



Course Specifications: Mechanics 2 MTH004

1. Basic Information

Program Title	Biomedical Engineering
Department offering the Program	Biomedical Engineering
Department Responsible for the Course	Engineering Mathematics and Physics
Course Code	MTH004
Year/ Level	Level 000
Specialization	Minor
Requirements	MTH002
Authorization data of course specification	

Teaching Hours	Lectures	Tutorial	Practical
	2	2	0

2. Course aims:

No.	Aim
1	Apply knowledge of engineering concepts to solve engineering problems related to the motion of particles and Motion of rigid body
5	Use modern techniques to design and analyze mechanical-based biomedical systems.

3. Intended Learning Outcomes (ILOs):

a. Knowledge and Understanding:

No.	Knowledge and Understanding
A ₁	Identify the concepts of Kinetics and Kinematics of a particle
A ₂	Define the basic information about Work and Energy, Conservative systems

b. Intellectual Skills

No.	Intellectual Skills
B ₁	Select appropriate method for Applying Newton's laws of motion on translation, rotation, general motion; Kinetics of rigid bodies
B ₃	Solve problems of dynamics in a creative and innovative manner.

c. Professional Skills

No.	Professional Skills
C ₁	Apply integrally knowledge of mathematics and mechanics tools to solve biomedical engineering problems.

d. General Skills

No.	General Skills
D ₃	Communicate effectively.

4. Course Contents:

No.	Topics	Weeks
1	Kinematics of a particle: Curvilinear motion in different coordinates	1-2
2	Absolute dependent motion analysis and Relative rectilinear motion analysis of two particles	3-4
3	Kinetics of a particle: Forces and Acceleration, Newton's laws of motion	5-6
4	Equations of motion in different coordinates	7-8
5	Work and Energy, Conservative systems, and Power and Efficiency	9-10
6	Kinetics of a particle: Impulse and momentum	11-12
7	Conservation of linear momentum for a system of particles and Impact	13-14

5. Teaching and Learning Methods:

No.	Teaching Method
1	Lectures
2	Discussion Sessions
3	Tutorial sessions

6. Teaching and Learning Methods for Disabled Students:

No.	Teaching Method	Reason
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1	Extra meeting time	To answer their questions
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7. Student Evaluation:

7.1 Student Evaluation Methods:

No.	Evaluation Method	ILOs
1	Mid Term Examination	A ₁ , A ₂ , B ₁
2	Semester work	A ₁ , A ₂ , B ₁ , B ₃ , C ₁ , D ₃
3	Final Term Examination	A ₁ , A ₂ , B ₁ , B ₃

7.2 Evaluation Schedule:

No.	Evaluation Method	Weeks
1	Mid Term Examination	8
2	Semester work	Every week
3	Final Term Examination	15

7.3 Weighting of Evaluations:

No.	Evaluation Method	Weights
1	Mid Term Examination	20%
2	Semester work	30%
3	Final Term Examination	50%
Total		100%

8. List of References

No.	Reference List
1	Hibbeler, R. C. Engineering mechanics. Upper Saddle River, N.J: Pearson, 2015.
2	Meriam, J. L., and L. G. Kraige. Engineering mechanics. Hoboken, NJ: Wiley, 2012.
3	Meriam, J. L., and L. G. Kraige. Statics. Hoboken, NJ: Wiley, 2015.
4	Meriam, J. L., and L. G. Kraige. "Engineering Mechanics: Statics, 7/e." (2011).
5	Costanzo, Francesco, Michael E. Plesha, and Gary L. Gray. Engineering mechanics: statics & dynamics. New York, NY: McGraw-Hill, 2013.
6	David J. Mc Gill and Witson W. King, "Engineering Mechanics", 2003

9. Facilities Required for Teaching and Learning:

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Sound System

10. Matrix of Knowledge and Skills of the Course:

No.	Topic	Aim	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
1	Kinematics of a particle: Curvilinear motion in different coordinates	1	A ₁			
2	Absolute dependent motion analysis and Relative rectilinear motion analysis of two particles	1	A ₁		C ₁	D ₃
3	Kinetics of a particle: Forces and Acceleration, Newton's laws of motion	1	A ₁	B ₁		
4	Equations of motion in different coordinates	1	A ₁	B ₁		D ₃



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5	Work and Energy, Conservative systems, Power and Efficiency	1,5	A ₂	B ₃	C ₁	D ₃
6	Kinetics of a particle: Impulse and momentum	5	A ₁ , A ₂	B ₁		D ₃
7	Conservation of linear momentum for a system of particles and Impact	5	A ₁ , A ₂	B ₃	C ₁	

Course Coordinator: Prof. Dr.

Head of Department: Assoc. Prof. Hossam Eldeen Moustafa

Date of Approval: