

MM 498E Design of Thermal Systems				DEPARTMENT of MECHANICAL ENGINEERING					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project /Field Study	Homework	Other	Total	Credit	ECTS Credit
8	42	-	-	31	2	-	75	3	3.0
Language	English								
Compulsory / Elective	Elective								
Prerequisites	-								
Course Contents	Systems design concepts. Mathematical modeling. Optimization methods. Steady state simulation of large systems; fans, pumps, heat exchangers, expanders, fluid in conduits. Dynamic behavior of thermal systems. Computer aided design.								
Course Objectives	Students are expected to review and use basic knowledge from thermodynamics, fluid mechanics and heat transfer, understand and be comfortable with thermal system component analysis and their synthesis in integral engineering systems and processes. Any design course invites extensive use of engineering application software in order to minimize tedious manual work and maximize efficiency of interpolation, iteration, what-if analysis, graphing etc. Mathematica application software is used throughout the course and will be our main choice for this course instruction.								
Learning Outcomes and Competences	Students are expected to be comfortable with thermal system component analysis and their synthesis. Design of complete systems is stressed. Students are also expected to do thermoeconomic optimization, thermoeconomic analysis and evaluation .								
Textbook and /or Reference	1) Design of Thermal Systems, W. F. Stoecker, McGraw Hill, 1989. 2) Design of Fluid Thermal Systems, W. S. Janna, PWS, Second Edition, 1998 3) Design and Simulation of Thermal Systems, N. W. Suryanarayana and Oner Arici, McGraw Hill, 2003.								
Assessment Criteria						If any, mark as (x)		Percentage (%)	
	Midterm Exams					X		30	
	Quizzes								
	Homework					X		10	
	Projects					X		20	
	Term Paper								
	Laboratory Work								
	Other								
	Final Exam					X		40	
Instructors	Prof. Hasmet TURKOGLU								
Week	Subject								
1	Introduction to Thermal System Design								
2	Equation Fitting								
3	Fluid Properties and Basic Equations								
4	Piping Systems I								
5	Piping Systems I								
6	Piping Systems II								
7	Piping Systems II								
8	Pumps and Pipng Systems								
9	Pumps and Fans								
10	Heat Exchangers								
11	Modeling and Numerical Simulation of Thermal Systems								
12	Modeling and Numerical Simulation of Thermal Systems								
13	Problem Formulation for Optimization Methods								
14	Optimization of Thermal Systems								