



Course Specification

(Bachelor)

Course Title: **Dynamics**

Course Code: **COE2103**

Program: **Construction Engineering**

Department: **Civil and Environmental Engineering Department**

College: **College of Engineering and Computing in Al-Qunfudhah**

Institution: **Umm Al-Qura University**

Version: **4th**

Last Revision Date: **March 2025**



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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: (4/2)

4. Course General Description:

This course covers the study of kinematics of a particle, rectilinear and curvilinear motion, and Kinetics of a Particle focusing on force and acceleration. Furthermore, Newton's Second Law of motion, work, energy, and kinematics of particles, i.e., impulse and momentum, are all included. The students are introduced to the kinematics of a Rigid Body, translation, and 3 rotational motions, as well as rigid body dynamics. The topics are linked to practical applications to improve students' reasoning skills.

5. Pre-requirements for this course (if any):

Statics (COE2102)

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

The main purpose of this course is to enable the students to relate the forces and moments acting on a body to the resulting motion, and to develop solution procedures using basic principles of mechanics.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100 %
2	E-learning	None	None
3	Hybrid	None	None



No	Mode of Instruction	Contact Hours	Percentage
	<ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning	None	

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	None
3.	Field	None
4.	Tutorial	None
5.	Others (specify)	None
Total		45

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Know the fundamentals of engineering dynamics and vibrations	K2	Lecture	Assignments, Quizzes, Midterm, Final exam
2.0	Skills			
2.1	Apply techniques for formulating engineering dynamics system.	S1	Lecture	Assignments, Quizzes, Midterm, Final exam
2.2	Model and analyze motion of rigid bodies subjected to external forces and moments.	S1	Lecture	Assignments, Quizzes, Midterm, Final exam



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.3	Solve engineering dynamics problems.	S1	Lecture	Assignments, Quizzes, Midterm, Final exam
3.0	Values, autonomy, and responsibility			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Course Description and Generalities & Introductory Elements	3
2.	Review of Kinematics: basic kinematic equation, coordinate systems	6
3.	Review of Particle and Rigid body Dynamics	6
4.	Kinetics - Newton laws and motion	3
5.	Free Vibration: The case of Mass-Spring-Damper	9
6.	Forced Vibration: The case of Mass-Spring-Damper	9
7.	Work and Energy in dynamics	6
8.	Quizzes and Midterm Exam	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	2, 5, 8, 11, 14	15%
2.	Quizzes	4, 11, 14	15%
3.	Midterm exam	7 or 8	30%
4.	Final exam	16 or 17	40%

*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	Dynamics and Vibration: An Introduction by. Magd Abdel Wahab (2008), Dynamics and Vibration: An Introduction, June 2008, Wiley. ISBN: 978-0470723005
Supportive References	None
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Equipped Classroom
Technology equipment (projector, smart board, software)	Blackboard, Data show, Smart Board
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Indirect
	Instructor	Direct
Effectiveness of Students assessment	Student	Indirect
	Instructor	Direct
Quality of learning resources	Student	Indirect
	Instructor	
The extent to which CLOs have been achieved	Instructor	Direct
Other		

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

Assessment Methods (Direct, Indirect)





G. Specification Approval

COUNCIL /COMMITTEE	Civil and Environmental Engineering Department Council in Al-Qunfudah
REFERENCE NO.	The fifteenth session of the academic year 1446
DATE	01/05/2025

