AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title		Advanced Mechanical Vibrations and İts Applications						
Course Code		MME535		Couse Level		Second Cycle (Master's Degree)		
ECTS Credit	8	Workload	203 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		To introduce knowledge to graduate students on modelling mechanical systems from real life applications as discrete or continuous systems, to solve eigenvalue problems, and to investigate free and forced vibrations of discrete systems.						
Course Content		Obtaining equation of motion of mechanical systems, solving eigenvalue problems, approximate solutions on obtaining eigenfrequency and mode shapes, and analyzing free and forced vibration of discrete systems.						
Work Placement		N/A						
Planned Learning Activities and Teaching Methods				Explanation (Presentation)				
Name of Lecturer(s)		Lec. Turgay ERAY						

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	50
Assignment	2	15

Recommended or Required Reading

1	Mechanical Vibrations, S.S. Rao, Pearson
2	Analytical Methods in Vibrations, L.Meirovitch, New-York,The Macmilan Comp
3	Principles and Techniques of Vibrations, L. Meirovitch, New Jersey, Prentice Hall

Week	Weekly Detailed Course Contents	
1	Theoretical	Review of Lagrange Mechanics: Obtaining equation of motion of mechanical systems
2	Theoretical	Modeling mechanical systems as discrete systems
3	Theoretical	Vibration of discrete systems: Mass and Stiffness matrices
4	Theoretical	Eigenvalue problem and mode shapes
5	Theoretical	Full and semi-definite discrete systems
6	Theoretical	Approximate methods on eigenfrequency determination
7	Theoretical	Continuous systems
8	Intermediate Exam	Midterm Exam
9	Theoretical	Vibration of strings, axial and torsional vibration of rods
10	Theoretical	Bending vibration of beams
11	Theoretical	Bending vibration of beams
12	Theoretical	Approximate methods on vibration of continuous systems
13	Theoretical	Damped vibration of discrete systems
14	Theoretical	Forced vibration of discrete systems
15	Theoretical	Forced vibration of continuous systems
16	Theoretical	Final exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	5	4	126
Assignment	5	0	3	15
Term Project	1	15	10	25
Quiz	2	3	1	8
Midterm Examination	1	15	2	17

Final Examination	1	10	2	12
		Total Workload (Hours)		203
		[Total Workload (Hours) / 25*] = **ECTS**		8

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	To model mechanical systems from real-life applications as discrete or continuous systems
2	To learn knowledge on vibration and mode shapes of mechanical systems by solving eigenvalue problems
3	To learn knowledge on damped and forced vibrational response of mechanical systems
4	To able to solve advanced dynamic problems
5	To able to simulate advanced dynamic problems

Programme Outcomes *(Mechanical Engineering (English) Master)*

1	To be able to access wide and deep information with scientific researches in the field of Engineering, evaluate, interpret and implement the knowledge gained in his/her field of study
2	To be able to complete and implement "limited or incomplete data" by using the scientific methods
3	To be able to consolidate engineering problems, develop proper method(s) to solve and apply the innovative solutions to them
4	To be able to develop new and original ideas and method(s), to develop new innovative solutions at design of system, component or process
5	To be able to gain comprehensive information on modern techniques, methods and their borders which are being applied to engineering
6	To be able to design and apply analytical, modeling and experimental based research, analyze and interpret the faced complex issues during the design and apply process
7	To be able to gain high level ability to define the required information and data
8	To be able to work in multi-disciplinary teams and to take responsibility to define approaches for complex situations
9	To be able to transfer of the process and results of studies at national and international environments systematic and clear verbal or written
10	To be able to be aware of social, scientific and ethical values guarding adequacy at all professional activities and at the stage of data collection, interpretation, and announcement
11	To be able to become aware of new and developing application of profession and ability to analyze and study on those applications
12	To be able to interpret engineering application's social and environmental dimensions and it's compliance with the social environment

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P1	3	4	3	3	3
P2	4	5	4	4	4
P3	4	4	3	5	5
P4	4	3	4	5	5
P5	3	4	4	4	4
P6	4	5	4	3	3
P7	4	4	4	3	5
P8	4	3	3	4	4
P9	4	4	4	5	3
P10	3	4	5	5	3
P11	4	4	4	4	4
P12	5	3	4	3	5