Course Specifications

Program(s) on which this course is given:	Aerospace Engineering
Department offering the program:	**Department of Aerospace Engineering**
Department offering the course:	**Department of Aerospace Engineering**
Academic Level:	MSc
Date	March 23 2015
Semester (based on final exam timing)	☐✓ Fall ☐ Spring

A- Basic Information

1. Title:	Intelligent Control (2)			**Code:**	AER 758			
2. Units/Credit hours per week:	Lectures	2	Tutorial	1	Practical	----	Total	3

B- Professional Information

1. Course description:	This course introduces the concepts of advanced intelligent control design of nonlinear autonomous vehicles using advanced artificial intelligent controllers based on Fuzzy logic and neural networks and heuristic optimization methods such as genetic algorithms and particle swarm optimization.
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	Student will understand the basics of artificial neural networks
	Student will understand the basics of Fuzzy logic
	Student will understand the basics of genetic algorithms and particle swarm optimization
	b) Intellectual Skills
	Student will be able to analyze control problem using Matlab neural networks toolbox
	Student will be able to analyze control problem using Matlab fuzzy logic toolbox
	Student will be able to formulate and solve optimization problems using genetic algorithms and particle swarm
	d) General and Transferable Skills
	Student will be able to design a controller using intelligent techniques

3. Contents

Topic	Total hours	Lectures hours	Tutorial/ Practical hours
Neural Network Architectures for Modeling and Control	6	4	2
Fuzzy Systems	6	4	2
Neuro-Fuzzy systems	9	6	3
Genetic Algorithms	9	6	3
Particle Swarm Optimization	6	4	2
Applications of intelligent control	9	6	3

4. Teaching and Learning Methods	Lectures (✓)	Practical Training/ Laboratory (✓)	Seminar/Workshop ( )
	Class Activity (✓)	Case Study ()	Projects (✓)
	E-learning (0)	Assignments /Homework (✓)	Other:

5. Student Assessment Methods	
• **.Assessment Schedule**	**Week**
-Assessment 1; Project Assignments	3,5,7,9
-Assessment 2; Presentations	10
-Assessment 3; Midterm Exam	9
-Assessment 4; Final Exam	16
• **Weighting of Assessments**	
-Mid-Term Examination	20
-Final-term Examination	40
-Project	20
-Class Test	15
-Presentation	5
-Total	100

6. List of References

Intelligent Control Systems: An Introduction with Examples, Applied Optimization, ISSN 1384-6485
AuthorsKatalin M. Hangos, R. Lakner, M. Gerzson, Springer Science & Business Media, 2001

Intelligent Control: Biomimicry for Optimization, Adaptation, and Decision-Making in Computer Control and Automation, by K. M. Passino, Springer-Verlag, London, UK, 2004

7. Facilities Required for Teaching and Learning

Computer lab

Course Coordinator:	**Dr. Ayman H. Kassem**
Head of Department:	**Dr. Ayman H. Kassem**