

MM 562 Modeling and Control of Flexible Manufacturing Systems				MECHANICAL ENGINEERING DEPARTMENT					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project/Field Study	Homework	Other	Total	Credit	ECTS credit
1,2	42					146	188	3	7.5
Language	Turkish								
Compulsory / Elective	Optional								
Prerequisites	-								
Course Contents	An introduction to flexible manufacturing systems (FMS): definitions, characteristics and types of FMS, examples, a detailed analysis of flexibility and performance issues, flexible manufacturing system as discrete event dynamic systems (DEDS): models used to represent TMS and DEDS: petri nets, min max algebra approach, markov chain, finite state machine approach, simulation models. More emphasis will be given to petri-net and min max approaches, comparison of modeling techniques, control of FMS, control architectures, decomposition and coordination issues, disturbance and necessary corrective control actions, real time scheduling methodologies.								
Course Objectives	Teaching the modeling and control approaches used in flexible manufacturing systems.								
Learning Outcomes and Competences	Understanding the workings of the flexible manufacturing systems; getting familiar and learning the modeling and control techniques used in the FMS.								
Textbook and /or Reference	1. Groover, M. P. (2001). Automation, Production Systems, and Computer Integrated Manufacturing Upper Saddle River: Prentice Hall. 2. Zhou, M. C. And K. Venkatesh (1999). Modeling, simulation, and control of flexible manufacturing systems : a Petri net approach World Scientific: River Edge, N.J.								
Assessment Criteria					If any, mark as (X)		Percentage (%)		
	Midterm Exams				X		30		
	Quizzes								
	Homeworks				X		10		
	Projects				X		10		
	Term Paper								
	Laboratory Work								
	Other								
Final Exam				X		50			
Instructors	Prof. Mustafa YURDAKUL								
Week	Subject								
1	Introduction to Flexible Manufacturing Systems Definitions, Characteristics and types of FMS								
2	Production Lines and Manufacturing Systems; Their Performance Analysis (production rates, utilization, machine quantities.)								
3	Performance Analysis of FMS.								
4	Performance Analysis of FMS.								
5	Performance Analysis of transportation systems (conveyors, AGVs) used in the FM								
6	Analysis of FMS as discrete event dynamic systems and definition and analysis of control problem in FMS								
7	Control of FMS using Programmable Logic Controllers.								
8	Control of FMS using Programmable Logic Controllers.								
9	Modelling and Control of FMS using petri nets								
10	Modelling and Control of FMS using petri nets								
11	Modelling and Control of FMS using petri nets								
12	Modelling and Control of FMS using petri nets								
13	Analysis of FMS with max-min algebra and other methods.								
14	Analysis of FMS with max-min algebra and other methods.								