

MM 504 Advanced System Dynamics and Optimal Control				MECHANICAL ENGINEERING DEPARTMENT					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project/Field Study	Homework	Other	Total	Credit	ECTS credit
1,2	12	30		30	30	86	188	3	7.5
Language	Turkish								
Compulsory / Elective	Optional								
Prerequisites	-								
Course Contents	State determined systems. State models of energetic systems. One port mechanical, electrical, fluid and thermal system elements. Multiport transducing elements. Formulation of state equations. Linear graphs. Controllability and observability. Variational methods in dynamics and control. Stability of linear and nonlinear systems; Liapunov function. Optimal control and the state function of Pontryagin. State function approach to linear system synthesis; Riccati equation, Kalman equation. Modeling & performance indices.								
Course Objectives	State determined systems. State models of energetic systems. One port mechanical, electrical, fluid and thermal system elements. Multiport transducing elements. Formulation of state equations								
Learning Outcomes and Competences	Learning to Optimal control and the state function of Pontryagin. State function approach to linear system synthesis; Riccati equation and Kalman equation. Modeling and performance indices.								
Textbook and /or Reference	1. K. Ogata, "System Dynamics.",Prentice-Hall, 1997. 2. Shearer, Murphy, Richardson,"Introduction to System Dynamics" Addison-Wesley,1972. 3. Rowel,Wormley," Introduction to System Dynamics" Prentice-Hall, 1997. 4. Y.Ercan," Mühendislik Sistemlerinin Modellenmesi ve Dinamiği", 2003								
Assessment Criteria					If any, mark as (X)		Percentage (%)		
	Midterm Exams				X		40		
	Quizzes								
	Homeworks				X		10		
	Projects								
	Term Paper				X		10		
	Laboratory Work								
	Other								
	Final Exam				X		40		
Instructors	Prof. Mehmet EROGLU, Assoc.Prof. Metin U. SALAMCI								
Week	Subject								
1	State Determined Systems								
2	Models of Energetic(Physical)SDS								
3	Models of Energetic(Physical)SDS								
4	Equations of State for Systems of Interconnected Part								
5	Causal Graphs and Transfer Functions								
6	Controllability, Observability								
7	System Responce,Matrix Exp.								
8	Stability								
9	Classical Control Synthesis								
10	Controllers,Performance Indexes								
11	Optimal Control								
12	State Function Pontryagin								
13	State Regulators								
14	Supplement Observers								