هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	**Classical Mechanics**
Course Code:	**251PHYS**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**Jazan University**
Version:	2022
Last Revision Date:	**January 9, 2023**

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	Level 5 /Year 2				
4. Course general Description					
The course is designed to provide students with 1. The fundamental concepts of vectors and its basic operations 2. Newton laws of motion. 3. Application of Newton's laws in one and two dimensions and in rectilinear motion 4. The concepts of work and energy and their applications in physical problems 5. The essential of the rotational motion and the rotational parameters and their analogy in linear motion 6. the physics of planetary motion and Kepler's laws.					
5. Pre-requirements for this course (if any): 201 MATH					
6. Co- requirements for this course (if any): NIL					
7. Course Main Objective(s) **This course is designed to provide students with:** • The Fundamental concept of vectors and basics vectors operations • The derivation of Newton's laws of motions. 1D and 2D motion and rectilinea motion • Understanding the concept of work and energy and their applications • A description for the rotational motion and analogy of the rotational parameters with liner one ● Understanding the physics of planetary motion.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	91
2.	E-learning		
3.	Hybrid ● Traditional classroom ● E-learning	3	9

No	Mode of Instruction	Contact Hours	Percentage
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	3
5.	Others (specify)	
	Total	33

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	**Define** the scalar and vectors quantities, the position, velocity and acceleration in different coordinates, the linear and rotational motion parameters.	**PLO1.1**	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
1.2	**State** the Newton's law of motion and Kepler's laws of planetary motion	**PLO1.1**	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
…	**Discuss** the concept of energy and momentum conservation in linear and rotational motion	**PLO1.2**	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.0	Skills			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	**Derive** Newton's laws of motion and laws of planetary motion	**PLO2.2**	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
2.2	**Solve:**physical problems related to the motion in 1D, 2D, rectilinear, and rotational motion, in addition for the particle motion under gravitational and central forces.	**PLO2.1**	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
…	**Develop** communication and critical thinking competencies during interactive discussion, group assignments, essays or web-based activities	**PLO2.4**	Lectures, blackboard and visualization, group and interactive guided discussion, Interactive discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams **Indirect**: student survey
3.0	Values, autonomy, and responsibility			
3.1	**Show** effective collaboration and bear individual responsibility during group work and/or assignments	**PLO3.1**	Interactive and Group discussion, expository and discovery teaching	**Direct** (formative and summative): interactive questioning-group

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				assignment **Indirect**: student survey

C. Course Content

No	List of Topics	Contact Hours
1	**Vectors**: Equality of vectors, vector addition, multiplication by a scalar, vector subtraction, commutative law, associative law, distributive law, magnitude of a vector, Scalar product, vector product, physical examples of products, triple products, derivative of a vector, position vector, velocity and acceleration in rectangular, plane polar, cylindrical and spherical coordinates.	**9**
2	**Newtonian Mechanics**: Newton laws of motion: first, second, and third law. Linear momentum, motion of a particle, rectilinear motion: uniform acceleration under a constant force, motion on inclined surface, Motion of a body with variable mass: rocket motion	**6**
3	**Energy:** Forces that depend on position: the concepts of kinetic and potential energy, Kinetic and potential energy, dynamic systems and the laws of conservation of energy.	**6**
4	**Circular and Rotational Motion:** Angular displacement, angular velocity, angular acceleration, rotational kinematics: Rotational motion with constant angular acceleration, rotational acceleration, moment of inertia torque, rotational work, rotational energy, conservation of angular momentum	**6**
5	**Newton Gravitation:** Newton's law of gravitation, Kepler's Laws: Newton's law of universal gravitation, Kepler's Laws of Planetary Motion: Kepler's First Law: The Law of Ellipses, Kepler's Second Law: Equal Areas and Conservation of Angular Momentum, Kepler's Third Law: The Harmonic Law and their mathematical derivations	**6**
Total		33

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Over semester	10%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	Quiz 1	5	5%
3.	Mid-term	6	20%
4	Quiz-2	9	5%
5	Activities	Over semester	10%
6	Final	12	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Analytical Mechanics; G. R. Fowls and G. Cassiday – 7th edition, Brooks, Cole, publishing, 2004.
Supportive References	-Classical Mechanics; V. Barges and M. Olsson, McGraw Hill, 1995. -Classical Mechanics; T. L. Chow, John Wiley and Son Ltd, 1995.
Electronic Materials	**http://ocw.mit.edu/courses/physics/** **https://www.edx.org** The Physics Classroom **http://www.physics.org/explore.asp**
Other Learning Materials	Mathematica Packages

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Computer Labs.
Technology equipment (projector, smart board, software)	Smart Board (exist in few classes)
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Effectiveness of students' assessment	Instructor	Direct/Indirect
Quality of learning resources		
The extent to which CLOs have been achieved	Students, Faculty members	Indirect
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	DEPARTMENT BOARD
REFERENCE NO.	PHYS2304
DATE	28/2/2023

Approved by:

Head of Physics Department

Dr. Hussain Alathlawi