Course Specifications

Program(s) on which this course is given:	Aircraft Structures
Department offering the program:	Aerospace Engineering
Department offering the course:	Aerospace Engineering
Academic Level:	M.Sc.
Date	March 2015
Semester (based on final exam timing)	☐ Fall ■ Spring

A- Basic Information

1. Title:	Structure Optimization			**Code:**		**AER 632**		
2. Units/Credit hours per week:	Lectures	2	Tutorial	1	Practical		Total	3

B- Professional Information

1. Coursedescription:	**Structural optimization is a major topic in the different fields of structure design. In aerospace Engineering where the minimum weight design is a basic requirement, this topic becomes of an extreme importance.**
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	Understanding the concept of structural optimization. Applications of the various techniques used in structure optimization. Computation of the optimum design.
	Case study and numerical examples.
	b) Intellectual Skills
	Analysis and Problem solving
	c) Professional and Practical Skills
	Manage , engineering design , computer programming and ability to identify the problem
	d) General and Transferable Skills
	Computing, management, use of technological tools and working in group.

3. Contents

Topic	**Total hours**	**Lectures hours**	**Tutorial/ Practical hours**
Unconstrained and constrained optimization techniques.	2	2	
Linear and Nonlinear Mathematical programming.	12	8	4
Geometric Programming.	6	4	2
Dynamic Programming.	6	4	2
Stochastic Programming.	7	4	3
Genetic optimization.	12	8	4
4. Teaching and Learning Methods	Lectures (x)	Practical Training/ Laboratory (x)	Seminar/Workshop (x)
	Class Activity	Case Study (x)	Projects ()

	(x)		
	E-learning (x)	Assignments /Homework (x)	Other:

5. Student Assessment Methods	
• **Assessment Schedule**	**Week**
-Assessment 1;Class test	3, 6, 10, 13
-Assessment 2; Project Assignment	14
-Assessment 3; Presentations	7,14
-Assessment 3; Midterm Exam	8
-Assessment 4; Final Exam	15
• **Weighting of Assessments**	
-Mid-Term Examination	10 %
-Final-term Examination	70 %
-Project	10 %
-Class Test	5 %
-Presentation	5 %
-Total	100 %

6. List of References
Optimization, theory and applications, S.S.Rao, John Wiley.
Optimum design of structures, K.I.Majid, Newness-Butterworths
Optimization methods for engineering design, R.L.Fox, Addison-Wesley.
An introduction to genetic algorithm, M.Melanie, A Bradford Book The MIT Press.

7. Facilities Required for Teaching and Learning
Computer Lab, Data show, software.

Course Coordinator:	**Prof. Edward A. Sadek**
Head of Department:	