Subject Code: 1ET4010201	**Subject Title: Basic Mechanical Engineering**
Pre-Requisite	--

Rationale

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.

Course Objective:

1. Comprehend the need of various sections in a workshop
2. Demonstrate observance of the safety consciousness and good housekeeping in a workshop
3. Follow the standard procedure for workshop practice.
4. Select and use appropriate materials for various sections of a workshop.
5. Use various tools, instruments and machines for different operations in fitting, smithy, carpentry, pipefitting and metal joining shop.
6. 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 Scheme (Hours per week)				**Evaluation Scheme (Marks)**				Total (Marks)
Lecture	Tutorial	Practical	Credit	Theory		Practical		
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment	
-	1	2	2	-	-	-	50	50

DETAILED COURSE CONTENTS:

SR. NO.	TOPIC	TOTAL HOURS
1	**Introduction** 1.1 Introduction of mechanical engineering. 1.2 Use of mechanical engineering : i: In day to day life. ii: Interdisciplinary use. 1.3 Items in general use- identification criteria, major types, specifications and uses : such as bolts, nuts, washers, bearings, bushes, belts, springs, levers, couplings, brakes, screws, rivets, keys, o' rings, oil seals, gears, pulleys, shafts, axles, etc. 1.4 Pipes and pipe fittings- Types, specifications and uses of pipes and pipe fittings. 1.5Hand and power tools: i: Types, specifications and uses of spanners (such as fix, ring, box, pipe, allen, adjustable, etc.). ii: Types, specifications and uses of hand tools (such as pliers, screw drivers, saws, hammers, chisels, cutters, planes, etc.). Types, specifications and uses of power tools(drill, chipper, etc.)	3
2	**Power Transmission & Safety** 2.1 Power transmission: i. Importance. ii. Modes (belt drives, rope drives, chain drives and gear trains). iii. Types of belts. iv. Gear train-concept, transmission ratio. v. Applications. 2.2 Types and applications of couplings in power transmission. 2.3 Causes and remedies of general accidents in power transmission. 2.4 Safety norms to be followed for preventing accidents and damage in power transmission. 2.5 Safety norms to be followed in mechanical based industries / shop floors.	4
3	**Internal Combustion Engines (I.C. Engines)** 4.1 Internal combustion engines. i: Meaning. ii: Classification. 4.2 Working of petrol engine, diesel engine and gas engine. 4.3 Performance parameters. 4.5 Main parts and functions. 4.6 Applications. Common troubles and remedies.	2
4	**Hydraulic and Pneumatic devices** 5.1 Concept of theory of fluid flow. 5.2 General properties of fluids. 5.3 Pump. i. Working principle. ii. Types. iii. Working of centrifugal and reciprocating pumps. iv. Performance parameters. v. Main parts of pumps and their functions. vi. Common troubles and remedies.	3

	5.4 Water turbines-working principle, types and applications. 5.5 Common troubles and remedies of water turbine. 5.6 Air compressor. i. Working principle. ii. Types. iii. Performance parameters. iv. Applications. 5.7 Other hydraulic/pneumatic/ hydro-pneumatic equipments. i. Principle of working-hydraulic lift, hydraulic pump, hydraulic power pack, hydraulic jack. ii. Applications of above equipments.	
5	**Material Handling** 6.1 Need of material handling. 6.2 Types, principle of working and applications of material handling equipments. i. Hoisting equipments. ii. Conveying equipments. iii. Surface & overhead equipments. iv. Earth moving machineries. v. Construction machineries.	**2**

SUGGESTED LIST OF EXERCISES / PRACTICALS

SR. NO.	TOPIC	PRACT. HOURS
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	04
2	a: 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. b: Student will calculate velocity ratios for belt drives and number of teeth for gear train based on given data	04
3	Study boiler, boiler mountings and boiler accessories.	04
4	Study of Internal Combustion engine 2-stroke, 4-stroke petrol & Diesel Engine	06
5	Demonstrate a water-turbine And Air compressor	04
6	Demonstrate of centrifugal pump. Also find fault and remedies for centrifugal pump	04
7	Study various types of materials handling equipments.	02
	TOTAL	28

REFERENCE BOOKS:

1. Workshop Familiarization E. Wilkinson
2. Workshop Technology - I Hazra and Choudhary
3. Workshop Technology - I W.A.J. Chapman
4. Sheet metal shop practice Bruce & Meyer
5. Workshop Technology Vol. I & II Gupta & Kaushik

List of Software/Learning Websites: ---

http://www.youtube.com/watch?v=1cFu2bkZ7Vw&feature=related (ic engine)

http://www.youtube.com/watch?v=pCg1Ih_oVSA (pump)

http://www.youtube.com/watch?v=V3aPHmZ97yM&feature=related (pump)

http://www.youtube.com/watch?v=FENCiA-EfaA&feature=related (impeller)

http://www.youtube.com/watch?v=TBdUcGYo7XA (gas turbine)