

Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Civil Engineering
BME103 - BASIC MECHANICAL ENGINEERING

Course (catalog) description

The program educational objectives (PEOs) for the mechanical-engineering program are to educate graduates who will be ethical, productive, and contributing members of society.

The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

The ability to apply principles of engineering, basic science, and mathematics to design and realize physical systems, components, or processes

Compulsory/Elective course : Compulsory

Credit & Contact hours : 3 & 30hour

Course Coordinator : **Mr.Karthick**

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in)	Consultation
Mr.Karthick	First year Civil			.mech:@ bharathuniv.ac.in	9.00-9.50AM

Relationship to other courses

Pre –requisites : Basic mechanical

Assumed knowledge : By understanding about mechanical knowledge in various fields

Following courses : Mechanical Engineering

Syllabus Contents

UNIT I ENERGY RESOURCES AND POWER GENERATION 6

Renewable and Non-renewable resources- solar, wind, geothermal, steam, nuclear and hydro power plants Layout, major components and working. Importance of Energy storage, Environmental constraints of power generation using fossil fuels and nuclear energy.

UNIT II IC ENGINES 6

Classification, working principles of petrol and diesel engines- two stroke and four stroke cycles, functions of main components of I.C engine. Alternate fuels and emission control.

UNIT III REFRIGERATION AND AIR-CONDITIONINGSYSTEM 6

Terminology of Refrigeration and Air-Conditioning, Principle of Vapor Compression & Absorption system- Layout of typical domestic refrigerator- window & Split type room air conditioner.

UNIT IV MANUFACTURING PROCESSES

6

description of Mould makes and casting process, Metal forming, Classification types of forging, forging operations, Brief description of extrusion, rolling, sheet forging, and drawing. Brief description of welding, brazing and soldering. Principal metal cutting processes and cutting tools, Brief description of Centre lathe and radial drilling machine.

UNIT V MECHANICAL DESIGN

6

Mechanical properties of material-Yield strength, ultimate strength, endurance limit etc., Stress-Strain curves of materials. Stresses induced in simple elements. Factor of safety - Design of Shafts and belts. Types of bearings and its applications. Introduction to CAD/CAM/CIM & Mechatronics

Total : 30 hr

TEXTBOOKS: 1. T.J.Prabhuetal, “Basic Mechanical Engineering“, SciTech Publications(p)Ltd,2000

REFERENCES: 1. NAGPAL,G.R,“PowerplantEngineering”,KhannaPublishers,2004.

2. RAO.P.N,“ManufacturingTechnology”,TataMcGraw-HillEducation,2000.

3. Kalpakjian,“ManufacturingEngineeringandTechnology”,AdissoWesleypublishers,1995.

4. Ganesan.V,“Internalcombustionengines”,TataMcGraw-HillEducation,2000.

5. C.P.Arora, “Refrigeration and Air Conditioning”,TataMcGraw-HillEducation,2001.

6. V.B.Bhandari, ”Design of Machine elements”, Tata McGraw-HillEducation,2010.

Computer usage: Animation Videos

Professional component

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	100%
Professional subject	-	0%

Broad area: Mechanical**Test Schedule**

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1 st week	Session 1 to 10	2 Periods
2	Cycle Test-2	September 2 nd week	Session 11 to 20	2 Periods
3	Model Test	October 2 nd week	Session 1 to 30	3 Hrs
4	University Examination		All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

Familiarize the students with the Basics and fundamental concepts of Engineering and to highlight the approaches in organization behavior	Correlates to program outcome		
	H	M	L
1. An ability to apply knowledge of mathematics	d	a,b,c,e,g	j,k
2. An ability to apply knowledge of science, and engineering	a,d,e	b,c,g	j,k
3. Ability to design and conduct experiments, as well as to analyze and interpret data.	a,d,e	b,c,g	j,k
4. An ability to function on multi-disciplinary teams	a,d	b,c,g	j,k
5. To provide basic Knowledge of basic manufacturing process.	a,d	b,c,g	j,k
6. Ability to identify, formulate, and solve engineering problems	a,d	b,g	j,k

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Session	Topics	Problem Solving (Yes/No)	Text / Chapter
UNIT I ENERGY RESOURCES AND POWER GENERATION			
1.	Renewable and Non-renewable resources- solar power plants Layout	No	Unit I T1/R1
2.	Wind, geothermal, steam power plants Layout	No	
3.	Nuclear and hydro power plants Layout	No	
4.	Major components and working of Power plant	No	
5.	Environmental constraints of power generation using fossil fuels	No	
6.	Nuclear energy.	No	
UNIT II IC ENGINES			
7.	Classification of I.C Engines	No	Unit II T1/R4
8.	Working principles of Petrol Engines	No	
9.	Working principles of Diesel Engines	No	
10.	Two stroke and four stroke cycles	No	
11.	Functions of main components of I.C engine	No	
12.	Alternate fuels and emission control	No	
UNIT III REFRIGERATION AND AIR-CONDITIONING SYSTEM			
13.	Terminology of Refrigeration and Air-Conditioning	No	

14.	Principle of Vapor Compression Refrigeration system	No	Unit III T1/R5
15.	Principle of Vapor Absorption Refrigeration system	No	
16.	Layout of typical domestic refrigerator	No	
17.	Layout of window type room air conditioner	No	
18.	Layout of Split type room air conditioner	No	
UNIT IV MANUFACTURING PROCESSES			Unit III T1/R5
19.	description of Mould makes and casting process	No	
20.	Metal forming, Classification types of forging, forging operations	No	
21.	Brief description of extrusion, rolling, sheet forging, and drawing	No	
22.	Brief description of welding, brazing and soldering	No	
23.	Principal metal cutting processes and cutting tools	No	
24.	Brief description of Centre lathe and radial drilling machine.	No	Unit III T1/R5
UNIT V MECHANICAL DESIGN			
25.	Mechanical properties of material-Yield strength, ultimate strength, endurance limit etc	No	
26.	Stress-Strain curves of materials	No	
27.	Stresses induced in simple elements, Factor of safety	No	
28.	Design of Shafts and belts	Yes	
29.	Types of bearings and its applications	No	
30.	Introduction to CAD/CAM/CIM & Mechatronics		

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	5%
Assignment	-	5%
Attendance	-	10%
Final exam	-	70%

Prepared by
Mr.S.THIRUPPATHIRAJA

Dated :

Addendum

ABET Outcomes expected of graduates of B.Tech / Civil / program by the time that they graduate:

- a) The ability to apply knowledge of mathematics, science, and engineering fundamentals.
- b) The ability to identify, formulate and solve engineering problems.
- c) The ability to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- d) The ability to design and conduct experiments, as well as to analyze and interpret data
- e) The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- f) The ability to apply reasoning informed by the knowledge of contemporary issues.
- g) The ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- h) The ability to understand professional and ethical responsibility and apply them in engineering practices.
- i) The ability to function on multidisciplinary teams.
- j) The ability to communicate effectively with the engineering community and with society at large.
- k) The ability in understanding of the engineering and management principles and apply them in project and finance management as a leader and a member in a team.
- l) The ability to recognize the need for, and an ability to engage in life-long learning.

Program Educational Objectives

PEO1: PREPARATION

Civil Engineering graduates will have knowledge to apply the fundamental principles for a successful profession and/or for higher education in Civil Engineering based on mathematical, scientific and engineering principles, to solve realistic and field problems that arise in engineering and non engineering sectors

PEO2: CORE COMPETENCE

Civil Engineering graduates will adapt to the modern engineering tools and construction methods for planning, design, execution and maintenance of works with sustainable development in their profession.

PEO3: PROFESSIONALISM

Civil Engineering Graduates will exhibit professionalism, ethical attitude, communication and managerial skills, successful team work in various private and government organizations both at the national and international level in their profession and adapt to current trends with lifelong learning.

PEO4: SKILL

Civil Engineering graduates will be trained for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS

Civil Engineering graduates will be installed with ethical feeling, encouraged to make decisions that are safe and environmentally-responsible and also innovative for societal improvement.

BME103 - BASIC MECHANICAL ENGINEERING

Course Teacher	Signature
Mr.S.THIRUPATHIRAJA	

Course Coordinator

HOD/Civil