AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Advanced Dynamics and Its Applications						
Course Code	MME605		Couse Level	Third Cycle (Doctorate Degree)			
ECTS Credit	9	Workload	251 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	Deals with advanced concepts in dynamics and assumes the knowledge of Newtonian dynamics of particles and systems of particles. Analytical dynamics is emphasized with developing mathematical models that describe the dynamics of systems of rigid bodies and elastically deformable bodies. The course will also address the formulation of equations of motion for complicated mechanical systems and methods for solving these equations. Formulation of mathematical models of the real engineering systems is also interested in.						
Course Content	Teaches fundamentals of dynamics and dynamic systems Teaches modeling of dynamic systems, equation of motion in different coordinate systems. Teaches modeling of dynamic systems and solving problems using different methods						
Work Placement	N/A						
Planned Learning Activities and Teaching Methods		Explanation (Presentation), Discussion, Case Study, Project Based Study, Individual Study, Problem Solving					
Name of Lecturer(s)							

Prerequisites & Co-requisities

Language Requisite	Yes

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	50
Term Assignment	3	30

Recommended or Required Reading

1	1. Haim Baruh, Analytical Dynamics, WCB/McGraw-Hill, Boston,R C Hibbeler.
2	2. Engineering Mechanics: Dynamics. 12th edition, 2010. Pearson Publishing Company.
3	3. Meriam JL & Kraige LG : Engineering Mechanics: Dynamics, sixth edition, SI version, 2008, John Wiley.

Week	Weekly Detailed Course Contents	
1	Theoretical	Review of Newtonian dynamics
2	Theoretical	Review of Newtonian dynamics
3	Theoretical	Relative motion, generalized coordinates.
4	Theoretical	Principle of virtual work and D'Alembert's principle
5	Theoretical	Lagrange's equations
6	Theoretical	Lagrange's equations
7	Theoretical	Kinematics and kinetics of rigid bodies
8	Intermediate Exam	Midterm
9	Theoretical	Kinematics and kinetics of rigid bodies
10	Theoretical	Three dimensional kinetics of a rigid body
11	Theoretical	Three dimensional kinetics of a rigid body
12	Theoretical	Computational approach to solve real dynamics problems
13	Theoretical	Dynamics of flexible bodies
14	Theoretical	Dynamics of flexible bodies
15	Theoretical	Dynamics of flexible bodies
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	6	3	126

Assignment	3	5	5	30
Term Project	3	12	5	51
Midterm Examination	1	20	1	21
Final Examination	1	20	3	23
			Total Workload (Hours)	251
			[Total Workload (Hours) / 25*] = **ECTS**	10

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	Defines fundamentals of dynamics and dynamic systems
2	Defines modeling of dynamic systems, equation of motion in different coordinate systems.
3	To ability to solve dynamic problems
4	To able to model dynamic problems
5	To be able to analyze the dynamic problems

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

1	1. In Mathematics, natural sciences and mechanical engineering, department has the sufficient infrastructure; the ability to use the theoretical and practical information for engineering solutions
2	2. The ability to identify, define, and solve the formula for complex engineering problems; the ability to select and apply for the appropriate analytical methods and modelling techniques
3	3. To meet desired needs of a system, system component, or process, analysing and designing skill under realistic constraints; in this respect, the ability to apply the methods of modern design
4	4. The ability to use and choose modern techniques and tools for required engineering applications and; the ability to use information technology effectively
5	5. The ability to design the experiment, collect the data for the experiment and interpret to analysing results
6	6. The ability to use computer software and hardware information, access to information and other information sources
7	7. The ability to work individually and with multidisciplinary teams effectively, taking responsibility self-confidence for complex situations
8	8. The ability to communicate with foreign colleagues by having high level of foreign language knowledge in the field of engineering
9	9. Monitoring the science and technology developments and the ability to renew itself with innovative ideas constantly
10	10. Professional and ethical responsibility awareness
11	11. Having an adequate information and awareness in the subjects of occupational safety, occupational health, social security rights, quality control and management issues of environmental protection
12	12. The ability to appreciate the effects of engineering solutions and applications in universal and social dimensions
13	13. The ability to be enlightened to the experts or non-expert audience groups on the issues related with engineering problems and solutions written and oral
14	14. The ability to have adequate knowledge and skills in the project development and application, manage the activities planning, including the projects to the employees having the responsibility of the project by increasing vocational awareness

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	3	5	3	5
P2	4	4	4	4	4
P3	5	5	3	5	3
P4	5	5	5	5	3
P5	4	4	4	4	4
P6	3	3	3	3	5
P7	3	3	3	3	5
P8	4	4	4	4	4
P9	5	5	5	5	3
P10	5	5	5	5	4
P11	4	4	4	4	5
P12	3	3	3	3	5
P13	4	4	4	4	4
P14	5	5	5	5	3