



### Course Specifications

<b>Program(s) on which this course is given:</b>	Aerospace Engineering Department
<b>Department offering the program:</b>	Aerospace Engineering Department
<b>Department offering the course:</b>	Aerospace Engineering Department
<b>Academic Level:</b>	Master
<b>Date</b>	April 2015
<b>Semester (based on final exam timing)</b>	<input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring

### A- Basic Information

<b>1. Title:</b>	<b>Stochastic Estimation and Control</b>			<b>Code:</b>	<b>AER661</b>			
<b>2. Units/Credit hours per week:</b>	Lectures	2 hrs	Tutorial		Practical		Total	2 hrs

### B- Professional Information

<b>1. Course description:</b>	The course aims at teaching students the followings: Estimation and control of dynamic systems. Classical and state-space descriptions of random processes and their propagation through linear systems. The Kalman filter to estimate the states of dynamic systems. Conditions for stability of the filter equations.
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<b>2. Intended Learning Outcomes of Course (ILOs):</b>	<b>a) Knowledge and Understanding</b>
	1. Students will be able to understand the fundamental concepts of estimation and control of dynamic systems.
	2. Students will be able to describe classical and state-space of random processes.
	<b>b) Intellectual Skills</b>
	1. Students will be able to use Kalman filter to estimate the states of dynamic systems.
	<b>c) Professional and Practical Skills</b>
	1. Students will be able learn the conditions for stability of the filter equations.
	<b>d) General and Transferable Skills</b>

### 3. Contents

Topic	Total hours	Lectures hours	Tutorial/ Practical hours
Estimation of dynamic systems	4	4	
Control of dynamic systems	4	4	
Classical and state-space descriptions of random processes	4	4	
The Kalman filter	4	4	
Estimate the states of dynamic systems	6	6	
Conditions for stability	4	4	
	Lectures ( )	Practical Training/Laboratory ( )	Seminar/Workshop ( )

	Class Activity ( )	Case Study ( )	Projects ( )
	E-learning ( )	Assignments/Homework ( )	Other:
<b>5. Student Assessment Methods</b>			
<b>• Assessment Schedule</b>		<b>Week</b>	
Assignment 1		Week 2	
Assignment 2		Week 4	
Assignment 3		Week 7	
Assignment 4		Week 10	
<b>• Weighting of Assessments</b>			
Assignments		25%	
Attendance		5%	
Final-term Examination		70%	
<b>6. List of References</b>			
<b>6.1- Course Notes</b>			
<b>6.2- Essential Books (Text Books)</b>			
1. Introduction to Random Signals and Applied Kalman Filtering [EC/51].			
<b>6.3- Recommended Books</b>			
1. Feedback Control Systems [John Van De Vegte].			
<b>7. Facilities Required for Teaching and Learning</b>			
. Data Show , Screen, Computer Lab.			
<b>Course Coordinator:</b>	<b>Prof. Gamal M. El-Bayumey</b>		
<b>Head of Department:</b>	<b>Prof. Ayman H. Kassem</b>		