ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Course Specifications

(CS) Waves/

Phys 208

Course Specifications

Institution: **University of Dammam** Date: *28/02/2014*

College/Department : **College of Science / Department of Physics**

A. Course Identification and General Information

1. Course title and code: **Waves/ Phys 208**

2. Credit hours: 3 (**Lecture)**

3. Program(s) in which the course is offered.

(If general elective available in many programs indicate this rather than list programs): **Bachelor of Physics / College of Science**

4. Name of faculty member responsible for the course:

A specific team from the Department of Physics

5. Level/year at which this course is offered: **Level 4**

6. Pre-requisites for this course (if any): **Phys 101**

7. Co-requisites for this course (if any): **Does not exist**

8. Location if not on main campus: **Physics Department/ College of Science**.

9. Mode of Instruction (mark all that apply)

a. traditional classroom	*Yes*	What percentage?	*60*
% b. blended (traditional and online)	*Yes*	What percentage?	
30 % c. e-learning	*No*	What percentage?	
10% d. correspondence	*No*	What percentage?	
0%			
f. other	*Yes*	What percentage?	
0%			

Comments: *Used the Cooperative Education and interactive learning*

B Objectives

1. What is the main purpose for this course?

- **The objective of this course is to familiarize students with the principles of periodic motions and to appreciate their applications in life and in technical equipment. The examples and problems selected for the course give students the necessary knowledge and skills to read and analyze scientific data with a proper understand. The first chapters lay down the foundation that is absolutely necessary to understand the wave phenomenon that appears in later chapters.**
- **On this basis, after finishing this course, student will be able to:**
  Describe oscillatory motion, simple harmonic motion, mass-spring system, simple pendulum, and damped and forced oscillation, resonance effect and calculate the parameters involved in motions classified as being oscillatory.
  Recognize the concept of wave and identify the properties of waves, wave velocity, energy, and related equations.
  Define wave, explain wave characteristics: superposition of waves, wave reflection and transmission, traveling and standing waves.
  Explain types of waves (sound and light waves) and identify the characteristic properties of waves, Doppler effect applied to mechanical waves, resonance, interference, and beats and diffraction phenomena.
- **The student will suitably prepared for studies beyond A Level in Physics, in Engineering or in.**

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in

the field)

Explain strategy of the course in the beginning of the semester
Outlines of the physical laws and relations, principles and the associated proofs. Lectures and power point presentation.
Self learning.
Open discussion s. Group work.
Used Black Board and e-learning. Small project.
Highlighting the day life applications whenever exist.
Encourage the students to see more details in the international web sites and reference books in the library.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:

	1. Topics to be Covered		
	List of Topics	No. of Weeks	Contact hours
1a	First contact - define the program of the module - Distribution of grades of assessment	1	1
	vOscillations		
	ü Simple Harmonic Oscillations (SHO)		
1a	Mass-Spring system - Differential Equation of SHO and its Solution - Amplitude, Frequency, Time Period and Phase. Velocity and - Acceleration. - Exercises	1	2
2a	- Kinetic, Potential and Total Energy and their Time average values. - Relationship between uniform circular motion and simple harmonic - Representation of SHO. - Exercises	2	3
3a	Pendulum - Simple Pendulum: Differential Equation of SHO and its Solution. - Angular Amplitude, Frequency, angular velocity and Acceleration, - Kinetic and Potential energy - Exercises	3	3
4a	- Physical Pendulum - Exercises	4-5	1
	ü Damped and Forced Oscillations:		
5a	Damped Oscillations - Define damped oscillations, - Effects of the degree of damping, - Differential Equation of motion and its Solution. - Over-damping regime - Critical regime	5	2

6a	- Oscillatory behavior regime - Effects of the degree of damping on the Time Period - Energy of a damped oscillator - Exercises	6	3
7a	Forced Oscillations - Solution of the differential Equation - Amplitude, Phase, - Resonance and its application, - Sharpness of Resonance - Power Dissipation and Quality Factor. - Exercises	7	3
	ü Superposition of Two Collinear Harmonic Oscillations		
8a	- Oscillations having Equal Frequencies and - Oscillations having Different Frequencies (Beats)	8	1
	vWaves		
	ü Wave Motion		

8a	Wave Motion - Define travelling wave - Mechanic, electromagnetic and matter waves - Longitudinal and Transverse - Plane and spherical Waves - Wave Equation	8	2
9a	- Differential Equation and particle velocity - Velocity of waves on a String - The energy in a mechanical wave - Exercises	9	3
10a	Superposition of waves -Transmission and reflexion - Interference - travelling wave and standing (stationary) wave - Standing waves in a string: Fixed and Free Ends. - Exercises	10	3
	ü Sound wave		
11a	- The Nature of Sound Waves - speed of sound in different media - Sound Intensity - Interference in Time, Beats - Standing waves in an open and closed Pipes - Doppler Effect - Exercises	11	3
12*a*	Light Wave Electromagnetic wave, Interference and diffraction of light waves, Young's experiment, Diffraction due to single slit and two slits, light polarization.	***1***2	3
13*a*	Review and questions and problems	13	3

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	*26*	*13*	*NA*	*NA*	*NA*	39
Credit	*26*	*13*	*NA*	*NA*	*NA*	39

3. Additional private study/learning hours expected for students per week.	4	

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	**Describe oscillatory motion, damped and forced oscillation and calculate the parameters involved in motions classified as being oscillatory** **Describe practical examples of damped oscillations with particular reference to the effects of the degree of damping and the importance of critical damping in cases such as a car suspension system and understand qualitatively the factors that determine the frequency response and sharpness of the resonance**	**Demonstrating the basic information and principles through lectures and the achieved applications**	**Quizzes Assignments Homework**
1.2	**Explain types of waves and wave characteristics, superposition of waves, waves on strings, and wave reflection and transmission** **State that all electromagnetic waves travel with the same speed in free space and recall the orders of magnitude of the wavelengths of the principal radiations from radio waves to γ-rays.** **Explain the wave-like behavior of light through diffraction and understanding that polarisation is a phenomenon associated with transverse waves**	**Discussing phenomena with illustrating pictures and diagrams Solve some example during the lecture.**	**Homework Quizzes Assignments**
1.3	**Improving logical thinking.**	**Lecturing method: Blackboard Power point e-learning**	**Quizzes mid term exams Long exams (final) Oral exams**

1.4	**To use mathematical formulation to describe the physical principle or phenomena**	**Tutorials Revisit concepts Discussions**	**Ask the student to clear the mis-understanding of some mathematical principle**
2.0	**Cognitive Skills**		
2.1	**The ability to use physical laws and principles to understand the subject.**	**Preparing main outlines for teaching Define tasks for each chapter**	**Assignments Midterm's exam Short quizzes**
2.2	**The ability to simplify problems and analyze phenomena**	**Lectures Group work**	**Asking about physical laws previously taught**
2.3	**Analyze and explain natural phenomena/ Doppler effect applied to mechanical waves, interference, and beats Show an appreciation that there are some circumstances in which resonance is useful and other circumstances in which resonance should be avoided.**	**Open discussions Group work Homework assignments Small project**	**Writing reports on selected parts of the course**
2.4	**Ability to Represent the problems mathematically**	**Encourage the student to look for the information in different references**	**Discussions of how to simplify or analyze some phenomena**
3.0	**Interpersonal Skills & Responsibility**		
3.1	**The students learn independently and take up responsibility**	**Learn how to search the internet and use the library.**	**Quizzes on the previous lecture. Checking report on internet use and trips.**
3.2	**The student fluent in dealing with others and collaborative work.**	**Teamwork**	**Mini project**
3.3	**The student respects the opinions of others . The student accepts criticism.**	**Interactive learning**	**Assignments Teamwork**
4.0	**Communication, Information Technology, Numerical**		
4.1	**Feeling mathematical reality of solving. problems**	**Know the basic physical principles. Discuss with the student**	**Their interaction with the lectures and discussions**
5.0	**Psychomotor**		
5.1	*NA*	*NA*	*NA*
5.2			

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across

the top.)

Course LOs #	Program Learning Outcomes (Use Program LO Code #s provided in the Program Specifications)													
	Knowledge				Cognitive Skills				Interpersonal Skills & Responsibility			Communic ation, Information Technology, Numerical		Psychomotor
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	5.0
1a														
2a														
3a														
4a														
5a														
6a														
7a														
8a														
9a														
10a														
11a														
12a														
13a														

6. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	*Homework Activity / Assignments / Group works*	**Every week**	**10**
2	*Quizzes*	**4 th and 10th weeks**	**10**
3	*Midterm exam 1*	**6th weeks**	**15%**
4	*Midterm exam 2*	**12th weeks**	**15%**
5	*Final exam*	**End of semester**	**50 %**
6	*Total*		**100%**

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

Faculty web-page with communication tolls in Black Board.
***4* office hours/ week.**

E Learning Resources

1. List Required Textbooks:

1. The Physics of Waves and Oscillations by N.K. Bajaj (Tata McGraw-Hill, 1988)
2. Fundamentals of Waves & Oscillations By K. Uno Ingard (Cambridge University Press,
1988)
3. Waves: Berkeley Physics Course(In SI Units), Volume 3, Franks Crawford ,Tata McGrawHill, 2007.
4. The physics of vibrations and waves, H. J. Pain, Wiley, 6rd (2005*)*
ىسوم الله دبع روتكدلا ناتسلأا ,جاوملأا و.
***5.* تازازتلا**
يسيقلا نيسايل يزاغروتكدلا,توصلا و جاوملأا و.
6. **تازازتلا**

2. List Essential References Materials (Journals, Reports, etc.):

- **Vibrations and Waves in Physics: Iain; Cambridge University Press.**
- **Fundamentals of Physics:Halliday and Resnick, John Willey and Sons.**
- **http://www.booksamillion.com/bam/covers/0/48/664/926/0486649261.jpg Physics of**
  Waves: William C. Elmore; Mark A. Heald; Elmore; Dover Publications.

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4- تايساسأ -
رشنلل ليرجكام راد - يدانلا دوصقملا دبع.
دمحم .د

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
Does not exist

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
Consult courses in website of the certified universities, lectures in Youtube..

5. Other learning material such as computer-based programs/CD, professional standards or regulations and
software.
Does not exist

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in
classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
Classrooms enough for 30 student, Black (white) boards

2. Computing resources (AV, data show, Smart Board, software, etc.)
Computer, data show, Smart Board

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach
list):
Does not exist

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
Via questionnaires
Meeting with students e-suggestions
Open door policy

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

Does not exist

3 Processes for Improvement of Teaching

Report writing of the course and determine goals. Fortification of the student learning. Handling the weakness point.

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

The instructors of the course are checking together and put a unique process of evaluation.

Feedback evaluation of teaching from independent organization.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Student evaluation,
Course report,
Program report,
Program Self study,
Plan of improvement should be given.
Collect all reports and evaluations at the end of the year for a reviewing purpose.
Conduct a workshop to presents finding of reports and evaluation to share knowledge.