Course Specification

(Bachelor)

Course Title:	Dynamics
Course Code:	ME 2217
Program:	Bachelor in Mechanical Engineering
Department:	Mechanical Engineering
College:	Engineering
Institution:	King Khalid University
Version:	1
Last Revision Date:	05/03/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (2)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (9/5)					
4. Course general Description:					
Dynamics is the study of bodies in motion. It is concerned with describing motion and explaining its causes. It includes Kinematics and Kinetics. Kinematics describes the motion of objects without considering the forces causing that motion. It deals with concepts like displacement, velocity, and acceleration. Kinetics focuses on the forces and torques acting on bodies, leading to their motion. Dynamics is crucial for designing machines, analyzing structures, and predicting how objects move under various forces. It provides a foundation for understanding celestial mechanics, fluid dynamics, and electromagnetism.					
5. Pre-requirements for this course (if any)**:**					
ME 2213 Statics					
6. Co-requisites for this course (if any)**:**					
NA					
7. Course Main Objective(s):					
Upon completion of this course, students will be able to: • State the principles of dynamics and outline the principles for the idealizations of Statics and Dynamics • Apply the laws and principles of dynamics to solve engineering problems • Evaluate and illustrate basic engineering problems independently or in a group					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

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

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

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define the principles for the idealizations of Statics and Dynamics problems	**KLO1**	• Lectures • E learning • Tutorials • Self-learning	• Short quizzes • Exams • Assignments
1.2	Describe kinetics of particles using Newton's law, work, and energy, impulse and momentum and impact principles	**KLO1**	• Lectures • E learning • Tutorials	• Short quizzes • Exams • Assignments
...				
2.0	**Skills**			
2.1	Apply newtons laws motions to dynamics problems	**KLO1**	• Lectures • E learning • Tutorials	• Assignments • Mid and Final exams • Tutorials
2.2	Analyze kinetics and kinematics of rigid bodies in plane motion	**KLO3**	• Lectures • E learning • Tutorials	• Assignments • Mid and Final exams

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
				• Tutorials
2.3	Develop Freebody diagrams to evaluate problems of particle and rigid body dynamics	**KLO3**	• Lectures • E learning • Tutorials	• Assignments • Mid and Final exams • Tutorials
3.0	**Values, autonomy, and responsibility**			
3.1	**NA**			
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction	2
2.	Center of gravity and Moment of Inertia	2
3.	Moment of Inertia (Tutorials)	2
4.	Kinematics of Particles	2
5.	Kinematics of Particles-Rectilinear Motion	2
6.	Kinematics of Particles-Projectiles	2
7.	Kinematics of Particles-Curvilinear Motion	2
8.	Kinetics of Particles - Force-and-Acceleration	4
9.	Kinetics of Particles - Work-and-Energy	2
10.	Kinetics of Particles - Impulse-and-Momentum	2
11.	Planar Kinematics of Rigid Bodies	2
12.	Planar Kinetics of Rigid Bodies	4
13.	Free Vibration of Particles	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exams (Mandatory)	5,10	30% (30 Marks)
2.	Assignments	4,8	10% (10 Marks)
3.	Quiz	5,9	10% (10 Marks)

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4.	Tutorial/Homework	12	10% (10Marks)
5.	Final Exam	15	40% (40 Marks)
...			

*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	• Beer, Ferdinand Pierre Beer, Elwood Russell Johnston, Phillip J. Cornwell, " Vector Mechanics for Engineers: Dynamics, Edition 9, McGraw-Hill, 2010, ISBN: 0071311084, 9780071311083 • R. C. Hibbeler, Engineering Mechanics: Dynamics, SI Units, Pearson Education, 2023 (9781292451930, 1292451939)
Supportive References	• Anthony Bedford, Wallace Fowler, Engineering Mechanics: Statics & Dynamics 5th Edition, Pearson; 5th edition (July 18, 2007) ISBN: (0136142257, 978-0136142256) • Robert W. Soutas-Little, Daniel J. Inman, Daniel S. Balint, "Engineering Mechanics: Dynamics", Computational Edition, Volume 10, Cengage Learning, 2008, ISBN:0495438170, 9780495438175
Electronic Materials	**NA**
Other Learning Materials	Lecture Handouts and Tutorials

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with 30 seats
Technology equipment (projector, smart board, software)	Projector and smart board
Other equipment (depending on the nature of the specialty)	Laptop / Computer system Multimedia teaching Calculators

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect (through course evaluation survey)
Effectiveness of Students assessment	Faculty and Quality Committee	Direct (through Rubrics)
Quality of learning resources	Students and faculty	Indirect (through university experience and mission-vision-PEO surveys)
The extent to which CLOs have been achieved	Quality Committee	Learning Outcome Assessment Review
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	