

# AHST 105 Mechanics

## 2024/2025

### 1- Basic Information

Course Title	Mechanics			
Course Code	AHST 105			
Department(s) responsible for course teaching.	General			
Course hours	<b>Theoretical</b>	<b>Practical</b>	<b>Other (specify)</b>	<b>Total</b>
	1	4	-----	3
Course type	<b>compulsory</b>			
Course level	Level 1 (1 <sup>st</sup> semester)			
Academic program	Basic Sciences			
<b>Institute</b>	Institute of High Technology Institute of Applied Health Science			
<b>Academy</b>	Nile delta for science and technology			
Course coordinator				
Course approval date	21-9-2024			
Decision approving board (attached the decision/minutes of the department council)				



## 2- Course Overview

Upon completing this course, students should be able to understand the fundamental principles of mechanics, including motion, forces, work, energy, and their applications in health sciences. The course aims to relate physics concepts to real-life clinical examples relevant to radiology and medical imaging.

## 3- Course Learning Outcomes CLOs

### Consistency of course learning outcomes with program outcomes (adopted standards)

Program Outcomes/Adopted Academic Reference Standards (PO Target by the course based on matrix)		Course Learning Outcome :By the end of this course the student will be able to	
Statement	code	Statement	code
Define physical quantities, units, and basic concepts of mechanics		Develop Knowledge of fundamental concepts of Applied Health Science	
Explain Newton's laws of motion and apply them to real-life clinical cases		Develop comprehensive understanding of human anatomy and physiology as it relates to health and disease and describe patient positioning	
Describe the principles of work, energy, and power in biomechanical systems.		Describe troubleshooting methods for technical issues in medical imaging equipment	
Analyze basic physical systems using mathematical and conceptual models.		Apply professional expertise and skills to analyze problems	

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	Interpret basic theories and concepts in medical imaging		Solve problems related to motion, forces, and mechanical energy.
	Troubleshoot technical errors and interpret results competently		Interpret experimental data and evaluate measurement accuracy.
	Apply specialized knowledge and demonstrate proficiency in specific areas		Use measuring tools to determine physical quantities in practical sessions.
	Demonstrate the competence to produce diagnostic radiographic images safely		Apply theoretical concepts to conduct basic mechanics experiments.
	Operate medical imaging devices		Record and analyze observations from practical physics labs.
	Promote understanding of the Medical Technologist role		Communicate scientific ideas clearly using proper terminology.
	Acknowledge the importance of teamwork		Work effectively in teams during lab experiments.
	Engage in ongoing professional development		Manage time and responsibilities when preparing assignments and reports..

## 4- Learning Methods

- a. *Interactive Lectures*
- b. *Self-Directed Learning (SDL)*
- c. *Group Discussions*
- d. *Practical Laboratory Sessions*
- e. *Problem-Based Learning (PBL)*
- f. *Workshops and Seminars*

## 5- Course Schedule

Week No.	Course Content/Topics	Total Weekly hours	Expected learning hours (contact hours)			
			Theoretical teaching (lectures/discussion groups/ .....)	Training (Practical/ Clinical/ .....)	Self-learning (Tasks/ Assignments/ Projects/ ...)	Other (to be determined)
1	Introduction to Mechanics & Medical Physics	3	1	4		
2	Measurement and Units; SI system	3	1	4		
3	Forces and Newton's Laws of Motion	3	1	4		
4	Work, Energy and Power	3	1	4		
5	Elasticity and Stress-Strain	3	1	4		
6	Midterm exams					
7	Static and Dynamic Equilibrium	3	1	4		
8	Friction and Applications	3	1	4		
9	Biomechanics of	3	1	4		

	Human Body					
10	Introduction to Thermodynamics	3	1	4		
11	Heat Transfer Mechanisms	3	1	4		
12	Surface Tension and Fluid Dynamics	3	1	4		
13	Review and Case Studies	3	1	4		
14	Review and Case Studies	3	1	4		
15	-----					
16	Practical exams					
17	Final exams					

## 6- Methods of students' assessment

No .	Assessment method*	Assessment time (Week No.)	Rating Scores	Percentage of the total course grade
1	Written exam 1 (term work)	6th	30	20%
2	Written exam 2 (term work)	-----	-----	-----
3	Final written exam	15th	75	50%
4	Final Practical exam	14th	45	30%
5	Final oral exam	-----	-----	-----
6	Activities / Project / Activity Booklet	-----	-----	-----
7	Filed training	-----	-----	-----
8	Other (list)	-----	-----	-----

\* The methods mentioned above are indicative examples, and may add and delete

## 7- Learning Sources and Facilities

<b>Learning resources (books, scientific references, etc.) *</b>	Main Reference	Badr, M. (2023). Basis of Mechanics. Cairo: Academic Publishing.
	Other references	<i>Course notes and handouts provided by the instructor.</i>
	Electronic Resources (Add the link)	<a href="https://www.physicsclassroom.com">https://www.physicsclassroom.com</a> <a href="https://www.khanacademy.org/science/physics">https://www.khanacademy.org/science/physics</a>
	Educational Platform (add the link)	<a href="https://bislms.mans.edu.eg/moodle2024/">https://bislms.mans.edu.eg/moodle2024/</a>
	Other (List)	<a href="https://www.ekb.eg/ar">https://www.ekb.eg/ar</a>
<b>Educational support equipment for teaching and learning *</b>	Devices	Projector
	Supplies	Whiteboard Markers
	Software	Model ابن الهيثم
	Skills Labs/Simulators	Practical Skills Labs
	Virtual Labs	-----
	Other (List)	-----

\* The mentioned list is indicative examples, and the institution may add and delete depending on the nature of the course.

Course Coordinator  
Name:  
Signature:

Program Coordinator  
Name:  
Signature: