

Subject Code: 2ET4030102	Subject Title: Fundamental of Mechanical Engineering
Pre-Requisite	--

Rational

In the era of technology integration, it has become unavoidable to possess the basic knowledge of various engineering disciplines. The advancement in technology is the best on multi technology integration and hence in performance too. The motive of this subject is to enhance the knowledge & skill level in the inter disciplinary area to strengthen the present practices. This course is specially designed with a view to impart basic knowledge of other conventional disciplines (other than own discipline).

This course mainly encompasses the major and general areas of mechanical engineering which are being used by common man to large industrial sectors. A technician has to know many times the implications and knowledge of other disciplines so as to conclude the solution of his/her own branch tasks. The study of basic concepts of Fundamentals of Mechanical Engineering will help the students understanding engineering subjects where the emphasis is laid on the application of these field.

Course objective

1. To perform the simple tasks related to mechanical engineering so as to reduce the dependency on mechanical engineers and to achieve the reliability and quality of own branch's tasks.

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme (Hours/ week)				Evaluation Scheme (Marks)				Total (Marks)
Lecture	Tutorial	Practical	Credit	Theory		Practical		150
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment	
2	-	2	3	60	40	20	30	

Subject Contents

SR. NO.	TOPIC	TOTAL HOURS	WEIGHTAGE (%)
1.	Introduction. Introduction of mechanical engineering, Use of mechanical engineering, Items in general use, Pipes and pipe fittings, Hand and power tools.	4	15%

2.	Power transmission & safety. Power transmission, Types(E.G. Belt, Rope, Chain and Gear drive) and applications of couplings in power transmission, Causes and remedies of general accidents in power transmission, Safety norms to be followed for preventing accident sand damage in power transmission, Safety norms to be followed in mechanical based industries / shop floors.	6	20%
3.	Steam generation and prime movers. Explain working of boilers and prime movers. Steam:-Generation Process and Properties.	4	15%
4.	Joining Process on Materials. Welding. a. Types. b. Working setup of arc and gas welding, accessories and consumables. c. Types of work carried out by welding. d.Precautions and safety during arc and gas welding. Brazing and Soldering. a. General set up. b. Applications.	4	15%
5.	Internal combustion engines. Internal combustion engines, Working of petrol engine, diesel engine and gas engine, Performance parameters, Main parts and functions, Applications, Common troubles and remedies.	6	20%
6.	Hydraulic and pneumatic devices. Concept of theory of fluid flow, General properties of fluids, Pump, Water turbines, Common troubles and remedies of water turbine, Air compressor, Other hydraulic/pneumatic/hydro-pneumatic equipments. Text: Single line Text, Multiline text. Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview	4	15%

List of Practical/Experiments:

1. Demonstrate use of various mechanical items, spanners, hand tools and power tools. Student will prepare the report which will include sketches of each item demonstrated with specifications and applications.
2. Demonstrate various power transmission methods. Also demonstrate items used in power transmission with material of construction and specifications of each item. Student will prepare the report on working principles, set up sketch, working parameters, specifications of items and safety norms followed.
3. Student will calculate velocity ratios for belt drives and number of teeth for gear train based on given data.
4. Study boiler, boiler mountings and boiler accessories.
5. Perform and study the effect of variation of load on fuel consumption of an I.C. engines (On petrol engine). Also locate the faults in a given petrol engine and suggest remedial measures.
6. Perform and study the effect of variation of load on fuel consumption of an I.C. engines (On diesel engine). Also locate the faults in a given diesel engine and suggest remedial measures.
7. Demonstrate a water-turbine.
8. Perform test on Air compressor.
9. Perform test on centrifugal pump. Also find fault and remedies for Centrifugal pump.

Course Outcome:

The students will be able to

1. Understand the basic concept of Mechanical Engineering.
2. Know about the power transmission system and their applications.
3. Explore different prime movers and about internal combustion engine.
4. Understand the basic concept of fluid flow, pump and water turbine.

List of References:

1. Theory of Machines, R. S. Khurmi and J. K. Gupta, S. Chand
2. Heat Engine, Shah & Pandya, Charotar Publishing House
3. Hydraulic machines, Jagdish lal, Metropolitan Book Company
4. Hydraulics, R. C. Patel, Acharya Book Depot
5. Pumps operation and Maintenance, Tyler and Hicks, Tata McGraw-Hill

List of Software/Learning Websites:

- a. <http://www.youtube.com/watch?v=1cFu2bkZ7Vw&feature=related> (ic engine)
- b. http://www.youtube.com/watch?v=pCg1lh_oVSA (pump)
- c. <http://www.youtube.com/watch?v=V3aPHmZ97yM&feature=related> (pump)
- d. <http://www.youtube.com/watch?v=8GSUgwombdE&feature=related> (boiler)
- e. <http://www.youtube.com/watch?v=8GSUgwombdE&feature=related> (boiler)
- f. <http://homepages.cae.wisc.edu>
- g. <http://en.wikipedia.org/wiki/Boiler>
- h. <http://www.youtube.com/watch?v=ftdgB93QOD8&feature=related> (gear box)

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Introduction of mechanical engineering, Use of its	2 Understanding
CLO2	To reduce the dependency on mechanical engineers	2 Understanding, 3 Applying
CLO3	Power transmission and its applications	1 Remembering 3 Applying
CLO4	Working of boilers and prime movers.	1 Remembering 2 Understanding
CLO5	Understanding of welding process on materials before studying their Application in manufacturing.	5,3, 4 Evaluate, Applying, Analyze
CLO6	Internal combustion engines its application	3 Applying, 2 Understanding

Course Learning Outcomes	Program Outcomes(Pos)												Program Specific Outcomes(PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	H														
CLO2	M	M													
CLO3	M						M								
CLO4	L					L									
CLO5	H	L		M			M								
CLO6	M	L		M								L			

H: High, M: Medium, L: Low