

MEC 509__Transport Phenomena (TP)

Aug. 28, 2016
Wed., 4PM_Frey 112

Fall 2016 Office hours: MW 11:00AM to 1:00PM

Course Description: Introduction to differential and integral formulation of mass, momentum, and energy transport in fluids and solids. Topics include viscosity, laminar flow, boundary layer flow, turbulent flow, friction factor, conduction, convection, heat transfer coefficients, radiation, and applications to energy technology.

Fall, 3 credits, ABCF grading

Textbook: *Transport Phenomena* by Bird, Stewart, and Lightfoot, (J. Wiley and Sons, New York 2010).

Course Topics:

		Week
	#1. Introduction: the commonalities among heat transfer, mass transfer, and fluid mechanics	1-08/31
Momentum	#2. Shell Momentum Balances and Velocity Distributions in Laminar Flow / Equations of Change for Isothermal Flow Systems [Chapters 2 and 3 are treated together]	1 & 2-08/31 & 09/07
	#3. Velocity Distributions with More than One Independent Variable and Boundary Layer Theory [Chapter 4]	3 & 4-09/14 & 09/21
	#4. Velocity Distributions in Turbulent Flow [Chapter 5]	5-09/28
	First midterm (Oct. 05) [materials from #2 to #3, closed book]	6-10/05
	#5. <u>Inter-phase Transport in Isothermal Flow Systems and Boundary Layer Flow with Separation</u> [Chapter 6]	7-10/12
Heat (energy)	Thermal Conductivity and the Mechanisms of Energy Transport (this chapter [Chapter 9] is your reading assignment)	
	#6. Temperature distribution in solids and in laminar flow / Equations of Change for Non-isothermal Systems [Chapters 10 and 11 are treated together]	8 & 9-10/19 & 10/26
	#7. Temperature Distributions with More than One Independent Variable [Chapter 12]	10-11/02
	#8. Temperature distributions in turbulent flow [Chapter 13]	11-11/09
	Second midterm (Nov. 16) [materials from #4 to #6, closed book]	12-11/16
	#9. Energy transport by radiation [Chapter 16]	13-11/30
	Final Examination (Dec. 7, class time [last class]) [comprehensive, open book]	14-12/07

Grades:

Two section tests 30 points each

Final Exam	35 points
Home work*	5 points

Note that materials of the two midterms (section tests) are based on the TP Solution Manual and the tests are closed book. The final examination is open book.

* I will collect the homework but will not return them back to you (keep a copy for yourself for each submission). The solutions from TP Solution Manual will be made available in due time; the submitted homework will be graded but, again, not returned.

Americans with Disabilities Act: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC(Educational Communications Center) Building, Room 128, [\(631\)632-6748](tel:6316326748). They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.<http://studentaffairs.stonybrook.edu/dss/index.shtml>.

Academic Integrity: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

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