



Course Book of
Mechanics and Properties of Matter for
1st year Physics Students

Physics Department

College of Education

Salahaddin University-Erbil

Lecturer: Dr Rashad Hassan Mahmud

Academic Year: 2023/2024

Course Book

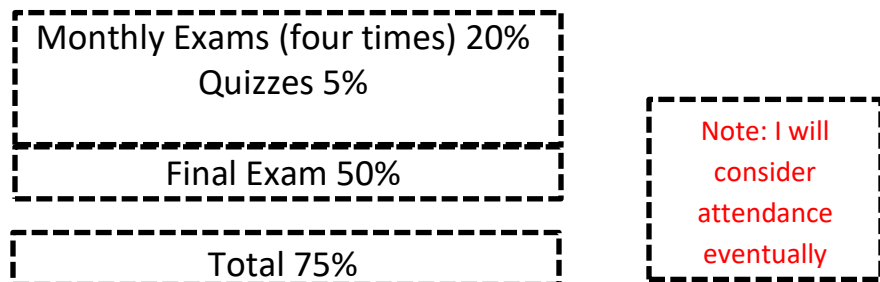
1. Course name	General Physics
2. Lecturer in charge	Dr Rashad Hassan Mahmud
3. Department/ College	Physics/ College of Education
4. Contact	e-mail: Rashad_862009@yahoo.com
5. Time (in hours) per week	Practical: 3 = (3 Hours per week)
6. Office hours	I will be available weekly from Sunday to Wednesday during 8:30 am to 1:00 pm.
7. Course code	N/A
8. Teacher's academic profile	<p>I was born in Erbil-Kurdistan, in 1986. I received the B.Sc. degree (First Class) in Physics from Salahaddin University-Erbil, in 2007, the MSc. degree (first class) in Electromagnetics from Salahaddin University-Erbil, in 2010, and the Ph.D. degree in microwave engineering from the University of Birmingham, Edgbaston, Birmingham, U.K., in 2016. My doctoral research concerned Micromachined terahertz waveguide circuits Such as antennas and filters. Also, part of my research interest is about microwave components integration. In 2007, I became an assistant physicist with the physics department, where I worked in the Electronic, advanced electricity and magnetism, and Mechanics Labs. Shortly after I joined the physics department, I Started my master and then became the decider of the department. Now, I am a lecturer in physics department and have been teaching Nuclear lab. and Mechanics and Properties of Matter.</p>

<p>9. Keywords</p>	
<p>10. Course overview: The importance of general physics or (Mechanics and Properties of Matter) is to let students have comprehensive view on mechanics of objects in the real word, and the nature of material when acted by external forces. Also, This module demonstrates the mechanics of the objects and implantation of Newton’s laws in a way that is relevant to our daily life. Students, after passing this module, will be able to talk about the quantities physically, and will have physical explanation to the phenomena relevant to this module.</p>	
<p>11. Course objective: The aim of this module is to provide students with</p> <ul style="list-style-type: none"> ❖ Good understanding on Mechanics and its role in our daily life. ❖ Good Understanding on Properties of Matter. ❖ Discussing the fundamental laws in Mechanics. ❖ To understand the natural and artificial behaviour of materials once acted by an external force, and explain, how do they react? 	
<p>12. Student's obligation Students are required to attend the class on time weekly as scheduled. If a student has a legitimate reason for being excused early from class, then he/she should discuss this with me before the class. Cell phones may not be used during class (no texting) and should be silent. Laptops may not be used for anything other than taking notes. It is important that you refrain from excessive talking during lecture as a courtesy to your fellow students. Students will be divided to three groups and each group will have a leader. At the end of any lecturer, home works will be given to them and they should solve it in a group. Homework solutions will be collected one week before the monthly exams. That will take 5 marks. Also, quiz will be undertaken in the class without the students being informed. This is to encourage students to review the lectures we will have in the class.</p>	
<p>13. Forms of teaching: Different forms of teaching will be used to come across with objectives of the course. Power point presentations for the head titles, definitions, graphs and many useful illustrations with summary at the end of each chapter will be presented and discussed. The power point will contain information about new topics and unsolved examples, and then whiteboard will be used to solve them and to let students to see the solutions. There will be also classroom discussions and the lecture will cover enough information about the</p>	

description of the subjects, solution of many examples, analysis and derivation for all necessary equations and proving theorems and many problems are presented as a home work for improving student abilities.

14. Assessment scheme

The maximum mark of this module is (100%). The grading system is based on the summation of two categories of evaluations: the evaluation depends on four ways. Firstly, students have to take four exams; each exam will be on 30 marks. Secondly, solving home works will take 7 marks. Thirdly, quizzes taken in the class will be on 3 marks. Finally, (60%) of the mark is based on final examination that is comprehensive for the whole of the study material reviewed during the academic year and it will be on June.



15. Student learning outcome:

After successful completion of the module, the students should have:

- ❖ Understanding the fundamentals Mechanics and Properties of Matter.
- ❖ Understanding the Essential Units system.
- ❖ Understanding Motions in one and two-dimensions.
- ❖ Understanding Newton's Laws and their applications.
- ❖ Learning the concepts of work, energy, momentum, power, gravity.
- ❖ Learning the foundation of materials and understanding their properties.

After successful completion of the module, the students should also be able to:

- ❖ Know the units of essential physical quantities.
- ❖ Know the physical meaning of motion in different coordinates.
- ❖ Understand the Newton's laws for motion.
- ❖ Realise the basic properties of materials

Students are prepared to become school teachers at secondary or preparatory.

16. Course Reading List and References:

Textbook: “**Fundamentals of physics**”, 2008, by Jearl Walker, 8th edition, The John Wiley & Sons, Inc.

Other References:

- 1- D.S MATHUR- **ELEMENTS OF PROPERTIES OF MATTER: S.CHAND AND CO. (2006)**
- 2- BRIJ LAL AND N. **SUBRAHMANYAM- PROPERTIES OF MATTER: - S.CHAND AND CO. (2003)**
- 3- Any other Physics textbook published in 21st century.

Note: The core materials of the course consist of the above book, articles from media and internet, and lecture’s notes.

17. The Topics:	Lecturer's name
18. Practical Topics (If there is any)	Lecturer's name
<p><u>MECHANICS:</u></p> <p>1- Units, Measurements, Vectors</p> <ol style="list-style-type: none"> 1. Basic Units 2. Coordinate Systems 3. Vectors 4. Dimensional analysis <p>2- Motion in One Dimension</p> <ol style="list-style-type: none"> 1. Kinematics Description of Motion 2. Velocity 3. Uniform Acceleration 4. Measuring g <p>3- Motion in Two Dimensions</p> <ol style="list-style-type: none"> 1. Displacement in Two Dimensions 2. Velocity, Position, and Acceleration 3. Motion of the Centre of Mass 4. Central Forces 5. Deformation by Central Forces 6. Centrifugal Escape 7. Projectile Motion <p>- Newton's First Law</p> <p>- Newton's Second Law</p> <p>- Newton's Third Law</p> <p>- Applications of Newton's Laws</p> <ol style="list-style-type: none"> 1. Dynamic Torque 	<p>Dr Rashad H. Mahmud</p> <p>Weeks:</p> <ul style="list-style-type: none"> ❖ Chapter 1 requires 3 weeks. ❖ Chapter 2 requires 2 weeks. ❖ Chapter 3 requires 2 weeks. ❖ Chapter 4 requires 3 weeks ❖ Chapter 5 requires 3 weeks. ❖ Chapter 6 requires 3 weeks. ❖ Chapter 7 requires 2 weeks. ❖ Chapter 8 requires 2 weeks ❖ Exams requires 4 weeks

<p>2. Friction</p> <p>4- Work and Energy</p> <ol style="list-style-type: none">1. Work2. Simple Machines3. Non-Conservative Forces4. Conservation of Energy5. Mechanical Power <p>5- Linear Momentum and Collisions</p> <ol style="list-style-type: none">1. Impulse and Thrust2. Conservation of Linear Momentum3. Mass and Momentum Transfer4. Rockets5. Collisions in One Dimension6. Collisions in Two Dimensions <p>6- Rotational Dynamics</p> <ol style="list-style-type: none">1. Moment of Inertia2. Rotational Energy3. Transfer of Angular Momentum4. Conservation of Angular Momentum5. Rotational Stability <p>7- Gravity</p> <ol style="list-style-type: none">1. Universal Gravitational Constant2. Orbits	
<p>19. Examinations:</p>	
<p>20. Extra notes:</p>	

21. Peer review

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