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

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS (CS)

PHYS 634

هيئة تقويم التعليم
Education Evaluation Commission

Course Specifications

Institution: King Saud University	Date: 02/01/2018
College/ Department: College of Science/Dept. of Physics & Astronomy	

A. Course Identification and General Information

1. Course title and code: PHY 634

2. Credit hours: 3

3. Program(s) in which the course is offered. Ph.D. Degree in Physics
(If general elective available in many programs indicate this rather than list programs)

4. Name of faculty member responsible for the course
Dr. Zeyad El-Ahmed

5. Level/year at which this course is offered: 600 level

6. Pre-requisites for this course (if any): PHY 537, PHY 631

7. Co-requisites for this course (if any): PHY 637

8. Location if not on the main campus: Main Campus for male and female (Diriyah, Riyadh)

9. Mode of Instruction (mark all that apply):

a. Traditional classroom	X	What percentage?	60
b. Blended (traditional and online)	X	What percentage?	20
c. E-Learning What percentage?	X		20
d. Correspondence What percentage?			
f. other		What percentage?	

Comments:

Using smart board and showing animations to demonstrate different phenomenon related to Photonics

B Objectives

1. What is the main purpose of this course?
   -To understand the basic concepts photonics and different photonic devices, its mathematical and experimental treatments and applications.
   -The students learn the problem-solving in photonics and photonic devices, help them to improve their skills in problem-solving and troubleshooting.

2. Briefly, describe any plans for developing and improving the course that is 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)

- One two introductory lectures to explain some basics of electronic instrumentation, laser, 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 photonics phenomenon.
- Homework and assignment, help them to develop their skill problem-solving in photonics.
- Small projects may also help them to understand experimental photonics 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:
Propagation of EM waves in Dielectric waveguide – Fiber optics (boundary conditions, phase and group velocity, attenuation, and dispersion, cut off frequency, single and multimode fibers) – Emitters (LED &laser diodes DH, QW, BDR, DFB, VCSEL's) - Fabrication techniques – Materials for Photonics – Laser modulation (AM, FM and PM) and Demodulation – Receivers (Detectors PIN, PMT, APD), homodyne and heterodyne detection – Sensors – Switching devices and waveguide switching

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Maxwell's equations and boundary conditions	1	3
Wave equations and plane waves	1	3
Group velocity and phase velocity	1	3
Propagation of electromagnetic waves	1	3
Fiber optics, waveguides, optical waveguides	2	6
Lighting Emitting Diode (LED) and Laser Diode	1	3
Photodetectors and Photovoltaic (solar cells), Sensors	1	3
Electro-optic and acousto-optics modulators,	2	6

Integrated optic modulator	1	3
Materials for Photonics and fabrication techniques	1	3
Switching electronic devices, waveguide switching	1	3
Optical communication	1	3

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planed	42 h		3 h			45 h
	Actual	42 h		3 h			45 h
Credit	Planed						
	Actual						

3. Additional private study/learning hours expected for students per week. 6

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	The physics of photonics	The achieved applications Using Blackboard in describing the photonics	Discussion during lectures
1.2	The physics of waveguide and photonics devices including fiber optics	Showing animation using smart-board, it helps to understand the photonics concepts visually	Quizzes, examinations
2.0	**Cognitive Skills**		
2.1	How to use physical laws and principles to understand the subject	To ask students to follow some derivations	Lecture questions and seminar sessions
2.2	Try to teach the way to give them real-life examples	Interactive presentations and sharing presented	Homework/assignments

		knowledge	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Description of the interpersonal skills and capacity to carry responsibility to be developed	Learn how to summarize lectures or to collect materials of the course	Through discussion during lecture
3.2	The students should learn how to: learn independently and take up responsibility for • Develop his English language • Think in solving problems	Learn how to search the internet and use the library	Asking questions during lectures
4.0	**Communication, Information Technology, Numerical**		
4.1	Communication: between teacher and students during the class	Advice students to communicate with the teacher to discuss difficulties	Discussion on the difficulties
4.2	The internet: computer skills, numerical skills through solving problems	Asking for solving some problems and search the internet for related topics	Cross questioning and examination
5.0	**Psychomotor**		
5.1			
5.2			

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Examination	8	25%
2	Class Activities (Presentation, Quizzes and participation)	Weekly	20%
3	Homework/Assignments	Monthly	15%
4	Final Examination	16	40%

D. Student Academic Counseling and Support

1. Arrangements for the 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

Fundamentals of Photonics, B. Saleh & M. Teich, 2nd edition, John Wiley & Sons, Inc.

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

1.Optoelectronics and Photonics: principles and practices, S. O. Kasap , 1st edition, Pearson Prentice Hall.

2. Fundamentals of guided wave optoelectronics devices, W. Chang, Cambridge, 2010 3. Photonics: optical electronics in modern communications, A. Yariv & P. Yeh, Oxford University Press, 2007. 4. Physics of optoelectronics devices, S. Chuang, John Wiley & Sons, 1995.
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-974-fundamentals-of-photonics-quantum-electronics-spring-2006/lecture-notes/
4. 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 25 students This course should have separate laboratory, 20% of this course should be experimental
2. Technology resources (AV, data show, Smart Board, software, etc.) Smartboard is essential Computer Simple software to understand photonics phenomenon
3. Other resources (specify, e.g., if specific laboratory equipment is required, list requirements or attach list) 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 Discussion with students Oral examinations
3. Processes for Improvement of Teaching Self-analysis Encouraging questions from students 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 the student's achievements and progress
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. Student evaluation Course reports Program self-study

Name of Course Instructor: _____

Signature: _____ Date Specification Completed: 02/01/2018

Program Coordinator: _____

Signature: _____ Date Received: _____