



**Course Book of
General Physics for
1st year Mathematics Students**

Physics Department

College of Education

Salahaddin University-Erbil

Lecturer: Dr. Ahmed A. Ahmed

Academic Year: 2023/2024

Course Book

1. Course name	General Physics
2. Lecturer in charge	Dr. Ahmed Abdulrahman Ahmed
3. Department/ College	Physics/ College of Education
4. Contact	e-mail: ahmed.ahmed2@su.edu.krd
5. Time (in hrs)/week	Theory: 2 = (2 Hours per week)
6. Office hours	I will be available weekly from Sunday to Wednesday during 8:30 am to 2:00 pm.
7. Course code	N/A
8. Teacher's academic profile	<p>I was born in Erbil in 1989. My academic career started in 2011 when I graduated from the department of physics at college of education/scientific department. In 2014, I went to the United Kingdom to study MSc in Physics with Nanotechnology at the university of Hull and achieved it in 2015. In 2023, I achieved PhD degree in material science at physics department/ college of education/Salahaddin University – Erbil. Now, I am a lecturer at physics department/college of education.</p> <p>Education:</p> <p>PhD Student (2020-2023) MSc Student (2014-2015) BSc Student (2007-2011)</p>
9. Keywords	
10. Course overview:	<p>The significance of general physics is to provide students with a complete understanding of the mechanics of real-world objects and the behaviour of objects under the influence of external forces. Furthermore, this module illustrates physical science in terms of scientific methods, theories, laws, and quantities. For example, using Newton's laws of motion in two dimensions. Students who successfully complete this module will possess the ability to physically describe quantities and provide physical explanations for phenomena that are pertinent to this module.</p>
11. Course objective:	<p>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. • 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?

12. Student's obligation

- Students are required to attend the class on time weekly as scheduled.
- Cell phones may not be used during class (no texting) and should be silent.
- It is important that you refrain from excessive talking during lecture as a courtesy to your fellow students.
- 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.

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 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.

Monthly Exam 35%
Homework + Quizzes 5%
Final Exam 60%
Total 100%

15. Student learning outcome:

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

- Understanding the fundamentals of Mechanics.
- 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:

- 1-Textbook: “Fundamentals of physics”, 2008, by Jearl Walker, 8th edition, The John Wiley & Sons, Inc.
- 2- Mathur, D.S., 2008. *Elements of properties of matter*. S. Chand Publishing.
- 3- ARORA, S.L., (2021). *New simplified Physics: A Reference Book for Class XI*. Dhanpat Rai & Co, London, Great Britain.
- 4- 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:

18. Practical Topics (If there is any)

MECHANICS:

1- Physical World

- 1.1 What is physics?
- 1.2 Scientific Method
- 1.3 Scientific Theory
- 1.4 Basic Quests in Physics
- 1.5 Branches of Physics
- 1.6 Fundamental Forces in Nature
- 1.7 Unification of Forces
- 1.8 Physics in Relation to Other Sciences
- 1.9 Physics in Relation to Society

Weeks:

- Chapter 1 requires 2 weeks.
- Chapter 2 requires 2 weeks.
- Chapter 3 requires 3 weeks.
- Chapter 4 requires 2 weeks
- Chapter 5 requires 3 weeks.

<p>1.10 Physics in Relation to Technology 1.11 Conservation Laws 2- Units and Measurements 2.1 Physical Quantities 2.2 The Measuring Process 2.3 Fundamental and Derived Units 2.4 Systems of Units 2.5 Definitions of Basic and Supplementary SI Units 2.6 Advantages of SI Units 2.7 Unit Prefixes 2.8 Conversion of Units 2.9 Dimensions of Physical Quantities 2.10 Significant Figures 2.11 Accuracy and Precision 2.12 Errors in a Measurement 2.13 Absolute Errors, Relative Error and Percentage Error 2.14 Combination or Propagation of Error 3- Vectors 3.1 Coordinate System 3.2 Cartesian Coordinates of Three-Dimensional Space 3.3 Vector and Scalar Quantities 3.4 Representation of a Vector 3.5 Types of Vectors 3.6 Zero Vector and Its Properties 3.7 Multiplication of a Vector by Real a Number 3.8 Addition or Composition of Vectors 3.9 Orthogonal Triad of Unit Vector: Base Vector 3.10 Rectangular components of a Vector in Three Dimensions 3.11 Product of Two Vectors 4- Motion in One and Two Dimensions</p>	
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<p>4.1 Mechanics 4.2 Rest and Motion 4.3 Concept of Point object 4.4 Motion in One, Two and Three Dimensions 4.5 Distance and Displacement 4.6 Speed 4.7 Velocity 4.8 Uniform and Non-Uniform Motion 4.9 Acceleration 4.10 Equations of Motion for Constant Acceleration 4.11 Motion Under Gravity (Free Fall) 4.12 Motion in Two-Dimensions: Projectile Motion</p> <p>5- Forces and Laws of Motion</p> <p>5.1. Force 5.2. Inertia and Its Types 5.3. Linear Momentum 5.4. Newton’s Laws of Motion 5.4.1 Newton’s First Law of Motion: Law of Inertia 5.4.2 Newton’s Second Law of Motion: Law of Momentum 5.4.3 Newton’s Third Law of Motion: Law of Action and Reaction 5.5. Impulse 5.6. Free-Body Diagrams (FBD)</p>	
<p>19. Examinations:</p> <p>Q1/ A cricket ball is thrown at a speed 28 ms^{-1} in a direction 30° above the horizontal. Calculate (a) the maximum height, (b) the time taken by the ball to return to the same level, and (c) the horizontal distance from the thrower to the point where the ball returns to the same level.</p> <p>Q/ A block of mass 2 kg is placed on the floor. The coefficient of static friction is 0.4. A force of friction of 2.5 N is applied on the block. Calculate the force of friction between the block and the floor.</p>	
<p>20. Extra notes:</p>	
<p>21. Peer review</p>	<p>پیداچوونہوہی ہاوہل</p>