Course Specifications

Program(s) on which this course is given:	Aerospace Engineering Department
Department offering the program:	Aerospace Engineering Department
Department offering the course:	Aerospace Engineering Department
Academic Level:	Master
Date	April 2015
Semester (based on final exam timing)	■ Fall ☐ Spring

A- Basic Information

1. Title:	**Noise and Filtering**			**Code:**		**AER662**		
2. Units/Credit hours per week:	Lectures	2 hrs	Tutorial		Practical		Total	2 hrs

B- Professional Information

1. Course description:	The course aims at teaching students how to analyze signals and noise, design of analogue filters, implement digital filter, and design a Kalman filter.
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding** 1. Students will be able to understand the fundamental concepts of signals and noise. 2. Students will be able to design analogue and digital filters.
	b) Intellectual Skills 1. Students will be able to detect noise from a signal and detect its frequency.
	c) Professional and Practical Skills 1. Students will be able to implement their design filter using simulation software. 2. Students will be able to compare deferent filter types and its effects on the signals.
	d) General and Transferable Skills 1. Students will be able to use deferent filter software as well as programming their own filter using programming language.

3. Contents

Topic	Total hours	Lectures hours	Tutorial/ Practical hours
Signals and noise	4	4	
Introduction to filters	4	4	
Analogue filters and its transformation.	4	4	
Passive and active analog filters implementation.	2	2	
IIR Digital filters.	2	2	
Digital filters implementation	2	2	

Random signals and its statistical analysis	2	2	
Kalman filter	6	6	
	Lectures (√)	Practical Training/Laboratory (√)	Seminar/Workshop ( )
	Class Activity ( )	Case Study (√)	Projects (√)
	E-learning ( )	Assignments/Homework (√)	Other:

5. Student Assessment Methods

• **Assessment Schedule**	**Week**
Assignment 1	Week 2
Assignment 2	Week 3
Assignment 3	Week 5
Assignment 4	Week 7
Assignment 5	Week 8
Assignment 6	Week 10
Assignment 7	Week 11

• **Weighting of Assessments**	
Assignments	30%
Attendance	5%
Lab and oral exam	15%
Final-term Examination	50%

6. List of References

6.1- Course Notes

6.2- Essential Books (Text Books)

1. A course in Digital Signal Processing [SIG/50].
2. Introduction to Random Signals and Applied Kalman Filtering [EC/51].

6.3- Recommended Books

1. Feedback Control Systems [John Van De Vegte].
2. Digital Filter Designer's Handbook [EC/46].
3. Filter Design [EC/56]
4. Digital Filtering: An Introduction [EC/52].

7. Facilities Required for Teaching and Learning

. Data Show , Screen, Computer Lab.

Course Coordinator:	**Prof. Gamal M. El-Bayumey**

Head of Department:	**Prof. Ayman H. Kassem**