المركز الوطني للتقويم والاعتماد الاكاديمي
National Center for Academic Accreditation and Evaluation

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS (CS)

هيئة تقويم التعليم
Education Evaluation Commission

Course Specifications

Institution: University of Tabuk	Date:	18/4/2019
Faculty/Department : Science/Physics		

A. Course Identification and General Information

1. Course title and code:
   Modern Physics Lab, PHYS381
2. Credit hours: 1
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
Bachelor of Science
4. Name of faculty member responsible for the course
Rachid Ayad
5. Level/year at which this course is offered: 5/3
6. Pre-requisites for this course (if any):
PHYS241
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		What percentage?	
b. blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. correspondence		What percentage?	
f. Lab roomWhat percentage?	■		100%

Comments:

B Objectives

1. What is the main purpose for this course?

This course gives students basics on how to perform experiments in Modern Physics. The student will first practice on how to interpret experiments results at the error analysis and statistical level. Then a series of experiments are scheduled spanning from properties of electromagnetic waves (light) and Quantum mechanics based experiments, to experiments dealing with Nuclear and Particle Physics topics. All these topics were taught in modern physics courses and the student will therefore practice here on applying them using known experiments performed by physicists since the beginning the the 20^{th} century. So the main objective of this course is the ability to setup experiments in the modern physics field, take data, analyze the data, interpret results, and write reports.

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)

The course does not need further updates.

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

Course Description:

The Lab course covers the following: Error Analysis, then applying concepts acquainted in Modern Physics I(PHYS241 and PHYS342) courses to perform the following experiments: Inverse square-law of electromagnetic waves, absorption of light on glass, cosmic rays and Muon lifetime, measuring the X-ray spectrum from Mo X-ray source, Duane-Hunt relation anddetermination of Planck's constant,measuring the activity of a radioactive material, and attenuation of electrons on Aluminum material.

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Planck's constant,measuring the activity of a radioactive material, and attenuation of electrons on Aluminum material.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Error Analysis with Excel fitting applications	2	4
Inverse square-law of electromagnetic waves	1	2
absorption of light on glass	1	2
cosmic rays and Muon lifetime	2	4
measuring the X-ray spectrum from Mo X-ray source	2	4
Duane-Hunt relation anddetermination of Planck's constant	2	4
measuring the activity of a radioactive material	1	2
attenuation of electrons on Aluminum material	1	2
Review and practice on all experiments	2	4

2. Course components (total contact hours and credits per semester): 28

		Lecture	Tutorial	Laboratory/ Studio	Practical	exams	Total
Contact Hours	Planed	28				2	30
	Actual	28				2	30
Credit	Planed	1					
	Actual	1					

3. Additional private study/learning hours expected for students per week: **20**

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	Be able to understandhow to apply theoretical basics of the fundamental concepts of various Modern Physics topics covered in previous Modern Physics courses to some experiments, historically performed by physicists since the beginning of the 20th century. To do this the student need to practice on performing experimental setups, take, interpret results at concept and error analysis level, and write a report.	- Introductory lecture about the significance of the course and the topics to be covered - Learn to use the library in the self-learning fashion - Students are assigned home-work problems - Solving selected home assigned problems from each text book chapter. - practice on experimental setups in the course Lab room with teacher guidance.	- Homework exams - Written and practice exams
1.2			
2.0	**Cognitive Skills**		
2.1	Be able to start experimental setups from scratch using the existing Lab apparatus. Then finish the full process to complete the experiments: take data, analyze data, interpret results, write reports, and eventually present the results. The student is also urged todraw conclusions about the experience he gained on above experimentation issues to build up ideas to perform future experiments he will be assigned to work on.	- Students should be assigned to perform experiments and write reports at a self-practicing level. - Learn to use the library in the self-learning fashion - The students should first write a theoretical summary of what they plan to accomplish before starting the experiments. This helps them to practice on writing proposals for research and R&D projects in the	-Perform experiments and write reports to be graded.
2.2	Be able to communicate effectively with a range of audiences in particular withstudents, teacher, and with colleagues in R&D groups, and general audience.		

		future. - On-line web-based learning	
3.0	**Interpersonal Skills & Responsibility**		
3.1	Directing the student to self-learning and greater knowledge in the field of the course.	-Assign students projects on topics related to the course subject - Give students critical thinking questions	-Presentations -Participation
3.2	Encouraging students to communicate among themselves under instructor guidance.		
4.0	**Communication, Information Technology, Numerical**		
4.1	None		
4.2			
5.0	**Psychomotor**		
5.1	None		
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	HW, Quizzes and participation	Over all the semester	10%
2	Midterm exam 1	6	25%
3	Midterm exam 2	11	25%
4	Final exam	15	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)

Students are split in groups and a Faculty member is assigned to a group as adviser. The adviser is responsible of:

1) Providing career guidance for students
2) Inform Students of Faculty and University Policies
3) Monitor Student Performance.
4) Conducting Orientation Sessions.
5) Informing Students of available Resources(library, classrooms, Labs, ….)

The course teacher has, as well, definite office hours to be available for student counseling and problems solving. The teacher uses every way possible to let students know when he hold office hours; He post them on his door office, mention them on the course syllabus, post them on the course website, and announce them in class.

E Learning Resources

1. List Required Textbooks

- **Theoretical Concepts textbook**: Modern Physics, for Scientists and Engineers", by J.R . Taylor, C.D. zafiratos, and M.A. Dubson, second edition
- **Practical TextBook**: Experiments in Modern Physics, by by Adrian C. Melissinos, and Jim Napolitano, 2nd Edition

2. List Essential References Materials (Journals, Reports, etc.)
Modern Physics Experiments
University of Chinese academy of Science
http://english.ucas.ac.cn/index.php/admission/undergraduate/course-syllabuses/617-school-of-physical-sciences/4497-modern-physics-experiments

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

a- MIT Junior Lad: http://web.mit.edu/8.13/www/index.shtml
b- Many youtube channels and videos like: PHYSICS 143 Lab course, Carleton College

https://www.youtube.com/watch?v=MDo3YcnIBgo&list=PLDKh3Bj92AtgEeu6xetcdQl7y57QPFYj9
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.) Lab Smart Classroom
2. Technology resources (AV, data show, Smart Board, software, etc.) - Data show. - Internet - Software
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 - Regular evaluation of the course teaching to identify the weak areas - Performance appraisal form filled up by students to show level of fulfillment - Confidential completion of standard course evaluation questionnaire
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department - A regular statistical review and analysis of the students' achievement in the department. - Prepare a questionnaire which should be filled by the students at the end of the term. Questionnaires should be analyzed and carefully studied.
3. Processes for Improvement of Teaching - Provide training and workshop opportunities for the teaching staff to improve their teaching strategies. - Form committees to follow up progress and work on improvement. - Provide opportunities to improve academic courses and research through conferences. - Provide the teaching staff members with all the references and electronic resources. - Updating teaching strategies through reading new articles about related topics to the course - Improve relations between instructor and students

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 department is working towards Standardization of exams in case of a multi-section course. The department is scheduling regular visits of external examiners to evaluate the teaching at overall and to verify standardization of student's assessment, as well its alignment with international quality assurance guidelines. The quality assurance deanship at the faculty and at the university level have also the task to ensure that students assessment is aligned with local and international curriculum.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. - Student's feedback on the quality of the course. - Consulting other faculty members or collaborator in overseas universities for their views on the method of quality of improvement - Check other universities teavhing websites - Improve course syllabus following syllabus templates from standard universities. - Create a specialized committee from the department to review the progress of teaching and update the resources - Consult distinguished students and discuss with them how to improve Lecturing issues.

Name of Course Instructor: Rachid Ayad

Signature: *Rachid Ayad* Date Specification Completed: 18/4/2019

Program Coordinator: Dr. Fahad Alharbi
Signature: *Dr. Fahad Alharbi* Date Received: 19/4/2019