هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Physics for Architecture**
Course Code:	**118Phys-3**
Program:	**The Academic Program (Bachelor)**
Department:	**Physics**
College:	**Science**
Institution:	**King Khalid University**

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University ☐ College ☐ Department √ Others ☐ **b.** Required √ Elective ☐
3. Level/year at which this course is offered: 1st Level / 1st Year
4. Pre-requisites for this course (if any)**: No pre-requisites**
5. Co-requisites for this course (if any)**:** No co-requisite course

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2×15=30	50%
2	Laboratory/Studio	2×15=30	50%
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	20
2	Laboratory/Studio	30
3	Tutorial	10
4	Others (specify)	
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

The standard undergraduate program in physics of the King Khalid University includes courses on Classical Mechanics1. To provide study material on such topic is obviously a difficult task partly because of the huge amount of material and partly because of the different nature of concepts used in these branches of physics.

The scope of the present course may be gauged from the contents. Each chapter consists of a succinct presentation of the physical principles, followed by a large number of completely solved problems which are a valuable learning tool and naturally develop the subject and illustrate these principles. The solved problems have been made short and have been ordered in terms of difficulty. This course consists of 5 chapters.

1- Measurements, Dimensions, and units of physical quantities.

Measuring Things, The International System of Units, Changing Units, Length, Time, Mass, Vectors and Scalars, Adding Vectors Geometrically,

2. Vectors, speed, velocity and acceleration.

Components of Vectors, Unit Vectors, Adding Vectors by Components, Vectors and the Laws of Physics, Multiplying Vectors, Motion, Position and Displacement, Average Velocity and Average Speed, Instantaneous Velocity and Speed, Acceleration, Constant Acceleration: A Special Case, Free-Fall Acceleration, Graphical Integration in Motion Analysis Position and Displacement, Average Velocity and Instantaneous Velocity, Average Acceleration and Instantaneous Acceleration,

Examples and problems

3. Free fall, motion in a vertical plane, Newton's laws of motion.:

Free fall from rest, Free fall of a body thrown vertically upward, Projectile Motion, Projectile Motion Analyzed, Uniform Circular Motion, Relative Motion.

Examples and problems

4. Newton's laws of motion and their applications

Newtonian Mechanics, Newton's First Law, Force, Mass, Newton's Second Law, Momentum, Some Particular Forces, Newton's Third Law, Applying Newton's Laws

Examples and problems

5. Energy and Energy transfer

What Is Energy, Kinetic Energy, Work, Work and Kinetic Energy, Work Done by the Gravitational Force, Work Done by a Spring Force, Power. Work and Potential Energy, Conservation of Energy.

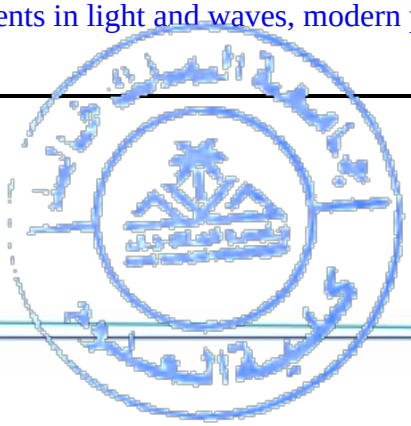
Examples and problems

6. Heat:

Temperature, The Zeroth Law of Thermodynamics, Measuring Temperature, The Celsius and Fahrenheit Scales, Thermal Expansion, Temperature and Heat, The Absorption of Heat by Solids and Liquids, specific heat, A Closer Look at Heat and Work, T First, second and third laws of thermodynamics, Some Special Cases of the First Law of Thermodynamics

Examples and problems

In addition to some experiments in light and waves, modern physics and materials science.



2. Course Main Objective

The main purpose of this course is to present the material in most elementary and digestible form and also to provide study material on diverse topics of the physics for architecture which are characterized by different nature of concepts used in these branches of physics. The students will be able to demonstrate their understanding of the foundations in this domain (mathematical foundations applied for general physics) by demonstrating competence in the major through appropriate homework assignments and examinations, particularly in their upper-level physics courses. Encouraging the student to increase the lecture attendance and to wake up his scientific curiosity towards the subjects of physics for architecture is also the objective of this course.

After completing this course, the student should be able to know, understand, and use the mathematical concepts and laws related to topics of measurements, units, vectors, motion in 1D and 2D, Newtons laws of motion, energy and energy transfer, potential energy, and thermodynamics etc. On the other hand, the student will be learning the followings.

1. Familiar with types of units and their dimensions and vectors and their laws.
2. Understand the newton's laws and equations and their applications.
3. Understands the energy and energy transfer concepts and about potential energy.
4. Understands the basic idea about thermodynamics and their laws
5. Fluent in analyzing practical experiments results and writing reports

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Develop required basic knowledge of the physics for architecture to learn about the Measurements, units, dimensions, vectors, Motion in one and 2-dimensions, Energy and energy transfer, Potential energy, Newton's laws of motion, laws of thermodynamics and their equations etc., and understand how they can be applied to explain specific natural phenomena.	K1
1.2	Use the laws and equations with applications in explaining some physical phenomena.	K2
2	Skills :	
2.1	Students will be able to apply the knowledge which they have acquired in this course - in solving problems of physics.	S1
2.2	Students will be able to apply acquired knowledge from this course to real world science and engineering problems.	S2

CLOs		Aligned PLOs
3	Values:	
3.1	To demonstrate social responsibility and ethical principles	V1, V2
3.2	Students will be asked to prepare notes/scientific reports after having close group discussions with their classmates	V2
3.3	Summarize the main points of the course and develop them through self-learning.	V1 , V3

C. Course Content

Theoretical and tutorials part:

No	List of Topics	Contact Hours
1	Measurements, Dimensions, and units of physical quantities.	**6**
2	Vectors, speed, velocity and acceleration.	**5**
3	Free fall, motion in a vertical plane, Newton's laws of motion.:	**5**
4	Newton's laws of motion and their applications	**5**
5	Energy and Energy transfer	**5**
6	Heat and Thermodynamics	4
Total		**30**

Practical part

No	List of Topics	Contact Hours
1	Introduction (Measurements and error)	**2**
2	Simple pendulum experiment	**2**
3	The Helical Spring experiment	**2**
4	Surface tension experiment	**3**
5	Viscosity experiment	**3**
6	Free fall experiment	**2**
7	simple DC-circuit and ohm's law experiment	**3**
8	Refractive Index experiment	**2**
9	Lenses experiment	**2**
10	The mechanical equivalent heat experiment	**3**
11	Diffraction of light experiment	**2**
9	A review of all laboratory trials with a general discussion of the weekly reports	**2**
!0	Final Exam	**2**
Total		**30**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Memorize basic physical principles of the basic physics1, their corollaries	Lectures and experimental	**Homework assignments,**

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	and understand how they can be applied to explain specific natural phenomena.	lab.	**short quizzes Write Exams Reports discussion**
1.2	Use the laws and equations with applications in explaining some physical phenomena's.		
1.3	Explain the operational principle, analysis, and design of; Energy, energy transfer, newtons laws, fluid dynamics, thermodynamics etc.		
2.0	**Skills**		
2.1	Interpret some physical phenomena in energy, potential energy, newtons laws, laws of thermodynamics. Also, think in solving problems. Select lost lectures that he missed. Distinguish between the different concepts of Classical Mechanics1.	Lectures and experimental lab.	**Homework assignments, short quizzes Write Exams Reports discussion**
2.2	Relate the concepts and principles physics 1 and materials science with the some modern applications. Also, recognize the relation between Classical Mechanics1 laws and the other domains of sciences		
2.3	Apply physical laws and mathematics to understand this course		
2.4	Write a weekly report including the results, analysis and discussion for each experiment.		
3.0	**Values**		
3.1	Evaluate some scientific problems with other students and write the corresponding reports.	Lectures and experimental lab.	**Homework assignments, short quizzes Write Exams Reports discussion**
3.2	Fluent in communicating with others and cooperating with them.		
3.3	Summarize the main points of the course and develop them through self-learning.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid Exam - I	7th	10%
2	Mid Exam - II	12th	10%
3	Assignment I	6th	2.5%
4	Assignment II	11th	2.5%
5	Practical Part (reports and exams)	15th	25%
6	Final exam	end	50%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice : **10 hours per week for individual or group of four students' consultations and academic advice + by appointment + Occasionally help session for weak students**

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	**Fundamentals of Physics Extended, 10th Edition, David Halliday, Robert Resnick, Jearl Walker, ISBN: 978-1-118-23072-5, Aug 2013, WILEY Publication.**
Essential References Materials	**University Physics: Models and Applications, William P. Crummett, Arthur B. Western, ISBN- 10: 0697111997 ISBN-13: 978-0697111999, William C Brown Pub (January 17, 1994).** **•Physics, Volume 1 5th Edition, Robert Resnick, David Halliday, Kenneth S. Krane, ISBN-13: 978-0471320579, ISBN-10: 0471320579,** **Wiley; 5th edition (April 5, 2001).** **Physics for Scientists and Engineers, :Saunders** **R. A. Serway, P College Publication**
Electronic Materials	**Web Sites, Facebook, Twitter, etc.** **http://library.thinkquest.org/10796** **http://www.phys4arab.net/vb/showthread.php?t=7495** **http://physics.arabhs.com**
Other Learning Materials	**No other learning materials**

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**A lecture hall for maximum 30 students to provide more attention to the students and identify the weaker one** **Well-equipped lab for 25 students maximum**
Technology Resources (AV, data show, Smart Board, software, etc.)	**Computer lab facilities in Physics Department as an optional**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**Large number of apparatus is required so as to maintain the quality of teaching learning process** **Providing educational facilities and models in the lecture.**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	**Students**	**Questionnaires/direct**
Extent of achievement of course learning outcomes	**Program Leaders, Peer Reviewer**	**Periodic self- assessment of the program.**
Quality of learning resources	**Faculty, Peer Reviewer**	**Analyzing of the results of students**

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Dr. Mohamed Aslam Manthrammel