Course specification

University/Academy: Damanhour University

Faculty/Institute: Science

Department: Mathematics

1. course Data:		
Course code: Math311	Course title: Solid and analytical dynamics	Academic year/level: 2009-2010 Third year - First term
Specialization: Mathematics and physics	No. of instructional units: lecture 4 tutorial 2 practical -	

2. course Aim	Demonstrate theoretical knowledge and have practical skills and personal attributes and competencies that will be required for an applied mathematics position. Demonstrate an ability to initiate and sustain in-depth research relevant to Dynamics. Have an opportunity to put theory into practice via work-based learning
3. Intended learning outcome	
a) Knowledge and understanding	a1. Describe the nature and operations of dynamics. a2 .Demonstrate familiarity with theories and concepts used in dynamics. a3. Recognize the nature and dimensions of dynamics. a4. Identify the steps required to solve a problem in dynamics.
b) Intellectual skills	b1. Apply appropriate theories, principles and concepts relevant to the dynamics. b2. Assess and evaluate the literature within dynamics.

	b3. Discuss a reasoned argument to the solution of familiar and unfamiliar problems relevant to dynamics
c) Professional skills	c1. Summarize practical activities using techniques and procedures appropriate to dynamics. c2. Demonstrate a piece of independent research using dynamics techniques. c3. Recognize ethical and safety issues which are pertinent to dynamics.
d) General skills	d1. Use appropriate effective written and oral communication skills relevant to dynamics. d2. Deal with problems relevant to dynamics using ideas and techniques some of which are at the forefront of the discipline. d3. Acquire the ability to self appraise and reflect on practice relevant to dynamics.
4. course content	Velocity and acceleration in different coordinates systems
	Motion of a heavy particle under gravity on a smooth surface of revolution
	Motion of a particle inside a smooth plane tube
	Motion of a particle on a twisted curve (the circular helix)
	Linear momentum, Angular momentum, kinetic energy.
	General equations of motion of a rigid body, Euler's equations.
	Generalized coordinates.
	Holonomic and non-holonomic dynamical systems
	Lagrange's equations of motion
	Systems with ignorable coordinates
	Hamilton's equations of motion.
	Small oscillations

5. Teaching and learning methods	5.1 Lectures. 5.2 Tutorials 5.3 Homework 5.4 Oral discussion
6. teaching and learning methods for students with special needs	None
7. Student Assessment	
a) Procedures used:	Final exam
b) Schedule:	Assessment 1 Final exam Week 15
c) Weighing of Assessment:	Final exam 200 Marks (100%)
List of Textbooks and References:	
d) Course Notes	Course notes provided by the staff member of Math department, to be handed at the beginning of the semester.
e) Required Books (Textbooks)	A.S .Ramsey, Part II, Dynamics . Cambridge At The University Press,1959.
f) Recommended Books	S.L. Loney, Dynamics of a particle and of rigid bodies. Cambridge At The University Press,1959.
g) Periodicals, web sites,…,etc	None

Course Instructor: Prof. Dr. Sami kassem

Head of Department: Dr. Ragab Omar Abd El-Rahman

Date: -----/-----/----