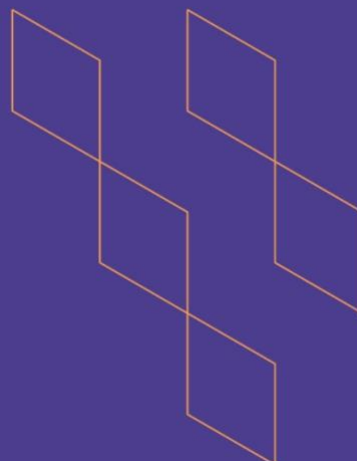




T-104
2022

Course Specification



Course Title:	Vibrations and Waves
Course Code:	PHYS 230
Program:	B.Sc. in Physics
Department:	Department of Physics and astronomy
College:	College of Science
Institution:	King Saud University
Version:	2.0.0
Last Revision Date:	Sep 2023



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A. General information about the course:

Course Identification	
1. Credit hours:	3(3+0+0)
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Track <input type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	Fourth level / second year.
4. Course general Description	
<p>The course aims to introduce students to the Free, Damped and Forced vibrations. The main topics are Harmonic motion, Angular, Acoustic, Plasma, and Molecular vibrations, Electrical circuit oscillations, Heavy, Light, and Critical damping, Steady state, Superposition and Transients in forced vibrations, Resonance circuits, Waves: travelling, standing, dispersive and nondispersive.</p>	
5. Pre-requirements for this course (if any): Phys 111	
6. Co- requirements for this course (if any): Math 209	
7. Course Main Objective(s)	
<ol style="list-style-type: none"> 1. Knowing the fundamentals of vibration and waves in Physics, particularly: Physics of free vibrations – damping in Physical phenomena – the physics of forced vibrations. 2. Knowing the practical applications of vibrations and waves. 3. Gaining the attitude to improve his generic skills (knowledge – cognitive –interpersonal – communication – IT) 4. Gaining a standard level of solving problems and evaluating numbers. 	

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	45	100%
2.	E-learning	0	0
3.	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 	0	0
4.	Distance learning	0	0

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	0
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
	Total	45

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	Demonstrate knowledge of course units (physics of the vibrations and waves, physics of free and forced vibrations, and physics of damping).	K1	<ul style="list-style-type: none"> Give extensive examples during lecture. 	<ul style="list-style-type: none"> Hold Class discussion, tutorial sessions.
1.2	Recognize the practical applications of vibrations and waves.	K2	<ul style="list-style-type: none"> Give problem sheets to be discussed during lecture. 	<ul style="list-style-type: none"> Give quizzes, mid-term exam, and final exam.
2.0	Skills			
2.1	Develop problem solving skills to effectively work on qualitative and quantitative problems related to the free, damped and forced vibrations.	S1	<ul style="list-style-type: none"> Give extensive examples during lecture. Give problem sheets to be discussed during lecture and labs. Assignments. Discussions in the classes. 	<ul style="list-style-type: none"> Hold Class discussion, tutorial and lab sessions. Give quizzes, mid-term exam, and final exam.
3.0	Values, autonomy, and responsibility			
3.1	Present oral and written scientific communication on discussions pertaining to physics of the vibrations and	V1	<ul style="list-style-type: none"> Assignments. Homework. 	<ul style="list-style-type: none"> Hold Class discussion.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	waves, think critically and work independently.			
3.2	Work as a team and acknowledge others' work.	V2		

C. Course Content

No	List of Topics	Contact Hours
1.	Free Vibrations: Harmonic motion, and Alternative Mathematics	6
2.	Free Vibrations in Physics: Angular, Acoustic, Plasma, Molecular vibrations and Electrical Circuit Oscillations	6
3.	Damping: Heavy, Light, and Critical damping	6
4.	Damping in Physics: Resonance, Electromagnetic, Collision, Friction Damping	6
5.	Forced Vibrations: Steady State, Superposition, and Transients	6
6.	Forced Vibrations in Physics: Resonant Circuit, Scattering Light	6
7.	Non-dispersive Waves: Traveling and Standing waves	6
8.	Fourier theory: Fourier series	3
Total		

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	First Midterm examination	Approx. 6	20%
2.	Second Midterm examination	Approx. 12	20%
3.	Assignments	Weekly	20%
4.	Final examination	From 16 to 18	40%

*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	الاهتزازات والموجات في الفيزياء تأليف إيان. ج. مين ترجمة: حمد عبدالله الهندي وعادل مجذوب حسيب جامعة الملك سعود، ١٩٩٩
Supportive References	The Physics of Vibrations and Waves, H.J. Pain John Wiley & Sons, Sussex, 1999



	Waves and Vibrations, George C. King A John Wiley and Sons, Ltd., Publication, 3 rd Ed., Great Brittan, 2009
Electronic Materials	None
Other Learning Materials	Internet sites relevant to the course

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A classroom which accommodates 25 students.
Technology equipment (projector, smart board, software)	Whiteboard and Smart board
Other equipment (depending on the nature of the specialty)	Not applicable

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students\ Peer Reviewer	Indirect \ direct
Effectiveness of students assessment	Students- Faculty	Direct
Quality of learning resources	students	Indirect
The extent to which CLOs have been achieved	Faculty	Indirect
Other	None	None

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Physics Department's council
REFERENCE NO.	6 th (1 st term /1445)
DATE	28/04/1445

