Course Specifications

Program(s) on which this course is given:	B.Sc. in Aerospace Engineering
Department offering the program:	Major
Department offering the course:	Aerospace Department
Academic Level:	Engineering Mathematics and Physics
Date	2014-2015 / 4th year
Semester (based on final exam timing)	■ Fall ☐ Spring

A- Basic Information

1. Title:	E1: Orbit Determeination			**Code:**	AER490			
2. Units/Credit hours per week:	Lectures	2	Tutorial	1	Practical	**0**	Total	4

B- Professional Information

1. Course description:	The course aims at teaching the student the basic concepts of orbital mechanics and orbit determination.
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	Historical background and equations of motion
	The two-body orbital mechanics and the restricted three-body problem.
	N-body orbital mechanics.
	Orbit determination, orbit prediction and orbital maneuvers.
	Lunar and interplanetary trajectories, orbital rendezvous and space navigation.
	The effect of rigid body models on the stability of orbiting satellites.
	b) Intellectual Skills
	The ability to solve the equations governing the motion of planets and satellite and utilize that for orbit determination.
	c) Professional and Practical Skills
	The ability to solve practical application problems governed the equations of motion and perform rigid body simulations of various satellites orbiting earth.
	d) General and Transferable Skills
	Computing, writing computer programs, analyzing results.

3. Contents

Topic	Total hours	Lectures hours	Tutorial/ Practical hours
Historical background and equations of motion	6	4	2
The two-body orbital mechanics and the restricted three-body problem.	6	4	2

N-body orbital mechanics.	8	6	2
Orbit determination, orbit prediction and orbital maneuvers.	6	4	4
Lunar and interplanetary trajectories, orbital rendezvous and space navigation.	6	4	2
The effect of rigid body models on the stability of orbiting satellites.	6	4	2
Review	4	2	2
Total	44	28	16
4. Teaching and Learning Methods	Lectures (√)	Practical Training/ Laboratory ( )	Seminar/Workshop ( )
	Class Activity (√)	Case Study (√)	Projects (√)
	E-learning ( )	Assignments /Homework (√)	Other:

5. Student Assessment Methods	
• **.Assessment Schedule**	**Week**
-Assessment 1; Class test	-
-Assessment 2; Project Assignment	Every week
-Assessment 3; Presentations	Every week
-Assessment 3; Midterm Exam	9
-Assessment 4; Final Exam	12
• **Weighting of Assessments**	
-Mid-Term Examination	10%
-Final-term Examination	70%
-Project	20%
-Class Test	-%
-Presentation	-
-Total	100%

6. List of References

Curtis, *Orbital Mechanics for Engineering Students*, Elsevier, 2005.

7. Facilities Required for Teaching and Learning

Lecture rooms, projector and overhead projectors, computer and internet connection.

Course Coordinator:	**Prof. Dr. Atef O. Sherif**
Head of Department:	**Prof. Ayman Kassem**