

Faculty of Engineering & Technology

Mechanics 2

Information :

Course Code : MEC 122 **Level :** Undergraduate **Course Hours :** 2.00- Hours

Department : Faculty of Engineering & Technology

Instructor Information :

| Title | Name | Office hours |
|--------------------|---------------------------------|--------------|
| Lecturer | Hamada Galal Taha Mohamed Askar | 6 |
| Assistant Lecturer | Reham Milad Kamel Samaan | |
| Assistant Lecturer | Noura Khedr Abdul raheem Ahmed | |

Area Of Study :

Overall aims of the course are:

- Enrich students knowledge about principles of kinematics of particles and the basic concepts of kinetics.
- Develop students skills to apply equations of motion to solve and analyze dynamic problems.

Description :

Displacement, Velocity and acceleration of a particle, Use of Cartesian coordinates to describe particle motion, Projectiles, Particle motion on straight paths, Trajectory equations, Rectangular and polar coordinates, Relative motion of two particles, Newton's law of motion, Resistive media, Rocket motion as an application on variable mass particles, Simple harmonic motion of a particle, Motion on circular path, Principle of work and kinetic energy, Conservative forces, Principle of conservation of mechanical energy, Principle of impulse and momentum.

Course outcomes :

a. Knowledge and Understanding: :

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| 1 - | Identify vector and scalar quantities in dynamic. |
| 2 - | Rewrite equations of motion in a different proper coordinate. |
| 3 - | Explain accelerations in different particle coordinates. |

b. Intellectual Skills: :

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| 1 - | Solve dynamic problems of particles using Newton's second law |
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Course Topic And Contents :

| Topic | No. of hours | Lecture | Tutorial / Practical |
|---|--------------|---------|----------------------|
| Displacement, Velocity and acceleration of a particle | 4 | 2 | 2 |
| Use of Cartesian coordinates to describe particle motion, Particle motion on straight paths | 4 | 2 | 2 |
| Rectangular coordinates | 4 | 2 | 2 |
| Polar coordinates | 4 | 2 | 2 |

Course Topic And Contents :

| Topic | No. of hours | Lecture | Tutorial / Practical |
|---|---------------------|----------------|-----------------------------|
| Relative motion of two particles | 4 | 2 | 2 |
| Newton's law of motion, | 4 | 2 | 2 |
| Principle of work and kinetic energy | 4 | 2 | 2 |
| Conservative forces | 4 | 2 | 2 |
| Resistive media, Rocket motion as an application on variable mass particles | 4 | 2 | 2 |
| Motion on circular path | 4 | 2 | 2 |
| Principle of conservation of mechanical energy | 4 | 2 | 2 |
| Principle of impulse | 4 | 2 | 2 |
| Simple harmonic motion of a particle | 4 | 2 | 2 |
| Principle momentum | 4 | 2 | 2 |

Teaching And Learning Methodologies :

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| Interactive Lecture |
| Discussion |
| Problem solving |

Course Assessment :

| Methods of assessment | Relative weight % | Week No | Assess What |
|------------------------------|--------------------------|----------------|--------------------|
| Assignment +quizzes | 10.00 | | |
| Final Exam | 40.00 | | |
| First Mid Term Exam | 15.00 | | |
| Participation | 10.00 | | |
| Second Mid Term Exam | 25.00 | | |

Course Notes :

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| course handouts & notes |
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Recommended books :

1. Beer, F.P., Johnson, E.R. and Eisenberg, E. R., "VECTOR MECHANICS FOR ENGINEERS: DYNAMIC", Mc Graw-Hill, 10th ed. in SI units

2. Hibbeler, R.C., "ENGINEERING MECHANICS: PRINCIPLES OF STATICS AND DYNAMICS" Pearson Prentice Hall, 2011