

MM 554 Analytical Mechanics				MECHANICAL ENGINEERING DEPARTMENT					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project/Field Study	Homework	Other	Total	Credit	ECTS credit
1,2	30	12				146	188	3	7.5
Language	Turkish								
Compulsory / Elective	Optional								
Prerequisites	-								
Course Contents	Variational principles and Lagrange's equations. Derivation of Lagrange's equations from Hamilton's principle. Differential equations of motion of an arbitrary system of particles. Equations of motion in a potential field. Variational principles and integral invariants. Eulerian angles. Calley-Klein parameters. The Hamilton equations of motion. Canonical transformations and the Hamilton-Jacobi equations. Stability of equilibrium and motions of a system. Small oscillations. Introduction to the Lagrangian and Hamiltonian Formulations for Continuous systems and fields.								
Course Objectives	Mechanics of deformable bodies involves the study of stress, strain, and temperature distribution in a solid or fluent body subjected to mechanical and termal loading.								
Learning Outcomes and Competences	Students are provided by the knowledge of formulation and analysis of the basic boundary/initial-value problems at the proper level of mathematical methods that enable them to understand the general underlying principles.								
Textbook and /or Reference	1. Meirovitch, L., (1970). Methods of Analytical Dynamics. McGraw-Hill. 2. Fowles, G.R., Cassiday, G.L., Analytical Mechanics, Saunders College Publishing, Sixth Edition, 1999 3. Bose, S., chattraj, D., Elementary Analytical Mechanics, Alpha Science, 2000								
Assessment Criteria					If any, mark as (X)		Percentage (%)		
	Midterm Exams				X		50		
	Quizzes								
	Homeworks								
	Projects								
	Term Paper								
	Laboratory Work								
	Other								
	Final Exam				X		50		
Instructors	Prof. Sefaattin YUKSEL								
Week	Subject								
1	Variational principles and Lagrange's equations.								
2	Derivation of Lagrange's equations from Hamilton's principle.								
3	Differential equations of motion of an arbitrary system of particles.								
4	Equation of motion in a potential field.								
5	Variational principles and integral invariants.								
6	Variational principles and integral invariants.								
7	Eulerian angles.								
8	Cayley-Klein parameters.								
9	The Hamilton equations of motion.								
10	Canonical transformations and the Hamilton-Jacobi equations.								
11	Canonical transformations and the Hamilton-Jacobi equations.								
12	Stability of equilibrium and motions of a system.								
13	Small oscillations.								
14	Introduction to the Lagrangian and Hamiltonian Formulations for continuous systems and fields								