate use of different welding transformers and consumables.
11	Prepare jobs using arc welding, gas cutting, and spot welding, brazing and soldering process.
12	Problem Based Learning.
13	School Within School.

Subject:-Applied Mechanics-3300008-(SEMESTER 2)

Sr. No	*Practical Exercises*
1	To Verify and calculate resultant force through Law of Parallelogram.
2	To Verify and calculate resultant force through Polygon Law of Forces.
3	To Verify and calculate resultant force through Lami's Theorem.
4	To Verify reactions in beam through Graphical method.
5	To Verify reactions in beam through analytical method.
6	To Calculate Centroid of lamina and Centroid of different sections.
7	To Calculate Co efficient of Sliding Friction for different surfaces.(Horizontal plane)
8	To Calculate Co efficient of Sliding Friction for different surfaces. (Inclined plane)
9	To Work-out M.A & Efficiency of Simple purchase crab.
10	To Work-out M.A & Efficiency of simple wheel and axle.
11	To Work-out M.A & Efficiency of Simple screw jack.

Subject:-Mechanical Drafting-3321901-(SEMESTER 2)

Sr. No	*Practical Exercises*
1	To draw all six views using first/third angle projection method for the given pictorial view of an object.
2	To draw sectional top view/side view/front view of given object using "first/third angle projection method."
3	To draw missing top view/side view of given of given figure using "First/third angle Projection Method."
4	To draw the development of the surfaces for given figure.
5	To draw Projections of solids for prism, cylinder, pyramid and cone.
6	To draw sectional views of different solids.
7	To draw intersectional views of an object.
8	To details to assembly drawing for given components.
9	To draw assembly to details drawing for given components.
10	To draw welding, piping and surface roughness symbols.

Subject:-Manufacturing Engineering I-3331901-(SEMESTER 3)

Sr. No	***Practical Exercises***
1	Prepare a job using Forging process.
2	Demonstration of spinning process with preparation of a job.
3	Demonstration of metal melting, metal pouring, metal casting and casting finishing.(Use Wax)
4	Prepare a pattern drawing, pattern and core from the given component.
5	Prepare a mould using prepared pattern, core and moulding sand.
6	Prepare a job using Arc Welding.
7	Prepare a job using gas cutting and gas welding.
8	Prepare a job using Spot Welding.
9	Prepare a job using Soldering & Brazing Techniques.
10	School Within School . (Exercise)

Subject:-Fluid Mechanics and Hydraulics Machines-3331903-

(SEMESTER 3)

Sr. No	***Practical Exercises***
1	Determine various Fluid Properties.
2	Demonstrate and Measure Pressure using different instruments.
3	Verify Bernoulli's Theorem.
4	Measure fluid flow by Venturi meter & Nozzles.
5	Measure fluid flow by Orifice meter & V notch.
6	Estimate Reynolds Number Using given Test rig.
7	Determine Major and Minor head loss through Pipe.
8	Perform testing of Centrifugal pump as per BIS.
9	Perform testing of Reciprocating pump as per BIS.
10	Demonstrate Different hydraulic & Pneumatic Device.
11	Exercise

Subject:-Strength of Materials-3331904-(SEMESTER 3)

Sr No.	*Practical Exercises*
1	Draw Stress Strain Curve for Tension Test on Ductile Materials like Mild Steel Aluminum
2	Determine Young's Modulus of wire of Given Material.
3	Calculate Moment of Inertia of Fly Wheel.
4	Demonstrate End Conditions of Column.
5	Calculate Impact Value of Mild Steel using IZOD Impact Test Apparatus.
6	Calculate Impact Value of Mild Steel using Charpy Impact Test.
7	Calculate Brinell Hardness Number of given material.
8	Calculate Hardness of given material using Rockwell Hardness machine.
9	Find out Compressive Strength of C.I , M.S using Compression Testing Machine.
10	Calculate at least Six Problems of Unit – I.
11	Calculate at least Six Problems of Unit – III.
12	Calculate at least Six Problems of Unit VII.
13	Calculate at least Six Problems of Unit VIII.

Subject:-Computer Aided Machine Drawing-3331906-(SEMESTER3)

Sr. No	*Practical Exercises*
1	To study different parts of computer and prepare a report on all parts of computer with specifications and uses.
2	Introduction to AutoCAD (Mechanical).
3	Introduction of machine drawing, geometrical symbols, tolerance, drawing standards, etc.
4	To prepare orthographic production drawing of 6-7 mechanical components made up of minimum 5-6 manufacturing operations in AutoCAD and write sequence of commands to prepare a drawing with basic dimensions, geometrical dimensions, tolerances and other information.
5	To prepare detail and assembly production drawing of any one simple mechanical assembly having minimum 5-6 component each made up of 5-10 manufacturing operations in AutoCAD with basic dimensions, geometrical dimensions, tolerances and other information.
6	To study about parametric and non parametric drawing.
7	To prepare 2D parametric drawing with dimensions.
8	Prepare project in group of 5-7 students using AutoCAD or Solid Edge, also project report on it.

Subject: - Manufacturing Engineering II-3341901-(SEMESTER 4)

Sr. No	***Practical Exercises***
1	Preparatory activity.
2	Demonstration of different types of chips.
3	Demonstration of taper turning attachment on lathe machine.
4	To grind a single point cutting tool.
5	Prepare a job on centre lathe as per the given drawing.(Including plain turning, taper turning, knurling, threading, grooving, etc).
6	Prepare a job having plain and inclined surfaces on shaping machine with minimum two holes as per given drawing.
7	Prepare a job using milling operations including use of indexing head.
8	Prepare a tool layout of a given component for capstan and turret lathe.
9	Mini project
10	Industrial visit
11	*Home Assignment -18 questions*
12	*Seminar (total 12 slides)*

Subject:-Thermal Engineering I-3341902-(SEMESTER 4)

Sr. No	***Practical Exercises***
1	Preparatory Activities
2	Demonstration-Low pressure boilers-Boiler mountings and accessories.
3	Boiler Performance-Boiler trial- determination of boiler efficiency equivalent evaporation and Heat balance sheet.
4	Demonstration-Steam prime movers-impulse and reaction turbines-Working of nozzles.
5	Demonstration-Steam condensers-Cooling towers.
6	Performance Test of Air Compressor: Performance test on a reciprocating air compressor and determine its volumetric
7	Performance Test Of Heat Exchanger: Determine overall heat transfer coefficient and LMTD of heat exchanger.
8	Mini Project and Presentation: (In the group of 3-5students- to be assigned in the beginning of the term).

Subject:-Theory of Machine-3341903-(SEMESTER 4)

Sr. No	*Practical Exercises*
1	Preparatory Activity.
2	Prepare a drawing sheet on construction of cam profile(for knife edge and Roller types followers-without offset).
3	Prepare a drawing sheet on construction of cam profile(for knife edge and Roller types followers-with offset).
4	Prepare a drawing sheet on velocity and ace. Diagram for given single slider crank chain mechanism.(Relative velocity method).
5	Prepare a drawing sheet on velocity and ace. Diagram for given single slider crank chain mechanism.(By Klein's construction method).
6	Prepare a drawing sheet on velocity and ace. Diagram for given four bar chain mechanism
7	Balancing: Drawing sheet preparation based on balancing of masses by graphical and analytical method.
8	Tutorials:
	(A) Based on Power loss due to friction in bearings (B) Based on Flywheel (C) Based on Power transmission
9	Mini projects and Presentation.

Subject: - Computer Aided Design-3341904-(SEMESTER 4)

Sr. No	*Practical Exercises*
1	Preparatory Activity
	Prepare a 2D drawing using AutoCAD and 2D parametric sketcher environment.
2	3D Solid Modeling-I
	Prepare 3D solid models using AutoCAD (Three mechanical components).
3	3D Surface Model:
	Prepare simple surface model using AutoCAD (Two mechanical components).
4	3D Solid Modeling-II:
	Prepare 3D solid model using any one (from Creo, Solid Edge, Inventor and Solid Works) parametric software. (Three models that includes base features, Extrude/Protrude/Revolve).
5	3D Solid Modeling-III:
	Prepare 3D solid models using any one (from Creo, Solid Edge, Inventor and Solid Works) parametric software. (Four models that includes engineering features).
6	Mini Project and Presentation Using Any One (from creo, solid edge, inventor and solid works) parametric software.

Subject:-Plant Maintenance and Safety-3341906-(SEMESTER 4)

Sr. No	***Practical Exercises***
1	Preparatory Activity.
2	To study measurement of Wear.
3	To study and identify the types of corrosion and possible causes.
4	Identify fault with the help of Decision Tree for any two items.
5	Maintenance of Mechanical Based Equipment/Device/Machine.
6	Prepare a Preventive Maintenance schedule of the typical workshop.
7	Demonstrate use of fire fighting and Safety related equipment.
8	Prepare a Test Chart of newly installed or repaired m/c tool.
9	Mini Project and Presentation.
10	Industrial Visit.

Subject: - Metrology and Instrumentation-3341905-(SEMESTER 4)

Sr. No	***Practical Exercises***
1	Preparatory Activity.
2	Measurement of different components by using vernier caliper.
3	Measurement of different components by using outside micrometer.
4	Measurement of different components by using Inside micrometers.
5	Measurement of different components by using Telescopic gauge.
6	Measurement of different components by using venire height gauge.
7	Measure angle between two planes with the help of sine bar & slip gauge.
8	Measure angle between two planes with the help of Bevel protector.
9	Measure roundness of cylindrical bar using Dial indicator& draw polar graph.
10	Measure chordal thickness & height of given gear with the help of Gear tooth vernier
11	Measure effective diameter of given thread.
12	Measure and compare temperature with help of various temperature measuring devices.
13	Measure pressure with the help of pressure gauge.
14	Measure surface roughness value using Surface roughness tester.
15	Demonstration and study of various Transducers.
16	Demonstration and study of various Limit gauges.
17	Demonstration and study of Ultrasonic testing of NDT.
18	Mini Project and Presentation

Subject: - Thermal Engineering II-3351901-(SEMESTER 5)

Sr. No.	***Practical Exercises***
1.	Preparatory Activity.
2.	Demonstration of IC engine parts.
3.	Demonstration of Valve timing diagram.
4.	Perform test and prepare heat balance sheet of IC Engine. (Petrol and Diesel-both separately)
5.	Demonstration of Refrigeration tubing operations.
6.	Demonstration of Leak detection, evacuation and refilling of the refrigerant.
7.	Determination of COP of VCRS.
8.	Determination of properties of Air.
9.	Determination of capacity of Window Air Conditioner.
10.	Industrial visit

Subject:-Design of Machine Elements-3351902-(SEMESTER 5)

Sr.No	***Practical Exercises***
1	Preparatory Activity .
2	Design of simple components.
3	Design of assemblies (Knuckle joint, Cotter joint, Flange coupling, Screw jack) .
4	Sketches and drawings of design assemblies (Knuckle joint, Cotter joint, Flange coupling, Screw jack) .
5	Solid Modeling of designed assemblies.
6	Tutorials: a. Tutorial on bell crank lever design b. Tutorial on bearing. (Teacher will assign the dataone problems). (Students are also expected to solve these as partial assignments at home.).
7	Mini project.

Subject:-Manufacturing Engineering III-3351903-(SEMESTER 5)

Sr.No.	***Practical Exercises***
1	Preparatory activity (Includes Home Assignments)
2	To study motion and power transmission path, transmission systems, work mounting systems, tool mounting systems and tool holders/holding systems of machine tools.
3	To grind various angles of single point cutting tool.
4	Prepare a job with various machining methods i.e. plain/taper turning, knurling, threading, cylindrical/surface grinding etc.
5	Prepare a complex job which include shaping, milling, drilling, taping, boring, slotting, surface grinding, etc. and prepare a report on process planning and route sheet with floor layout for a given job.
6	Produce spur gear on milling machine using indexing head.
7	Prepare a multi start/square threaded bolt and nut.
8	Mini project
9	Presentation
10	Technical visit/participation

Subject:-Industrial Engineering-3351904-(SEMESTER 5)

Sr. No	***Practical Exercises***
1	Preparatory Activity.
2	Mini Project and presentation
3	To draw an Operation process chart (OPC) for a given job.
4	To draw a Flow diagram (FD) for a given job.
5	To prepare a Man and machine chart for a given job.
6	Performance rating by dealing of cards.
7	To measure the standard time by using stop watch.
8	To measure and verify the variable characteristics of a normal dist
9	To plot Control charts for variables
10	To plot Control charts for attributes.
11	Prepare single sampling a double sampling plan for a lot.
12	Industrial Visit

Subject:-Estimating Costing and Engineering Contracting-3351905-(SEMESTER 5)

Sr. No	*Practical Exercises*
1	Preparatory activity.
2	Collection of parts and its production drawing.
3	To study Break Even Analysis.
4	To study the Elements of cost.
5	To estimate Gas welding and Arc welding Cost.
6	To study procedure for cost estimation of Forging Process and estimate cost for the same.
7	To study procedure for cost estimation of Pattern and Foundry shop and estimate for the same.
8	Estimate machining cost for the various machining process.
9	Estimate process cost for the various standard process.
10	Mini Project – Turn Buckle.

Subject:-Self Employment and Entrepreneurship Development-3351906-(SEMESTER 5)

Sr. No	*Practical Exercises*
1	Preparatory activity.
2	Creativeness and innovativeness.
3	Identification of self-employment areas.
4	Visit report.
5	Preparing project feasibility report of assigned product.
6	Case analysis and presentations.

Subject:-Computer Aided Manufacturing-3361901-(SEMESTER 6)

Sr. No.	*Practical Exercises*
1	Preparatory Activity.
2	1. Demonstration and Study.
	1. Demonstration of CNC machines and operations. 2. List major parts and write specification of it. 3. Tabulate sensors/feedback device with type, specifications and use. 4. Sketch display console.
	2. Interfacing of CAD and CAM.
3	Preparation and execution of simple part.
4	Preparation and execution of simple part Program for milling which include simple contour milling, contour milling with circular interpolation, contour milling with drilling/tapping. (Minimum three drawings).
5	Demonstration of CAD/CAM integration..

Subject:-Tool Engineering-3351902-(SEMESTER 6)

Sr. No	*Practical Exercises*
1	Preparatory activity.
2	Sketch the cutting tool with nomenclature taken for re-sharpening.
3	Design a suitable milling fixture for a given component.
4	Design a suitable drill jig, fixture for a given component.
5	Design a suitable die assembly for a given component.

Subject:-Power Plant Engineering-3361906-(SEMESTER 6)

Sr.No	***Practical Exercises***
1	Preparatory activity:
2	Study of high pressure boilers.
3	Presentation (Teacher will assign any one topic from following) based on: Steam based power plant. Gas turbine power plant. Solar power plant. Wind power plant. Nuclear power plant.
4	Model preparation and exhibition (In a group of 08 - 12 students).
5	Industrial visit report.

Subject:-Thermal Systems and Energy Efficiency-3361907-

(SEMESTER 6)

Sr. No.	***Practical Exercises***
1	Preparatory Activities
2	Case study based on boiler.
3	Case study based on boiler furnace.
4	Case study based on heat exchanger.
5	Case study based on air conditioner.
6	Case study based on refrigeration system.