2023
TP-153

Course Specification
(Bachelor)

Course Title:	Mechanical Engineering Design(2)
Course Code:	342-MEC-3
Program:	Bachelor of Science in Engineering
Department:	Mechanical Engineering
College:	College of Engineering
Institution:	Najran University
Version:	1.0
Last Revision Date:	27 February 2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Fourth Year \ Level 8)					
4. Course general Description:					
Shafts: Stress in Shafts, Kinds and Causes of Failure, Design Calculation for Strength and Deflection, Short and Line Shafts, Fatigue Consideration, Types of Couplings and their Design, Materials for Shafts. Bearings: Rolling and Sliding Bearings, Nomenclature of Journal Bearings, Lubrication in Loaded Journals, Non-Dimensional Characteristic Numbers and their Application in Design, Thrust Bearings, Friction in Following Contact Bearings, Equivalent Static Load. Power Transmission Systems: Types of Drives, Comparison, Mechanical Drives, Belt Drives, Velocity Ratio in Belt Drives, Selection of Belt Materials, Surface Strength Against Bending, Design of Chain Drives. Design of Gear Drives, Gear Box, Sliding Mesh Gearing, Design for Spur Gear, Materials for Gear Standards, Lubrication and Efficiency of a Gear Drive					
5. Pre-requirements for this course (if any)**:**					
341-MEC-3 (MECHANICAL ENGINEERING DESIGN (1))					
6. Co-requisites for this course (if any)**:**					
NIL					
7. Course Main Objective(s):					
1.Design shafts and couplings under different working conditions. 2.Design different types of bearings for static and dynamic loading. 3.Design the power transmission system using gears, pulleys etc. 4.Identify the different materials for designing standard gears and belt drives. 5.Design different types of gears with varying power requirements and working environments.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	15
3.	**Field**	
4.	**Tutorial**	15
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Learning the fundamentals and applying principles	1	TS:1-Interactive lectures using PowerPoint slides TS:2- Engaging the students in problem-based learning through tutorials TS: 3 – Associating the topics in each chapter with the CLO.	-Test performance evaluation -Evaluation of participation in discussion and group assignments

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			TS:4 – Conducting quizzes from each chapter TS:5 – Giving more example programs in the lecture TS: 6 – Discussion with the students in the class hours	
1.2	Apply the knowledge for the Design of shaft, bearing, and gears.	7	TS:1-Interactive lectures using PowerPoint slides TS:2- Engaging the students in problem-based learning through tutorials TS: 3 – Associating the topics in each chapter with the CLO. TS:4 – Giving more assignment from each chapter TS:5 – Giving more example programs in the lecture TS: 6 – Discussion with the students in the class hours	-Test performance evaluation -Evaluation of participation in discussion and group assignments
2.0	**Skills**			
2.1	Revision and recapitulating in the beginning of class and asking students to recall the contents of previous class and do the experiments	6	TS:1-Interactive lectures using PowerPoint slides TS:2- Engaging the students in problem-based learning through tutorials TS: 3 – Associating the topics in each chapter with the CLO.	•Locally Developed Exams such as Quiz, Mid & Final Exams with scoring rubrics •Assignments involving critical and logical thinking questions

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			TS:4 – Conducting quizzes from each chapter TS: 5 – Discussion with the students in the class hours	•Quizzes
3.0	**Values, autonomy, and responsibility**			
3.1	Motivating through Group discussions among the students and complete all assignments in due time	4	TS:1-Interactive lectures using PowerPoint slides TS:2- Engaging the students in problem-based learning through tutorials TS: 3 – Associating the topics in each chapter with the CLO. TS:4 – Conducting midterm and Final Exam from each chapter TS:5 – Giving more example programs in the lecture TS: 6 – Discussion with the students in the class hours	Locally Developed Exams such as Quiz, Mid & Final Exams with scoring rubrics •Assignments involving critical and logical thinking questions •Quizzes

C. Course Content

No	List of Topics	Contact Hours
1.	Design shafts and couplings under different working conditions	12
2.	Design different types of bearings for static and dynamic loading	12
3.	Power transmission system using gears and pulleys	12
4.	Different terminologies related to gears	12
5.	Types of gears with varying power requirements and working environments.	12
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	1-10	10%
2.	Quizzes	1-10	10%
3.	Mid-term	4 & 8	20%
4.	labs	1-10	10%
5.	Final exam	15	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Mechanical Engineering Design by J. E. Shigley, C. R. Mischke & R. G. Buyres, McGraw Hill,2015
Supportive References	1.Machine Design by Paul H. Black and O. Eugene Adams, Auckland, McGraw hill Publications, 1968 2.Design of Machine Elements by V. B. Bhandari, Tata McGraw Hill Publications, 2010
Electronic Materials	Online custom books
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and laboratories
Technology equipment (projector, smart board, software)	--
Other equipment (depending on the nature of the specialty)	--

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Program Leaders and Peer Reviewer	Direct, Indirect
Effectiveness of Students assessment	Students & Faculty	Direct and Indirect
Quality of learning resources	Students & Faculty	Direct and Indirect
The extent to which CLOs have been achieved	Students & Faculty	Direct and Indirect
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT OF MECHANICAL ENGINEERING
REFERENCE NO.	
DATE	27/02/2024