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: 31/12/2017
College/Department : College of science, department of physics and astronomy	

A. Course Identification and General Information

1. Course title and code: Classical Mechanics, PHYS 508
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)
Master of physics, all tracks
4. Name of faculty member responsible for the course
Salwa M ALSALEH, PhD
5. Level/year at which this course is offered: 1st year of Msc Programme
6. Pre-requisites for this course (if any): none
7. Co-requisites for this course (if any): none
8. Location if not on main campus: Main campus (Girls campus)
9. Mode of Instruction (mark all that apply):

a. traditional classroom	*	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?

Give the master students a strong background (mathematical and conceptual) in classical mechanics. In order for them to utlise this background in other advanced cources.

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)

Include programming to solve numerical problems.

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

Course Description:

Mathematical introduction . Variational principles and Lagrange's Equations, Central force problem, Oscillations, Classical mechanics of the special theory of relativity, Hamiltonian equations of motion, Canonical transformation, Hamilton -Jacobi theory and action-angle variables, Lagrangian and Hamiltonian formulation for continuous systems and fields.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Mathematical introduction : differential geometry	2	6
Generalized coordinates and constraints	1	3
Variational principle and the principle of stationary action	2	6
Symmetry and conservation laws, Neother's theorem	1	3
Application to Lagrangian mechanics: oscillations, central body motions..etc	2	3
Hamiltonian mechanics and canonical formalism	2	6
Hamilton-Jaccobi equation	1	3
Special relativity and covariant formalism	1	3
Classical field theory (Lagrangian and Hamiltonian construction and Neother's theorem for fields)	2	6
Systems with constraints, Dirac formalism and gauge field theory.	1	3
Example of classical field theory : General relativity	1	3

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planed	40	8	NA	NA		48
	Actual	33	12	NA	NA		45
Credit	Planed	3	-	NA	NA		3
	Actual	3	-	NA	NA		3

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	Mathmatical skills (differential geometry)	Lectures, tutorials	Homeworks , exams
1.2	Computer skills (objective-oriented programming)	Tutorials	Computer-basined homeworks
2.0	**Cognitive Skills**		
2.1	Deep understanding of physical concepts	Lecture, discussion	Presentations, reports, exams
2.2			
3.0	**Interpersonal Skills & Responsibility**		
3.1	Commitment	Correspondence v	grading presence and deadlines.
3.2			
4.0			
4.1			
4.2			
5.0			
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			
2			
3			
4			
5			
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) All course material and announcements are available at the faculty member website. Frequent correspondence between the faculty member and students via email, SMS and other communication channels. http://fac.ksu.edu.sa/salwams/course/211994 The Faculty member has well-known office hours (announced on the office and website) , of 8 hours per week. Students can ask for any academic advice via any available channel . Inter-classroom discussion(s) are encouraged.

E Learning Resources

1. List Required Textbooks * Finn, J. Michael. Classical mechanics. Jones & Bartlett Publishers, 2009. **Bagchi, Bijan. Advanced Classical Mechanics. CRC Press, 2017. ***Goldstein, Herbert. Classical mechanics. Pearson Education India, 2011.
2. List Essential References Materials (Journals, Reports, etc.) Loring W. An introduction to manifolds. Springer Science & Business Media, 2010. Nakahara, Mikio. Geometry, topology and physics. CRC Press, 2003. Arnol'd, Vladimir Igorevich. Mathematical methods of classical mechanics. Vol. 60. Springer Science & Business Media, 2013. Dittrich, W., M. Reuter, and M. Mobius. "Classical and Quantum Dynamics from Classical Pathsto Path Integrals." (1996) 594
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. http://igorivanov.tripod.com/physics/mechanics.html http://www.feynmanlectures.caltech.edu/ https://www.wolframalpha.com/
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Python and/or Mathmatica

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.) Classrooms only (computer laboratory could be beneficial sometimes.)
2. Technology resources (AV, data show, Smart Board, software, etc.) Smart baord for occasional demonstrations
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 Continuous assessments, via homeworks. Presentations by students and feedback forms supplemented to the students.
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department Analysis of students grades, and feedback forms.
3. Processes for Improvement of Teaching Self-assessment guided by continuous updates of course references and teaching techniques.
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: __Salwa M Alsaleh _____

Signature: _____salwams_____ Date Specification Completed: 28/12/2017

Program Coordinator: _____

Signature: _____ Date Received: _____