Course Specifications

Program(s) on which this course is given:	Aerospace engineering
Department offering the program:	**Aerospace department**
Department offering the course:	**Aerospace department**
Academic Level:	3rd year
Date	November 2014
Semester (based on final exam timing)	■ Fall □ Spring

A- Basic Information

1. Title:	**Mechanics of Flight and Control A**			**Code:**		**AER307A**		
2. Units/Credit hours per week:	Lectures	3 hrs	Tutorial	2 hrs	Practical		Total	5 hrs

B- Professional Information

1. Course description:	Review of Modeling in State Space, Analysis of State Space Systems, Controllability and Observability, State Space Feedback, Output Feedback, Observer Design, Optimal Control, Case Studies. Aircraft Longitudinal Dynamics and Stability, Lateral Dynamics and Stability, Stability Augmentation.
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	-Students should be able to understand the fundamental concepts of atmospheric flight dynamics. -Students should be able to understand and model the aircraft dynamics using the nonlinear 6DOF equations
	b) Intellectual Skills
	-Students should be able to analytically estimate static and dynamic stability derivatives.
	c) Professional and Practical Skills
	The students should be able to analyze and design controllers using the root locus method
	d) General and Transferable Skills

3. Contents

Topic	Total hours	Lectures hours	Tutorial/ Practical hours
Introduction flight dynamics and control	6	4	2
Longitudinal static stability	12	8	4
Lateral static stability	12	8	4

Aircraft equations of motion	12	8	4
Longitudinal dynamics	6	4	2
Lateral dynamics	8	6	2
Root locus method	18	12	6
	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	Every two weeks
-Assessment 2	Week 11
-Assessment 3	Six announced tests
• **Weighting of Assessments**	
6 Tests (best 4)	14 %
Final-term Examination	68 %
Projects	11 %
Assignments	7 %

6. List of References

6.1- Course Notes

6.2- Essential Books (Text Books)

. Nelson, R. C**., "Flight Stability and Automatic Control**", 2nd Ed**.,** McGraw-Hill Co., 1998

John Van De Vegte, **"Feedback Control Systems".** Prentice Hall, 1994

6.3- Recommended Books

Robert F. Stengel, **"Flight Dynamics",** Princeton University Press, 2004

7. Facilities Required for Teaching and Learning

Data Show , Screen

Course Coordinator:	**Prof. Ayman Hamdy**
Head of Department:	**Prof. Ayman Hamdy**