ÇANKAYA UNIVERSITY
MSE 303- Transport Phenomena
(2014-2015 Fall)

Methods of Instruction	Theor.	Appl.	Lab.	Total	Credit	ECTS Credit
	42	-	-	42	(3 0 3)	4
Semester	Fall 2013 – 2014					
Instructor	Assist. Prof. Dr. Şeniz Kuşhan Akın, Materials Science and Engineering Dept. Room: NB-17, e-mail:					
Assistant	Emre Yılmaz, Materials Science and Engineering Dept. Room: NC-08, e-mail: emreyilmaz@cankaya.edu.tr					
Schedule	Lecture Hours : Monday 14:20-16:10 Wednesday 12:20-13:10					

Course Description

Fluid flow; energy balances, friction, types of flow, flow measurements. Heat transfer; conduction, convection, radiation. Mass diffusivity: steady-state diffusion, nonsteady-state diffusion, mass transfer by convection, mass transfer models and correlations, chemical rate phenomena, applications of rate phenomena theory, flow behavior in chemical reactors.

Course Objective

1) Introduce students to the theory and applications of fluid mechanics, also known as momentum transport.
2) Explain principal means of analyzing and understanding fluid motion comes from mass, momentum and energy balances applied to fluids.
3) Explain the basic mechanisms of heat transfer, namely, conduction, convection and radiation.
4) Make necessary calculations related to momentum and heat transfer.

Textbook

- D.R. Poirier and G.H. Geiger, Transport Phenomena in Materials Processing, TMS, Pittsburgh, 1998

Reference Book

- Manabu Iguchi, Olusegun J. Ilegbusi, Basic Transport Phenomena in Materials Engineering, Springer NY., Inc., 2014.

Attendance

70% attendance of all lecture hours is required by the university's regulations**.** Absence from a quiz or an examination will result in zero grade.

Grading Policy

Attendance…… 5%
Homework + Quiz……..…. 15%
Midterms (I&II)……..…….. 40%
Final…… 40%

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Tentative Course Outline

Week	Topics covered
1 (22-26 Sept)	Introduction, SI Units, Temperature Pressure and Ideal Gas Law, Properties of Fluids
2 (29 Sept-03 Oct)	Types of Fluid Flow and Reynolds Number, Newtonian Fluids
3 (06-10 Oct)	Viscosity, Non-Newtonian Fluids No lecture on 06th October (Religious Holiday)
4 (13-17 Oct)	Laminar Flow and Momentum Balance, Application of Differential Equations
5 (20-24 Oct)	Turbulent Flow, Friction Factor, Fluidised Bed
6 (27-31 Oct)	Conservation of Energy No lecture on 29th October (Republic Day)
7 (03-07 Nov)	Friction Losses, Flow Measurement/ **MIDTERM-I**
8 (10-14 Nov)	Flow and Vacuum Production, Fourier's Law and Thermal Conductivity
9 (17-21 Nov)	Flow and Vacuum Production, Fourier's Law and Thermal Conductivity
10 (24-28 Nov)	Heat Transfer and The Energy Equation
11 (01-05 Dec)	Conduction of Heat in Solids, Radiation Heat Transfer
12 (08-12 Dec)	Thermal Behaviour of Metallurgical Packed-Bed Reactors / **MIDTERM-II**
13 (15-19 Dec)	Diffusion in Solids Liquids and Gases, Fick Laws
14 (22-26 Dec)	Mass Transport in Fluid Systems