هيئة تقويم التعليم
Education Evaluation Commission
المركز الوطني للتقويم والاعتماد الأكاديمي
National Center for Academic Accreditation and Evaluation

COURSE SPECIFICATIONS
(CS)

Optics

PHYS 331

June 2018

Course Specifications

Institution King Saud University	Date 30/11/2017
College/Department College of Science / Department of Physics & Astronomy	

A. Course Identification and General Information

1. Course title and code: Optics, PHYS 331			
2. Credit hours 3(3+0+0)			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) BSc degree in Physics			
4. Name of faculty member responsible for the course Dr. Tayyab Imran + Dr. Zeyad Alahmed			
5. Level/year at which this course is offered Level5/Third Year			
6. Pre-requisites for this course (if any) PHYS 232			
7. Co-requisites for this course (if any)			
8. Location if not on main campus Main Campus for Male and Female (Diriyah)			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	X	What percentage?	80
b. blended (traditional and online)	X	What percentage?	20
c. e-learning		What percentage?	
d. correspondence		What percentage?	
f. other		What percentage?	

Comments:
Using smart board and showing optics related animations is very interactive

B Objectives

1. What is the main purpose for this course? . The students should be able to understand and express wave theory of light and its applications. . The students should be aware and deal with some basic optical instruments . The students learn the problem-solving in optics and light, help them to improve their skills.
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) - Two introductory lectures to explain some basics of light and optics, and explain to them how this course will proceed through or strategy of the course. - Provide them necessary material online, and show animations so that they can understand the more easily complex optical phenomenon. - Homework and assignment, help them to develop their skill problem-solving in optics. - Small projects may also help them to understand experimental optics to improve experimental building skill. - Solving selected problems in the class will help the students to take an interest in this course. - Encourage students to read reference books.

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

Course Description: Waves theory of light: wave equation, sinusoidal waves, phase velocity, complex representation, and plane waves. Superposition of waves: superposition principle, superposition of waves of the same frequency, standing waves, phase and group velocities, energy and power. Interference: two-beam interference, Young's double-slit experiment, double-slit interference with virtual sources, interference in dielectric films, Newton's Rings. Optical Interferometer. Polarization, production of polarized light, double refraction (birefringence). Diffraction of light: types of diffraction, Fraunhofer diffractio, beam spreading, and resolution. Diffraction grating, grating equation, dispersion, types of grating and grating instruments.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to Light and Optics	1	3
Wave theory of light	2	6
Superposition of waves	2	6
Interference	3	9
Optical interferometry	2	6
Polarization	2	6
Diffraction	3	9

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	45	-	-	-	-	45
Credit	45					45

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.

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	State principles and important applications of optics, Define and describe the physics of wave phenomena like interference, diffraction, and other related concepts in polarization and coherence.	Lecturing method: a) Blackboard b) Power point c) Tutorials d) Revisit concepts e) Dissection with students inside the class.	1. Contribution during Lectures 2. Midterm and Final exam 3. Homework's and open book Exam.
2.0	**Cognitive Skills**		
	• Solving problems related to course contents. • Discussing typical and lengthy problems. • summarize the importance topics in the optics • explain phenomena, • draw diagram related to topics	analysis, capability for creative thinking, problem identification and solving - Home works assigned to students. - Solving selected problems inside the class.	- quick questions. - Adopting quizzes or fast exam.
3.0	**Interpersonal Skills & Responsibility**		
3.1	• Description of the interpersonal skills and capacity to carry responsibility to be developed, • Demonstrating the basic information and principles optics and waves,	Learn how to: - search the internet and use the library - cover missed lectures - summarize lectures - collect materials of the course - solve difficulties in learning - enhance educational skills	-Exams -Take-home assignments -Quizzes on the previous lecture -Checking report on internet use.
4.0	**Communication, Information Technology, Numerical**		

4.1	- Report on small project - Search in the internet for information on a given point the use of new technological tools - Discussing phenomena with illustrating pictures and diagram	Ask the student to search the internet Give the student tasks to develop his write reports	-Continuous assessment inside the class. -Duties and homework's are continuously given. reports for the different aims -Discussion
4.2	1- scientific forums For Numerical skills: 2- Calculate numerical problems , 3- Computational analysis 4- Data representation analysis and interpretation.	Creating working groups to collectively discuss difficulties Encourage students to join scientific forums	Problem solutions Results of computations and analysis Comments on some resulting numbers
5.0	**Psychomotor**		
	NA		

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	Midterm Examination 1	6	15%
2	Midterm Examination 2	11	15%
3	Class Activities (Quizzes-Participation)	weekly	15%
4	Homework/Assignment	Monthly	15%
5	Final Examination	16	40%

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)

Office Hours: 4 hours per week

E Learning Resources

1. List Required Textbooks
   1. Introduction to Optics, by J. Pedrotti, Leno M, Leno S. Pedrotti, 3rd ed. 2014, Publisher: Benjamin Cummings.
   2. Introduction to optics A Dowyan and M Salhee, 2009, KSU press (in Arabic)

3. Optics by Eugene Hecht, 4th ed. 2002, Addison Wesley
2. List Essential References Materials (Journals, Reports, etc.) 1. Lectures notes by Rick Trebino, Georgia Institute of Technology.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) Wave Phenomena, eds. Hamad Abdullah Alhendi and **Adil Magzoub Hassib**, KSU(translation of: Vibration and Waves in Physics, eds. Lain G. Main, Third Edition, Cambridge University Press.
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. https://www.staff.science.uu.nl/~gadda001/goodtheorist/files/louro_optics.pdf
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

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.) Lecture room for 30 students Laboratory for Wave Phenomena (there is a special course for laboratory related to waves)
2. Computing resources (AV, data show, Smart Board, software, etc.) Smartboard is essential Computer lab and Simple software to understand optical phenomenon
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Optics animation demonstration

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching Student feedback/evaluation is done electronically by the University
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department It can be evaluated by discussion with students, through oral examinations
3 Processes for Improvement of Teaching Self-analysis

Course report
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) Teachers/instructors evaluate and check student achievement
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. The following points may help to get the course effectiveness Student evaluation Course report Program Self-study

Name of Instructor: Dr. Tayyab Imran & Dr. Zeyad Alahmed

Signature: _____ Date Report Completed: 03/12/2017

Name of Teaching Staff:

Program Coordinator:_____

Signature: _____ Date Received: _____