

MM 466 Numerically Controlled Machine Tools				DEPARTMENT of MECHANICAL ENGINEERING					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project / Field Study	Homework	Other	Total	Credit	ECTS Credit
8	42	-	5	10	-	18	75	3	3.0
Language	English								
Compulsory / Elective	Elective								
Prerequisites	None								
Course Contents	Coordinate systems, motion control, table/tool movements and drive systems in numerically controlled machine tools. Machine tool-computer interface in numerically controlled machine tools. DNC, CNC and AC technologies in numerical control. Part programming techniques in CNC machine tools; manual programming, computer assisted programming; APT, part programming applications.								
Course Objectives	Understanding of hardware and software structure of numerically controlled machine tools, lerning of part programming languages, communication of numerically controlled machine tools with other system components								
Learning Outcomes and Competences	Understanding of stucture and programming of numerically controlled machine tools, capabilities of the numerically controlled machine tools								
Textbook and /or Reference	M P Groover, Automation, Production Systems and Computer Integrated Manufacturing, Prentice-Hall International, ISBN: 0-13-054610-0. 2. M. Akkurt, Bilgisayar Kontrollu Takim Tezgahları (CNC) ve Sistemleri, Birsen Yayınevi, İstanbul, 1991. 3. A. Esin, Sayısal Denetimli Takim Tezgahları, Cilt 1, TMMOB Makina Müh. Odasi, Yayın No: 140, 1992. 4. E. Aslan, BSD (CNC) Programlama Esasları ye Uygulamaları, 72TDFO Ltd. Şti. Yayınları, 1995, ISBN: 975-95038-0-8.								
Assessment Criteria						If any, mark as (x)		Percentage (%)	
	Midterm Exams					X		40	
	Quizzes					X		10	
	Homeworks					x		10	
	Projects								
	Term Paper								
	Laboratory Work								
	Other								
Final Exam					X		40		
Instructors									
Week	Subject								
1	Introduction								
2	Coordinate systems and machine motions								
3	Types of Numerical Control (NC) machine tools								
4	MCU (machine control unit) and other components of the NC systems								
5	MCU (machine control unit) and other components of the NC systems								
6	NC part programming; Manual part programming, computer-assisted part programming (the APT language)								
7	NC part programming; Manual part programming, computer-assisted part programming (the APT language)								
8	NC part programming; Manual part programming, computer-assisted part programming (the APT language)								
9	NC part programming; Manual part programming, computer-assisted part programming (the APT language)								
10	NC part programming; Manual part programming, computer-assisted part programming (the APT language)								
11	DNC (Direct NC), CNC (computer numerical control) and AC (adaptive control systems)								
12	NC feed drive systems								
13	NC feed drive systems								
14	Computer-Machine interfacing								