



Course Syllabus
Gyanmanjari Institute of Technology
Semester-1

Subject: Introduction to Mechanical Engineering - BETME11301

Type of course: Major

Prerequisite: Basic knowledge of Physics

Rationale:

In today's world, basic knowledge of Mechanical engineering is required for engineers. Now Bachelor in Technology degree holder expected to look after many activities related with mechanical Engineering. Students can understand the basic knowledge of various filed of mechanical Engineering such like Thermal Engineering, I. C. Engine, various power generation methods, various mechanical machines, etc. Also, student can aware about the recent trends of the field and can think about the future scenario. This course is designed in such a way that student can perform practical of the various equipment and develop their skill about the field and for the industry also. Student can learn also how mechanical engineering is useful in day-to-day life of human being.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	Theory Marks		Practical Marks		
			ESE		MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.



Continuous Assessment:

(For each activity maximum-minimum range is 5 to 10 marks)

Sr. No	Active Learning Activities	Marks
1	Poster Presentation Prepare a Poster on engine specification of any automobile vehicle and upload on Moodle.	05
2	Survey Survey for economic analysis of any solar plant on given parameters and upload the calculation sheet on Moodle.	10
3	Quiz Unit wise Quiz of 10 MCQs.	10
4	Report Writing Prepare a report in 150 words on the topic (recent trend) assigned by faculty and upload on Moodle.	5
Total		30

CourseContent:

Unit No	Course content	Hrs	% Weightage
1	Chapter-1 : Introduction to Thermodynamics: Concept of heat energy, Thermodynamics system, change of state, path, process, cycle, internal energy, Enthalpy, zeroth of thermodynamics, First law of thermodynamics and its application Chapter-2 : Introduction to Boiler and Thermal Power plant: Introduction to Boiler, Classification, Mounting and accessories of boiler, Elements of Thermal Power Plant, Layout of Thermal Power plant	15	25%
2	Chapter-3 : Properties of gas and steam: Bayle's law, Charles's law, Gay-Lussac's law, Avogadro's law, characteristic equation, gas constant, relation between CP and CV, Various Non flow process, Steam formation, types of steam, Enthalpy, specific volume, Internal energy and dryness fraction of steam, application with steam table	17	25%



3	<p>Chapter-4 : I.C. Engine: Introduction, classification, Working of Two stroke and four stroke engines, Performance parameters, Engine specification of automobile vehicle</p> <p>Chapter-5 : Introduction to Mechanical Machines: Introduction to prime mover and machine, Basics and simple working of compressor, pump, Turbine, Refrigerator, Air-conditioner, Manufacturing machines (Lathe, Milling, Drilling etc.)</p>	15	25%
4	<p>Chapter-6 : Power Generation: Power Generation by Hydroelectric power plant, solar power plant, wind mill, geothermal power plant, atomic power plant.</p> <p>Chapter-7 : Recent Trends in Mechanical Engineering: Green Engineering, Automation in Manufacturing, additive manufacturing, Robotics</p>	13	25%

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	40%	40%	-	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Understand basic knowledge of Thermodynamics.
CO2	Understand behavior of gas and steam for engineering application.
CO3	Learn actual power generation from thermal power plant.
CO4	Learn basic knowledge of working of I.C. Engine and various Machines.
CO5	Understand recent trend of Mechanical Engineering.



List of Practical

(Minimum-10practical):

Sr. No	Descriptions	Unit No	Hrs
1	To study about the basic thermodynamics	1	2
2	To calculate the gas behaviour for given situation	2	2
3	To perform the difference between sensible heat and latent heat	2	2
4	To study about various types of boiler and IBR rules	1	4
5	To calculate the Efficiency of Petrol Engine	3	4
6	To calculate the Efficiency of Diesel Engine	3	2
7	To analyze the performance of Power Plant	4	4
8	To study about working principle of various Mechanical Machines	3	4
9	To analyze application of Renewable energy sources in power plant	4	4
10	To Discuss about recent trends in Mechanical Engineering	4	2
		Total	30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.



Reference Books:

- [1] Fundamental of Mechanical Engineering, G. S. Sawhney, Prentice Hall of India Publication, New Delhi
- [2] Engineering thermodynamics, P.K. Nag, McGraw-Hill Education
- [3] Automobile Engineering, K. K. Jain, R. B. Asthana, Tata McGraw-Hill Publishing Company Limited
- [4] Industrial robotics: technology, programming and application, Groover, Mikell P., Mitchell Weiss, and Roger N. Nagel, McGraw-Hill Higher Education

