

MM 543 Numerical Methods in Heat Transfer				MECHANICAL ENGINEERING DEPARTMENT					
Semester	Methods of Education							Credits	
	Lecture	Recit.	Lab.	Project/Field Study	Homework	Other	Total	Credit	ECTS credit
1,2	24	18				146	188	3	7.5
Language	Turkish								
Compulsory / Elective	Optional								
Prerequisites	-								
Course Contents	Variational Techniques. Method of weighted residuals. Finite difference and finite volume methods. Finite element method. Characteristics of transport equations; solution methodology; combined heat transfer; advanced turbulence method; compressible reacting systems. Case studies in heat transfer.								
Course Objectives	To derive basic equations which are governing numerical methods in heat transfer. To teach and apply basic analytical and numerical methods employed for solution of these equations. To solve engineering problems by commercial software.								
Learning Outcomes and Competences	Understanding of the basic characteristics of numerical methods in convective heat transfer and applications of methods. Learning and applications of methods used for the solution of convective heat transfer problems. Interpret the results of solved problems. Solution of engineering problems by commercial software.								
Textbook and /or Reference	1. Course notes								
Assessment Criteria					If any, mark as (X)		Percentage (%)		
	Midterm Exams				X		10		
	Quizzes								
	Homeworks				X		10		
	Projects				X		10		
	Term Paper				X		10		
	Laboratory Work								
	Other								
	Final Exam				X		60		
Instructors	Assist. Prof. Oguz TURGUT								
Week	Subject								
1	Introduction to Computational Fluid Dynamics.								
2	Fundamental Equations of Momentum and Energy Equations.								
3	Fundamental Equations of Momentum and Energy Equations.								
4	Overview of Numerical Methods.								
5	Finite Difference Method.								
6	Clasifcation of Partial Differential Equations.								
7	One Dimensional Boundary Value Problems.								
8	Parabolic Partial Differential Equations.								
9	Elliptic Partial Differential Equations.								
10	Hyperbolic Partial Differential Equations.								
11	Scalar Representation of the Navier – Stokes Equations.								
12	Incompressible Navier Stokes Equations, Simple and Simplec Algorithms.								
13	Incompressible Navier Stokes Equations, Simple and Simplec Algorithms.								
14	Introduction to Commercial CFD Softwares and Applications.								