FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

Faculty of Engineering & Technology

Dynamics of Rigid Bodies (Mechanics3)

Information :

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

Department : Department of Structural Engineering & Construction Management

Instructor Information :

Title	Name	Office hours
Lecturer	Amr Mohamed Metwally Ismaiel	8
Assistant Lecturer	Noura Khedr Abdul raheem Ahmed	

Area Of Study :

ÅRecognize the fundamental principles of kinematics of a rigid body.

ÅAnalyze 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.
ÅLearn how to represent and apply relations of position, velocity and accelera-tion for rolling motion problems.
ÅStudy and analyze the various principles of Kinetics such as force-acceleration, work-energy and the impulse-momentum principles for various types of prob-lems that containing the motion of a rigid body

Description :

Kinematics of rigid bodies: Types of planar motion of rigid body: translation, rotation about a fixed axis and general motion. Angular velocity and angular acceleration, in-stantaneous center, relative velocity and relative acceleration. Kinetics of rigid bodies, Newton's laws, friction and elastic forces, equations of motion. Principle of work and energy. Conservation forces and principle of conservation of mechanical energy. Prin-ciple of impulse and momentum, impulsive forces, impact. Introduction of free and forced vibrations.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	a1- Define the main terms of kinematics of planar general motion
2 -	a2- List the main items of mechanism of connected rigid bodied
3 -	a3- Explain the principals of rolling motion
4 -	a4- Describe the main concept of kinetics of a rigid body
5 -	a5- Define the main terms of impulse & momentum
b.Intellectual Skills: :	
1 -	b1- Solve problems regarding kinematics of planar general motion
2 -	b2- Calculate the values of rolling motion
3 -	b3- Calculate the values of kinetics of a rigid body
4 -	b4- Solve problems regarding Force-acceleration method
5 -	b5- Assess issues of work ï energy method

6 -	b6- Calculate the values of impulse & momentum
c.Professional and Practical Skills: :	
1 -	c1- Prepare technical reports for rolling motion
d.General and Transferable Skills: :	
1 -	d1- Search for information and self-learning discipline

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
mechanism of connected rigid bodied	5	3	2
rolling motion	5	3	2
kinetics of a rigid body	10	6	4
Force-acceleration method	15	9	6
work ï energy method	15	9	6
impulse & momentum	10	6	4
kinematics of planar general motion	10	6	4
Revision	5	3	2

Teaching And Learning Methodologies :

Interactive Lec.

Discussion

Problem Solving

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
1st Midterm	15.00		
2nd Midterm	15.00		
Assignments, Partic-ipation, & Quizzes	30.00		
Final Exam	40.00		

Course Notes :

Lecture notes on the course moodle page, FUE website.

Recommended books :

Hibbeler R.., " Engineering Mechanics: Dynamics ", 12th Edition.
Riley W. and Sturges L.., " Engineering Mechanics: Dynamics ".