

Faculty of Engineering & Technology
Dynamics of Rigid Bodies (Mechanics3)
Information :

Course Code : MEC 221 **Level :** Undergraduate **Course Hours :** 3.00- Hours

Department : Department of Mechanical Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Amr Mohamed Metwally Ismaiel	13
Lecturer	Amr Mohamed Metwally Ismaiel	13
Teaching Assistant	Amira Khaled Hasan Mohamed Elkodama	4
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Area Of Study :

This course aims to:

- ~ Enrich the student's knowledge about the fundamental principles of kinematics of a rigid body.
- ~ Prepare the student to analyze the concepts of planar motion and its types (translation, rotation and general plane motion) of a rigid body or systems of connected bodies using vector and scalar methods.
- ~ Train the student to represent and apply relations of position, velocity and acceleration for rolling motion problems.
- ~ Prepare the student to analyze the various principles of Kinetics such as force-acceleration, work-energy and the impulse-momentum principles for various types of problems that containing the motion of a rigid body.

Course outcomes :
a.Knowledge and Understanding:

- 1 - Describe position, velocity and acceleration for a moving rigid body.
- 2 - Define the equations of motion of a rigid body.
- 3 - Explain the analysis of work and energy, impulse and momentum methods.

b.Intellectual Skills:

- 1 - Discriminate between different types of motion.
- 2 - Formulate the kinematic and kinetic equations in order to describe the motion of the rigid body.

c.Professional and Practical Skills:

- 1 - Design experiments for motion studies.

d.General and Transferable Skills:

- 1 - Work effectively in a team and develop the skills which are related to creative thinking, problem solver, and teamwork in different fields of the motion of rigid bodies.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Planar kinematics of a rigid body, Translation, rotation and general motion	4	2	2
Vector and scalar methods for analysis	8	4	4
Analysis of connected rigid bodies	4	2	2
Rolling motion and applications.	4	2	2
Kinetics of a rigid body	4	2	2
Force-acceleration method of a rigid body	12	6	6
Work and energy of a rigid body	12	6	6
Impulse and momentum method of a rigid body and impact problems	8	4	4
Impact problems	4	2	2

Teaching And Learning Methodologies :

Interactive Lecturing

Problem Based Learning

Discussion

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	10.00	14	
Final Exam	40.00	16	Written exam.
Mid- Exam I	15.00	6	Written exam.
Mid- Exam II	15.00	11	Written exam.
Participation	10.00	15	
Quizzes	10.00	12	

Course Notes :

Lecture notes on the course moodle page, FUE website.

Recommended books :

Hibbeler R.C., "Engineering Mechanics: Dynamics", 13th Edition.

Riley W. and Sturges L, "Engineering Mechanics: Dynamics". 6th Edition