Kerala Technological university KTU First year B.tech Syllabus for**ME100 Basics Of Mechanical Engineering**

Course No. : ME100

Course Name: Basics Of Mechanical Engineering
L-T-P-Credits: 2-1-0-3

Year of Introduction: 2015
Course Objectives:

To expose the students to the thrust areas in Mechanical Engineering and their relevance by covering the fundamental concepts.

Syllabus:

Thermodynamics, laws of thermodynamics, implications, cycles, energy conversion devices, steam and water machines, engines, turbo machines, refrigeration and air conditioning, power transmission devices in automobiles, latest trends, engineering materials and manufacturing processes, types of materials, alloys, shape forming methods, machine tools.

Expected outcome:

The student will be able to understand the inter dependence of the thrust areas in Mechanical Engineering and their significance leading to the development of products, processes and systems.

Text Book:

1. Fundamentals Of Mechanical Engineering – G S Sawhney– Phi
2. Basic Mechanical Engineering – Balachandran Owl Books
3. Basic Mechanical Engineering – J Benjamin Pentex Books

References:

1. An Introduction To Mechanical Engineering Part I – Michael Clifford, Kathy Simmons And Philip Shipway. Crc Press
2. Basic And Applied Thermodynamics – P. K Nag – Tata Mcgraw-Hill
3. Basic Mechanical Engineering - Pravin Kumar
4. Fundamentals Of Ic Engines- Gill, Smith And Zuirys - Oxford And Ibh Publishing Company Pvt. Ltd. New Delhi. Crouse, Automobile Engineering, Tata Mc-Graw-Hill, New Delhi.
5. Roy And Choudhary, Elements Of Mechanical Engineering, Media Promoters & Publishers Pvt. Ltd., Mumbai.
6. Automobile Engineering, Crouse- Tata Mc-Graw-Hill, New Delhi

Module 1 Contents

Thermodynamics: Laws of Thermodynamics, significance and applications of laws of thermodynamics; entropy, available energy; Clausius inequality; principle of increase of entropy; Ideal and real gas equations; Analysis of Carnot cycle, Otto cycle , Diesel cycle and Brayton cycle; Efficiency of these cycles.

Module 2 Contents

Energy conversion devices: Boilers, Steam turbines, Gas turbines and Hydraulic turbines; Working principle of two stroke and four stroke I.C. Engines (Diesel and Petrol), Reciprocating and centrifugal pumps, rotary pumps, reciprocating and centrifugal compressors, fans, blowers, rotary compressors; Air motor.

Module 3 Contents

Refrigeration and Air Conditioning: Vapour compression and absorption refrigeration systems, COP, Study of household refrigerator, Energy Efficiency Rating, Psychrometry, Psychrometric processes, window air conditioner, split air conditioner. Ratings and selection criteria of above devices. Refrigerants and their impact on environment.

Module 4 Contents

Engines and Power Transmission Devices in Automobiles, Different types of engines used in automobiles, types of automobiles; major components and their functions (Description only); Fuels; Recent developments: CRDI, MPFI, Hybrid engines. Belts and belt drives; Chain drive; Rope drive; Gears and gear trains; friction clutch (cone and single plate), brakes (types and applications only); Applications of these devices.

Module 5 Contents

Materials and manufacturing processes: Engineering materials, Classification, properties, Alloys and their Applications; Casting, Sheet metal forming, Sheet metal cutting, Forging, Rolling, Extrusion, Metal joining processes - Powder metallurgy.

Module 6 Contents

Machine Tools (Basic elements, Working principle and types of operations) Lathe – Centre Lathe, Drilling Machine – Study of Pillar drilling machine, Shaper, planer, slotter, Milling Machine, Grinding machine, Power saw; Introduction to NC and CNC machines.