



Course Specification

— (Bachelor)

Course Title: **Mechanics**

Course Code: 2022203-4

Program: Bachelor in Mathematics

Department: Mathematics and Statistics Department

College: **Faculty of Sciences**

Institution: **Taif University**

Version: **1**

Last Revision Date: 20/05/2023



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A. General information about the course:

1. Course Identification

1. Credit hours: 4(4,0,0)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: Level 4 / Second Year

4. Course general Description:

This course introduces vectors algebra. Force- Forces Resolved in Plane-Resultant of several coplanar forces – Equilibrium of a particle (body) acted upon two forces – Application. Equilibrium of a particle (body) acted upon three (several) forces-. Study center of gravity. Provide an understanding of friction, forces distribution, and momentum in the plane. Dynamics of the physical point "movement in a straight line", Newton's laws are also included. Study and derive the motion of projectiles in the plane, polar coordinates, Components of the velocity and the acceleration in polar coordinates- Applications circular motion, and the movement in resistive medium. From which emerge an understanding of the simple harmonic motion.

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

Calculus II (2022104-4)

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

None

7. Course Main Objective(s):

The student will be taught as follows:

1. Introducing the fundamental concepts in mechanics.
2. Examining mechanical system and deriving all forces, couples, moments and its applications.



2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4Hr /Week	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	60
2.	Laboratory/Studio	NA
3.	Field	NA
4.	Tutorial	NA
5.	Others (specify)	NA
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	Recognize the motion for various systems.	K2	<ul style="list-style-type: none"> Lectures Group discussions 	<ul style="list-style-type: none"> Quizzes
1.2	Describe Newton's laws and equations of equilibrium.	K2	<ul style="list-style-type: none"> Lectures Self-learning through the website 	<ul style="list-style-type: none"> Exams
2.0	Skills			
2.1	Explain the simple projectiles motion and their applications.	S4	<ul style="list-style-type: none"> Lectures Interactive classes 	<ul style="list-style-type: none"> Exams
2.2	Evaluate a mechanical system.	S4	<ul style="list-style-type: none"> Self-learning through the website Problem based learning 	<ul style="list-style-type: none"> Quizzes



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.3	Demonstrate all forces, couples and momentums of the mechanical system.	S4	<ul style="list-style-type: none"> Group discussions Self-learning through the website Problem based learning 	<ul style="list-style-type: none"> Exams
3.0	Values, autonomy, and responsibility			
3.1	Show the responsibility for their own learning and continuing personal and professional development.	V2	<ul style="list-style-type: none"> Projects 	<ul style="list-style-type: none"> Oral exams

C. Course Content

No	List of Topics	Contact Hours
1.	Vector Algebra (Addition, subtraction and multiplication) (Scalar and vector product double and triple)	4
2.	Force- Forces Resolved in a Plane-Resultant of several coplanar forces	4
3.	Equilibrium of a particle (body) acted upon two forces – Applications,	4
4.	Equilibrium of a particle (body) acted upon three (several) forces- Applications,	4
5.	Momentum: Moment of a force- principle of moments - Applications,	4
6.	Friction – Forces distribution	4
7.	First Midterm exam	4
8.	Centre of gravity, Dynamics of the physical point "movement in a straight line"	4
9.	Newton's Laws, Projectiles in the plan	4
10.	Polar coordinates	4
11.	Components of the velocity and the acceleration in polar coordinates- Applications	4
12.	Circular motion	4
13.	Second Midterm exam	4
14.	Movement in resistive medium	4
15.	Simple harmonic motion	4
Total		60



D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Continuous Evaluation	10 %
2.	Assignments, report	Continuous Evaluation	10 %
3.	Midterm 1 Exam	8-9	15%
4.	Midterm 2 Exam	12-13	15%
5.	Final Exam	15-16	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	Gupta, Kumar and Sharma, Classical Mechanics, India (2003). https://www.amazon.in/Classical-Mechanics-Gupta/dp/9350067137
Supportive References	Hannah, J. & Hillier, M., Applied Mechanics (3e), Pearson United Kingdom, 1995
Electronic Materials	http://farside.ph.utexas.edu/teaching/301/lectures/node3.html
Other Learning Materials	https://en.wikipedia.org/wiki/mechanics

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, which can accommodate up to 50 students and equipped with e-podiums, and internet access.
Technology equipment (Projector, smart board, software)	Laptop, smart board, and projector.
Other equipment (Depending on the nature of the specialty)	Wi-Fi internet connections





F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department Council
REFERENCE NO.	4
DATE	October 2023

