COURSE SPECIFICATIONS
(CS)

Accelerator Physics

PHYS 485

June 2018

Course Specifications

Institution **King Saud University**	Date**4.dec.2017**
College/Department Science / physics and Astronomy	

A. Course Identification and General Information

1. Course title and code:**Accelerator Physics (PHYS 485)**			
2. Credit hours**2 (2+0+0)**			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) **B.Sc. of Science in Physics**			
4. Name of faculty member responsible for the course **Dr. Safar Alghamdi- Dr. Mohamed Saleh Al-Garawi –Dr. Khaled Kezzar**			
5. Level/year at which this course is offered**Level 8**			
6. Pre-requisites for this course (if any)**PHYS 481**			
7. Co-requisites for this course (if any)			
8. Location if not on main campus **Main Campus (Boys) and Female Campus (Girls), Dariyah**			
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? 1- **The student should be able to identify many aspects of accelerator physics** **2- The student should be able to use physical laws and principles** **3- The student should be able to Work independently and within a group** **4- The student should be able to use of the internet**
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) **1- Students are encouraged to communicate through the e-mail of the lecturer site which has many links to important sources of knowledge in the field of accelerators.** **2- Encourage students to search in the specialized web sites in the Internet to increase their knowledge about the use of accelerators and to follow any result of new research in the field.**

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
- Comprehensive introduction to the physics of the charged particlebeams and modern particleaccelerators	**4**	**8**
-Basic components of accelerator.	**2**	**4**
- Various types of accelerators including electrostatic accelerators, induction linear accelerators, linear radio-frequency (RF) accelerators, and various circular accelerators such cyclotrons, synchrotrons, chargedparticle in electromagnetic fields, beam acceleration and phase stability.	**6**	**12**
-Applications of accelerators...	**3**	**6**
Total	**15**	**30**

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	**30**					**30**
Credit	**30**					**30**

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

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	Define the particle accelerator and recognizecomponents and their basic operation.	Lectures, illustrations via slides and videos. Individual presentations	Homeworks, peer-evaluation exams
1.2	List the main and recent particle accelerators/colliders that had a major contribution to physics understanding	Research activities and discussions	Self-evaluation, reports and case studies
2.0	**Cognitive Skills**		
2.1	Explain the physics behind the operation of particle accelerators and	Lectures, slides	Homeworks and exams
2.2	Compare between particle accelerators and particle colliders	Lectures, individual presentations	Exams, evaluate the student presentations
2.3	justify the physics motive for the construction of particle accelerators and colliders	Research activities, presentations and if possible a specialist guest speaker	Short essays or reports . Self-assessment
3.0	**Interpersonal Skills & Responsibility**		

3.1	Demonstrate responsibility and commitment	Group work	Homeworks, reports (with deadline)
4.0	**Communication, Information Technology, Numerical**		
4.1	Calculate the energy, rapidity or other measurable of a particle accelerator from its design parameters	Lectures	Homeworks, exams
4.2	Research the web and other sources for information and data related to particle physics and particle accelerators	Research activities, presentations and projects	Evaluation of the presentation and reports, disscussions
5.0	**Psychomotor**		
5.1	NA	NA	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	**Class activities (questions, discussion, and homework)**	**continuos**	**20%**
2	**Term exam I**	**6**	**20%**
3	**Term exam II**	**12**	**20%**
4	**Final exam**	**16**	**40%**
5	**Essays on some topics related to the subject**		

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 : 6 hours / week

E Learning Resources

List Required Textbooks

1- Accelerator Physics and Engineering, Alexander Wu Chao and Maury Tigner,

2nd edition, World Scientific, ISBN: 981 02 3858 4. **2- The Physics of Particle Accelerators, Klaus Wille, Oxford University Press, 2000, ISBN: 19 850549.** **3- Particle Accelerator Physics I , Helmut Wiedemann, Springer, 2nd edition, 1999, ISBN 3 540 64671 .**
2. List Essential References Materials (Journals, Reports, etc.) **Not applicable**
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) **Not applicable**
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. **http://en.wikipedia.org/wiki/Particle_accelerator** **http://www2.slac.stanford.edu/vvc/accelerator.html** **http://nobelprize.org/educational/physics/accelerators/** **http://particleadventure.org/accel.html** **http://www2.slac.stanford.edu/vvc/accelerators/circular.html** **http://hyperphysics.phy-astr.gsu.edu/hbase/particles/linac.html**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. **Not applicable**

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 with at least 30 – 40 seats**
2. Computing resources (AV, data show, Smart Board, software, etc.) **Scientific calculator for each student** **Data show facility**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) **Not applicable**

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching **- Examination results and type of questions answered** **- Course evaluation by student** **- Students- faculty meetings**
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department **- Peer consultation on teaching** **- Departmental council discussions** **- Discussions within the group of faculty teaching the course**
3 Processes for Improvement of Teaching **Workshops on teaching and learning methods**
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) **- Exchanging the course with other lecturers and comparing results** **- Providing statistical information based on examination results**
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. **- The course material is periodically reviewed and the changes to be taken are approved in the departmental and higher councils.** **- The head of department and faculty council take the responsibility of implementing the proposed changes.**

Name of Instructor: _____

Signature:_____Date Report Completed:_____

Name of Field Experience Teaching Staff _____

Program Coordinator:_____

Signature: _____ Date Received:_____