Course Specifications

Program(s) on which this course is given:	B.Sc. Aerospace Engineering
Department offering the program:	Aerospace Engineering
Department offering the course:	Aerospace Engineering
Academic Level:	1st Year
Date	2014/2015
Semester (based on final exam timing)	■ Fall ☐ Spring

A- Basic Information

1. Title:	E1: Dynamics of Structures			**Code:**	AER452			
2. Units/Credit hours per week:	Lectures	1½	Tutorial	½	Practical		Total	2

B- Professional Information

1. Coursedescription:	
2. Intended Learning Outcomes of Course (ILOs):	**a) Knowledge and Understanding**
	1- Understand the vibration of Single Degree of Freedom (SDOF) systems 2- Know what is modal analysis
	3- Interpret the frequency response of a system
	b) Intellectual Skills
	1- Calculate modal properties of SDOF systems 2- Theoretically calculate the modal properties of viscous MDOF systems
	3- Experimentally calculate the modal properties of a real structure
	c) Professional and Practical Skills
	1- Understand the vibration of viscous Multi Degree of Freedom (MDOF) systems and structures
	2- Understand theoretical modal analysis 3- Understand experimental modal analysis
	d) General and Transferable Skills

3. Contents

Topic	Total hours	Lectures hours	Tutorial/ Practical hours
1- Introduction	2	1	
2- Modal Testing	2	1	
3- SDOF Modal Analysis	6	2	1
4- MDOF Spatial Analysis	6	2	1
5- MDOF Modal Analysis	6	2	1
6- Modal Parameter Extraction (Experimental Modal Analysis)	6	2	1

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

5. Student Assessment Methods	
• **.Assessment Schedule**	**Week**
-Assessment 1;Class test	2
-Assessment 2; Project Assignment	6
-Assessment 3; Presentations	11
-Assessment 3; Midterm Exam	14
-Assessment 4; Final Exam	16
• **Weighting of Assessments**	
-Mid-Term Examination	15%
-Final-term Examination	70%
-Project	
-Class Test	15%
-Presentation	
-Total	100%

6. List of References

1. A. Brandt, Noise And Vibration Analysis, Wiley, 2011. (Comprehensive and very good for both theoretical and experimental modal analyses)

2. D. J. Ewins, Modal Testing: Theory and Practice, Wiley, 2nd ed., 2001. (Concise Includes vast topics. Difficult for beginners. Reader unfriendly.)

3. K. Shin and J. K. Hammond, Fundamentals of Signal Processing for Soundand Vibration Engineers, John Wiley & Sons, 2008. (Very good explanation of Signal Processing. Comprehensible for mechanical engineering students. Assisted with very interesting examples and Matlab codes. Wider and more practical than Brigham's)

4. E. O. Brigham, The fast Fourier transform and its applications, Prentice-Hall, 1988. (Visual and very good explanation of the Fourier Analysis and its properties . . .)

5. Mircea Rades, Mechanical Vibrations I, 2006. (Very very good)

6. Mircea Rades, Mechanical Vibrations II, 2010. (Very very good)

7. Facilities Required for Teaching and Learning

.projector and white board

Course Coordinator:	**Dr.Ahmed Mohamed Rashed**
Head of Department:	**Dr.Ayman Hamdy**