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

COURSE SPECIFICATIONS
(CS)

Classical Mechanics 1

PHYS 211

June 2018

Course Specifications

Institution	Date of Report
King Saud University	December 2017
College/Department : College of Science / Physics and Astronomy Department	

A. Course Identification and General Information

1. Course title and code: Classical Mechanics 1 – PHYS 211			
2. Credit hours : 3(3+0+0)			
3. Program(s) in which the course is offered. : Bsc in Physics Program (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course Dr. Abubaker Ahmed Siddig			
5. Level/year at which this course is offered : 4th level			
6. Pre-requisites for this course (if any) : PHYS 110			
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	Yes	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 be able to define and describe the basics concepts and principles of mechanics.**
- **The student should be able to understand and interpret the motion of mechanical systems in terms of classical mechanics formulae.**
- **The student should be able to apply a structured process for solving problems in basic classical mechanics**
- **The student should be able to apply the concepts and principles of mechanics through lectures and assessment tools.**

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)

- Add new recent references.

- Assigning extra hours for solving selected problems that are of particular interest.
- Post some course material on the website which could be accessed by the students

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

Course Description:

Motion in one and two dimensions, Newtonian laws and Friction, Circular Motion, Linear and Angular Momentum, Elastic and Inelastic Collisions, Equilibrium, Rigid body Dynamics, Moment of Inertia, Simple Harmonic Motion, Gravitation and Kepler's Laws

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
- Introduction: Vectors . Dimension analyses.	1.33	3.99
- Motion in one dimension and applications.	1.33	3.99
- Motion in two and three dimension and applications.	2	6
- Newtonian laws, friction and applications.	2	6

- Linear momentum ,isolated system and conservation law	1	3
- Collisions in one and two dimensions.	1.33	3.99
-Rigid body dynamics : Angular momentum and conservation law . Momentum of inertia . Torque. Rotation. Kinetic energy of rotation.	2	6
-Rolling motion.	0.66	1.98
- Equilibrium and applications	1	3
- Simple harmonic motion.	1	3
- Gravitation and Kepler's Laws	1.33	3.99

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

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	45					45
Credit	45					45

3. Additional private study/learning hours expected for students per week. 4 - 6

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The ***National Qualification Framework*** provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

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. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

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.

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Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Describe: motions into one, two, and three dimensions, the three Newton's laws of motion and oscillations motion and its applications. Applying Newton's laws for rotation and rolling systems.	- Discussion with students during lecture time - Encouragement of reading more topics from other sources, eg. Web.	- Evaluation of homework assignments - Asking questions during class time
1.2	Recognize elastic and non-elastic collisions, and solve problems of equilibrium	- Show the best ways to deal with problem. - Brain storming sessions.	- Imposing short quizzes
2.0	**Cognitive Skills**		
2.1	- Solve problems in general classical mechanics. - Identifying the differences between dynamic and static systems. - Recognize the basic Newton's laws and their daily applications. - Enhancing the ability of analyzing of the daily problems using scientific approach. - Identifying the effect of gravitation on	- Discussion with students during lecture time. - Enhancing this knowledge through homework assignments. - Encouragement of reading more topics	-Imposing short quizzes. - From the output of examinations. - Check the problems solution. - Discussion of how to simplify or analyses some phenomena

	systems and bodies.	from other sources, eg. Web. - Define duties for each chapter.	during the lecture
3.0	**Interpersonal Skills & Responsibility**		
3.1	- Work independently and as part of a team. - Communicate results of work to others	- Divide the student into groups and encourage the group work and explain its benefit. - Learn how to search the internet and use the library. -Develop his interest in science through: lab work. - Encourage the student to attend lectures regularly.	- The accuracy of the result gained by each group will indicate good group work. - Presenting the required research on time and the degree of the quality will show the sense of responsibility.
4.0	**Communication, Information Technology, Numerical**		
4.1	- Encourage the student to communicate with peers to overcome difficulties, and to communicate with lecturers to: enhance understanding, discuss difficulties. -Use the web for research and to contact with other students from other institutions. - Encourage the student to use libraries. -Discussion between students during the class.	- Creating working groups to collectively prepare: report on small project, solving problems. - Refereeing them as groups to use the internet to search for certain topics and to locate ideas. - Encourage students to join scientific forums.	- Discussing reports and group work sheets. - Discussing to see the student ability in the desired skills.
5.0	**Psychomotor**		

Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

NQF Learning Domains	Suggested Verbs
Knowledge	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop,

Cognitive Skills	create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise
Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
Communication, Information Technology, Numerical	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
Psychomotor	demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct

Suggested ***verbs not to use*** when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge	Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage	Deepen

Some of these verbs can be used if tied to specific actions or quantification.

Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.

5. 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	Midterm 1	around 6th	20%
2	Midterm 2	around 12th	20%
3	Attendance, Assignment, Quizzes	Weekly	20%
6	Final exam	End of semester	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) - 3 office hours per week - Email contact with students (not restricted)

E. Learning Resources

1. List Required Textbooks **Fundamentals of Physics, Binder Ready Version 10th Edition** Authors: David Halliday, Robert Resnick ,Jearl Walker **Publisher:** Wiley; 10 edition (August 5, 2013)
2. List Essential References Materials (Journals, Reports, etc.) - Physics for scientists and engineering by : R. Serway Brooks Cole; 9 edition (January 1, 2013) - The mechanics problem solver, M. Fogiel - Schaum series in Physics and mechanics
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) Many resources such as MIT website (provided by the course responsible)
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software - Data show.

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.) - Classroom equipped with Data show.and smart board
2. Computing resources (AV, data show, Smart Board, software, etc.) data show, Smart Board

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 - Confidential completion by the student of "the standard course evaluation" questionnaire - Group discussion with small groups of students.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor - Regular meetings by the general coordinator with the students. - Observations and assistance from other colleagues - Independent assessment of standards achieved by students
3 Processes for Improvement of Teaching • Course and program reports evaluation • Attending workshops, organized by KSU, dealing with teaching new approaches and strategies. • Periodical departmental revisions of the adopted methods of teaching • Monitoring of teaching activities by senior faculty members
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) • Providing samples of all kinds of assessment within the course portfolio • Assigning a group of faculty members teaching the same course to grade same questions for various students.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • The course material and learning outcomes should be periodically reviewed and hence changes can be taken and approved (by the departmental and higher councils). • The head of department and faculty take the responsibility of implementing the proposed changes. • Improvement: known Faculty in the field from other institutions can be invited to review the accuracy of the teaching and evaluation processes

Faculty or Teaching Staff: _ _____

Signature: _____ **Date Report Completed: _____**

Received by: _____ **Dean/Department Head**

Signature: _____ **Date: _____**

Course Specifications

Institution: King Saud University	Date of Report: May 2018
College/Department : College of Science / Physics and Astronomy Department	

A. Course Identification and General Information

2. Course title and code: Classical Mechanics 1 – PHYS 211
2. Credit hours : 3(3+0+0)
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4. Name of faculty member responsible for the course Dr. Abubaker Ahmed Siddig
5. Level/year at which this course is offered : 4th level
6. Pre-requisites for this course (if any) : PHYS 110
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	Yes	What percentage?	100
b. Blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other		What percentage?	

Comments:

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1. What is the main purpose for this course?
   - The student should be able to define and describe the basics concepts and principles of mechanics.
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List of Topics	No. of Weeks	Contact Hours
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- Motion in one dimension and applications.	1.33	3.99
- Motion in two and three dimension and applications.	2	6
- Newtonian laws, friction and applications.	2	6
- Linear momentum ,isolated system and conservation law	1	3
- Collisions in one and two dimensions.	1.33	3.99

-Rigid body dynamics : Angular momentum and conservation law . Momentum of inertia . Torque. Rotation. Kinetic energy of rotation.	2	6
-Rolling motion.	0.66	1.98
- Equilibrium and applications	1	3
- Simple harmonic motion.	1	3
- Gravitation and Kepler's Laws	1.33	3.99

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

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planed	45	-----	-----	-----	-----	45
	Actual	45	-----	-----	-----	-----	45
Credit	Planed	45	-----	-----	-----	-----	45
	Actual	45	-----	-----	-----	-----	45

3. Additional private study/learning hours expected for students per week. 4 - 6

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1.2	Recognize elastic and non-elastic collisions, and solve problems of equilibrium	- Show the best ways to deal with problem. - Brain storming sessions.	- Imposing short quizzes
2.0	**Cognitive Skills**		
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	understanding, discuss difficulties. -Use the web for research and to contact with other students from other institutions. - Encourage the student to use libraries. -Discussion between students during the class.	report on small project, solving problems. - Refereeing them as groups to use the internet to search for certain topics and to locate ideas. - Encourage students to join scientific forums.	- Discussing to see the student ability in the desired skills.
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Name of Course Instructor: _____

Signature: _____ Date Specification Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____