

SCHOOL OF ENGINEERING

SWARNIM STARTUP & INNOVATION UNIVERSITY

Course	Bachelor of Engineering.
Duration	4 Years.
Aim	Our aim is to promote the education and applied research and development of knowledge in the field of engineering.
Objective	<ul style="list-style-type: none">• To maintain a high standard of education through outstanding teaching, innovative curriculum and research training.• To improve, develop and establish teaching and research programs in lined with industry needs.• To develop and promote quality and market driven academic and professional peruses.• Increase interaction and collaboration with industry.• To provide opportunities for students to work as part of teams on multidisciplinary projects.
Course Outcome	<ul style="list-style-type: none">• Automobile engineering is also called vehicle engineering, one of the most challenging fields in engineering but at the same time it has more growth opportunity worldwide.• Automobile engineering is an applied science that includes elements of Mechanical engineering, Electrical engineering, Electronic Engineering, Software Engineering and Safety engineering as applied to the design, manufacture and operation of automobiles, buses and trucks and their respective engineering subsystems. Automobile engineering consist combination of NHV, Fuel economy / emission, vehicle dynamics, safety engineering, vehicle electronics.

SWARNIM STARTUP & INNOVATION UNIVERSITY

SCHOOL OF ENGINEERING

DEPARTMENT OF EC/CE/EE/EEE/CL/AUTO/ME

ENGINEERING GRAPHICS

CODE:

B.E. 1st Year

Teaching & Evaluation Scheme:-

Teaching Scheme				Credits	Evaluation Scheme				
Th	Tu	P	Total		Internal		External		Total
					Th	Pr	Th	Pr	
2	-	4	6	6	30	50	70	-	150

Prerequisites: - Zeal to learn the subject

Course outline: - Engineering Drawing is an effective language of engineers. It is the foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realization.

Sr. No.	Course Contents	Number of Hours
1	Introduction to Engineering Graphics: Drawing instruments and accessories, BIS – SP 46. Use of plane scales, Diagonal Scales and Representative Fraction.	6
2	Engineering Curves: Classification and application of Engineering Curves, Construction of Conics, Cycloidal Curves, Involute and Spirals along with normal and tangent to each curve.	6
3	Projections of Points and Lines: Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes	6

4	Projections of Planes: Projections of planes (polygons, circle and ellipse) with its inclination to one reference plane and with two reference planes, Concept of auxiliary plane method for projections of the plane	6
5	Projections of Solids and Section of Solids: Classification of solids. Projections of solids (Cylinder, Cone, Pyramid and Prism) along with frustum with its inclination to one reference plane and with two reference planes. Section of such solids and the true shape of the section	6
6	Orthographic Projections: Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method, full sectional view	6

Learning Outcomes:- After learning the course the students should be able to

1. To know and understand the conventions and the methods of engineering drawing.
2. Interpret engineering drawings using fundamental technical mathematics.
3. Construct basic and intermediate geometry.
4. To improve their visualization skills so that they can apply these skills in developing new products.
5. To improve their technical communication skill in the form of communicative drawings.
6. Comprehend the theory of projection.

Teaching & Learning Methodology:-

Note: Topic No. 1, and 6 of the above syllabus to be covered in Practical Hours.

Books Recommended:

1. A Text Book of Engineering Graphics by P.J.Shah S.Chand & Company Ltd., New Delhi
2. Elementary Engineering Drawing by N.D.Bhatt Charotar Publishing House, Anand
3. A text book of Engineering Drawing by R.K.Dhawan, S.Chand & Company Ltd., New Delhi
4. A text book of Engineering Drawing by P.S.Gill, S.K.Kataria & sons, Delhi
5. Engineering Drawing by B. Agrawal and C M Agrawal, Tata McGraw Hill, New Delhi

List of Open Source Software/learning website: <http://nptel.iitm.ac.in/courses.php>

Practical List:-

Students are required to prepare drawing sheets on the following topics. Minimum three problems must be given for sheet number 3 to 8.

1. Practice sheet (which includes dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts, use of stencil,)
2. Plane scale and diagonal scale
3. Engineering curves
4. Projection of line and Projection of plane (minimum two problems on each)
5. Projection and section of solid
6. Orthographic projection

SWARNIM STARTUP & INNOVATION UNIVERSITY

SCHOOL OF ENGINEERING

DEPARTMENT OF EC/CE/EE/EEE/ME/Civil/Auto

Elements of Mechanical Engineering

CODE: _____

B.E. 1st Year

Teaching & Evaluation Scheme:-

Teaching Scheme				Credits	Evaluation Scheme				
Th	Tu	P	Total		Internal		External		Total
					Th	Pr	Th	Pr	
4	-	2	6		30	50	70	-	150

Objectives: - Understanding of basic principles of Mechanical Engineering is required in day to day life.

Course outline: - After learning the course the students should be able to

1. To understand the fundamentals of mechanical systems
2. To understand and appreciate significance of mechanical engineering in different fields of engineering

Sr. No.	Course Contents	Number of Hours
1	Introduction: Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat capacity, Change of state, Process, Cycle, Internal energy, Enthalpy, Statements of Zeroth Law and First law.	3
2	Material Handling: (1) Need of material handling. (2) Types of material handling equipment such as Hoisting equipment, Conveying equipment, Surface and Overhead equipments, Earth Moving machineries and Construction machineries. (3) Criteria for selection of material handling equipment. And Factors affecting selection of such equipments.	4
3	Properties of Gases: Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, Relation between Cp and Cv, Various non flow processes like constant volume process, constant pressure process, Isothermal process, Adiabatic process, Poly-tropic process.	6

	Properties of Steam: Steam formation, Types of Steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of Steam tables, steam calorimeters	
4	Heat Engines: Heat Engine cycle and Heat Engine, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles	5
5	Steam Boilers: Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox boiler, Functioning of different mountings and accessories	5
6	Internal Combustion Engines: Introduction, Classification, Engine details, four-stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, Efficiencies	6
7	Pumps: Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming. Air Compressors: Types and operation of Reciprocating and Rotary air compressors.	5
8	Refrigeration & Air Conditioning: Refrigerant, Vapor Compression refrigeration system, vapor absorption refrigeration system, Domestic Refrigerator, Window and split air conditioners	5
9	Couplings, Clutches and Brakes: Construction and applications of Couplings(Box; Flange; Pin type flexible; Universal and Oldham), Clutches (Disc and Centrifugal), and Brakes (Block; Shoe; Band and Disc)	4
10	Transmission of Motion and Power: Belt drive, Chain drive, Friction drive, Gear drive	3

Books Recommended:

1. Elements of Mechanical Engineering by N M Bhatt and JR Mehta, Mahajan Publishing House
2. Basic Mechanical Engineering by Pravin Kumar, Pearson
3. Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publication New Delhi
4. Elements of Mechanical Engineering by Sadhu Singh S. Chand Publication
5. Introduction to Engineering Materials by B.K.Agrawal Tata McgrawHill Publication, New Delhi

E-resources:-

1. libguides.wpi.edu/mechanicalengineering
2. paniit.iitd.ac.in/indest/index.php/e-resourc
3. krc.gitam.edu/about/e-resources
4. [NPTL resources](#)

Practical List:-

Sr. No.	Practical
1	To understand construction and working of various types of boilers.
2	To understand construction and working of different boiler mountings and accessories
3	To determine brake thermal efficiency of an I. C. Engine.
4	To understand construction and working of different types of air compressors
5	To demonstrate vapor compression refrigeration cycle of domestic refrigerator OR window air conditioner OR split air conditioner.