ENCH630: TRANSPORT PHENOMENA, Spring 2003

Instructor:

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Course web: AJC Online & http://www.glue.umd.edu/~dimitrak/Courses

Teaching Assistant:

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Course Description:

Momentum, heat and mass transfer theory is taught at both the continuum and microscopic levels utilizing integral and differential conservation equations; similarities between the three types of transport; dimensionless analysis and time scales; Finite Fourier Transform and similarity methodologies; and numerical analysis. The course includes steady and unsteady state creeping and laminar flows; viscous and inviscid flows; transport at interfaces; lubrication theory; boundary layer theory; forced and natural convection; with specific application to complex and biological chemical engineering processes.

The course is divided into 3 parts: (a) similarities between the three types of transport and relevant mathematical methodologies (Appendix, Chapters 1-5), (b) fluid mechanics (Chapters 5-8), and (c) heat and mass transfer (Chapters 9-12).

Required Text:

Analysis of Transport Phenomena, by William M. Deen.

Oxford University Press, 1998.

On reserve at the Engineering Library.

Supplementary Reading:

As required

Grading Policy:

Homework	10 %
Individual Project	5 %
Two mid-term exams of equal weight	$2 \times 25 = 50$ %
Final exam	35 %

Examinations:

All exams are "closed-books"/"closed-notes".

Each of the two "mid-term" exams will be one class period in length.

Dates (subject to change): Monday March 10, 2003 & Monday April 21, 2003.

Final Exam: the date is set by the University.

Homework Assignments:

Homework problems will be assigned on a regular basis.

The homework must be submitted at the beginning of the class the date it is due.

The problems and the solutions will be posted on the course web page.

Individual Project:

The goal of this project is to familiarize the students with the current scientific and engineering utilization of transport phenomena. Each student will choose (in agreement with the course instructor) a research topic involving application of transport phenomena to nanotechnology, bioengineering, biomedicine or polymer science. Based on recent publications, the student will write a small proposal (up to 10 double-space pages) describing the proposed research. The proposal should include abstract, introduction, review of relevant publications, proposed research, conclusions and references. The paper is due one week before the last class of the semester, i.e. on Wednesday May 7, 2003.

Academic Honesty:

Any academic dishonesty will not be tolerated.

For more information see: http://www.testudo.umd.edu/soc/dishonesty.html