DEPARTMENT OF AERONAUTICAL ENGINEERING
COURSE SYLLABUS

AE 457: Data Acquisition and Signal Processing

COURSE TITLE	ENGLISH CODE/NO	ARABIC CODE/NO.	CREDITS			
			Th.	Pr.	Tr.	Total
Data Acquisition and Signal Processing	**AE 457**	**457 هـ ط**	**2**	**3**	**-**	**3**
Pre-requisites:	AE 303, EE 251					
Course Role in Curriculum *(Required/Elective):*	Elective					
Catalogue Description: Introducing and Navigating LabView, Software Development Method and Virtual Instrument (VI) implementation, Developing Modular Applications, Design Techniques and Patterns, Data Acquisition Hardware and Software, Signal Conditioning and Signal Processing, Digital Signals and DSP, Digital Filters design.						

***Textbooks*:**
(Author, Title, Pub., year)

1. 'Labview', Labview User Manual 2009, National Instruments Corporation.
2. Andreas Antoniou, 'Digital Signal Processing – Signal Systems and Filters', McGraw-Hill. Copyright © 2006.

Supplemental Materials:

Course Learning Outcomes:

By the completion of the course the students should be able to:

1. Demonstrate understanding of the principles of instrumentation used in data acquisition and real-time control processes such as sensors and transducers.
2. Plan experiments according to a proper experimental design and choose the appropriate experimental design for different circumstances.
3. Demonstrate understanding of the fundamental graphical programming for instrumentation.
4. Write programs based on an industry-standard graphical programming language.
5. Gain experience in experimental design, technical specifications and selecting proper instruments for a given application.
6. Define terminologies associated with instrumentation systems and data analysis (e.g., range, sensitivity, dynamic response, calibration, hysteresis, error, accuracy, precision, data uncertainty, mean and standard deviation, fitting, etc.)
7. Use data acquisition software and hardware to collect and analyze data from a physical system.
8. Develop computerized instrumentation systems for industrial processes using interface electronics, data acquisition card, serial instruments, etc.
9. Develop special skills and knowledge by training, practice and study of particular subjects in data-acquisition and signal processing.
10. Design and implement some experiments concerning aeronautical and aerospace fields

Topics to be Covered:		***Duration in Weeks***
1.	Data Acquisition Hardware and Software configuration	1
2.	Software Development Method and interface implementation	2
3.	Instrumentation system and Instrument Control	2
4.	graphical programming for instrumentation	2
5.	Signal Conditioning and signal processing	2
6.	Digital Signals and DSP	2
7.	Digital Filters Design and Implementation	2
8.	Laboratory Experiments	1

Key Student Outcomes addressed by the course: (Put a ✓ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	✓
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	✓
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	✓

Key Student Outcomes assessed in the course: (b) and (i)

Instructor or course coordinator: Dr. Belkacem Kada
Last updated: May 2015