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

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS (CS)

هيئة تقويم التعليم
Education Evaluation Commission

Course Specifications

Institution: **King Saud University**	Date: **07 January 2018**
College/Department : **Department of Physics and Astronomy**	

A. Course Identification and General Information

1. Course title and code: **Materials Science** & code: **Phys 574**
2. Credit hours: (3+0+0)
3. Program(s) in which the course is offered. **Master in materials science**
(If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course: Dr. Amel Laref
5. Level/year at which this course is offered: : Level three of master
6. Pre-requisites for this course (if any): **Phys 570**
7. Co-requisites for this course (if any):
8. Location if not on main campus:
9. Mode of Instruction (mark all that apply):

a. traditional classroom	x	What percentage?	100 %
b. blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. correspondence		What percentage?	
f. other		What percentage?	

Comments:

B Objectives

1. What is the main purpose for this course?

The student should get acquainted with crystalline and amorphous solids, type of defects in solids, different techniques of crystalline growth in solids and ceramics and their related alloys. X-ray diffraction and elemental analysis are provided. To understand the phase diagram of materials and their related alloys under various conditions, such as temperature, pressure and concentration effect. The mechanical properties of materials, such as hardness and elasticity are also involved. The optical properties (UV and IR) of materials are provided. In addition, he/she should learn about various physical properties of materials and their functionalities in advanced technologies.

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)

Based on the acquired knowledge in material science and theory of solids, the student will be able to write reports and survey about a chosen small research project related to materials science and to learn then about novel material applied in advanced technologies.

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

Course Description:

Crystalline and amorphous solids – Metallic, semiconducting and insulating materials – Crystal growth – Thin films – Nano-properties – Phase change in solids and phase diagrams – X-ray diffraction – Elemental analysis – Preparation of alloys and ceramics – Types of defects – Elasticity and hardness – Polymers and plastics - Ultraviolet and infrared properties of materials.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Crystalline and amorphous solids, Type of defects	2	6
Metallic, semiconducting and insulating materials	2	6
Crystal growth, Thin films-Nanoproperties, Preparation of alloys and ceramics	3	9
Phase change in solids and phase diagrams	3	9
X-ray diffraction, Elemental analysis	2	6
Elasticity and hardness, polymers and plastics	2	6
, Ultraviolet and infrared properties of materials	2	6

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planed	45	0	0	0		45
	Actual	45	0	9	0		58
Credit	Planed	3	0	0	0		3
	Actual	3	0	0	0		3

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

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 student will be able to grasp the idea of learning the crystalline and amorphous solids, X-ray diffraction and elemental analysis, different type of defects in solids, different techniques of crystalline growth in solids, ceramics and their alloys.	-From interactive class lectures. - By solving problems in the classes. -From the home assignments	-To increase quizzes in the class. - To evaluate the home works, reports, presentations, midterm and final exams.
1.2	To understand their phase diagram and their mechanical and optical properties within their different physical applications. In addition, he/she should learn about various physical properties of different materials and their usage (in related physical problems).	-From interactive class lectures. - By solving problems in the classes. -From the home assignments	-To increase quizzes in the class. - To evaluate the home works, reports, presentations, midterm and final exams.
2.0	**Cognitive Skills**		

2.1	- To acquire knowledge about the basic concepts of materials science starting from various states of materials and to learn about the useful techniques for crystalline growth and analysis in material science.	-From interactive class lectures. - By solving problems in the classes. -From the home assignments.	-To increase quizzes in the class. - To evaluate the home works, reports, presentations, midterm and final exams.
2.2	The student will develop skills to perform research bibliography and summarizing the existing research papers.	-Leaning steps for writing research paper	-Oral presentation for research paper
3.0	**Interpersonal Skills & Responsibility**		
3.1	To acquire experience in writing reports and giving presentations.	-Develop thinking besides to team work during the classes. Home assignments and research reports	-Gaining experience by presenting the given research paper. -To discuss the related problem during classes
3.2	To perform the task by taking all necessary steps for achieving research projects, reports, and home assignments in the required time.	-Home assignments, quizzes, reports and research papers.	-Gaining experience by presenting the given research paper. -To discuss the related problem during classes
4.0	**Communication, Information Technology, Numerical**		
4.1	To develop communication skills	-Develop thinking besides to team work during the classes. Home assignments and research reports	-To provide small research project in the concerned course.
4.2	To gain experience by searching for research articles in recognized scholar webs.	Research reports and presentations	-To provide small research project in the concerned course.
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	Home assignment every two weeks	3rd, 6th, 9th, 12th	12 %
2	Midterm exam 1	7th	20%
3	Midterm exam 2	12th	20%
4	Term research paper and presentation	14th	8%
5	Final exam	16th	40%
6			
7			

8			

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: Three hours per week.

E Learning Resources

1. List Required Textbooks - Material science engineering. Callister - Introduction to materials science for engineers. James F. Shackelford
2. List Essential References Materials (Journals, Reports, etc.) - Understanding materials science by Hummel. - The science and engineering of materials by Askeland
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Raswin, Hypechem, and Rall & stick softwares.

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.) 1. Lab.
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department
3. Processes for Improvement of Teaching
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)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Name of Course Instructor: _____

Signature: _____ Date Specification Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____