Proposed changes to the NMT course catalog for 500-level classes:

1. MATE 509 (description change)

OLD:

MATE 509, Statistical Mechanics of Simple Materials, 3 cr, 3 cl hrs

Prerequisite: Graduate Standing or consent of instructor

Materials that can be "fooled" into looking like ideal gases are used to introduce the concepts and methods of statistical mechanics. Topics covered include: gas adsorption, blackbody radiation, superfluidity and superconductivity, blackhole formation, electrical conductivity, the Curie temperature, and the calculation of pi.

NEW

MATE 509, Statistical Mechanics of Simple Materials, 3 cr, 3 cl hrs

Prerequisite: MATE 350 or ChemE 349 or Graduate Standing or consent of instructor

After a brief review of thermodynamics, the basics of Statistical Mechanics are presented and applied to a number of cases of interest. These include solid state heat capacity, the adsorption of gases on surfaces, Bose-Einstein statistics, blackbody radiation, magnetism, superfluidity, Fermi-Dirac statistics, the electron gas, theories of phase transitions, and the Monte Carlo method.

Reason for Change:

To better reflect the current coverage in the class. This class is taught every two to three years with enrollments of 8 to 12 students.

2. MATE592, graduate seminar, description change

Graduate Programs
Masters of Science in Materials Engineering
(p. 174 in 2014-2015 Catalog)

REPLACE OLD:
"Students must take a minimum of 2 credit hours of MATE 592, Graduate Seminar; however, credit hours may not be used to fulfill degree requirements. Students in residence are encouraged to attend graduate seminar each semester it is offered."

INSERT NEW:
"Graduate students must take MATE 592 each semester

offered. The student may appeal to their advisory committee for possible exception."

and

Doctor of Philosophy in Materials Engineering
(p. 175 in 2014-2015 Catalog)

OLD
"Students must take a minimum of 3 credit hours of MATE 592, Graduate Seminar; however, credit hours may not be used to fulfill degree requirements. Students in residence are encouraged to attend graduate seminar each semester it is offered."

INSERT NEW:
"Graduate students must take MATE 592 each semester offered. The student may appeal to their advisory committee for possible exception."

Reason of change:
The reason that MATE 592 can not be used by for class credit is that a few years ago we changed MATE 592 from a graded course to a Pass/Fail. The graduate office policy is that Pass/Fail may not be used for class credit.

3. New 500-level Class

MATE 5XX, Glasses and Other Complex Fluids 3 cr, 3 cl hrs

Prerequisite: Graduate standing or MATE 351 or consent of instructor

Complex Fluids span the range between the traditional Newtonian fluid (where shear stress is proportional to strain rate) and linear response solids (where shear stress is proportional to strain). In all cases, non-trivial relaxation mechanisms introduce a range of relaxation times and extreme temperature sensitivity in the materials properties. Glasses are the most dramatic examples of this class of materials although all polymeric materials show complex behavior under temperature and time scales in typical applications. This course introduces the techniques used to quantify the thermal and temporal response of common complex fluids focusing primarily on rheometry and calorimetry. In addition, theories linking evolving microstructures are employed to explain the observed macroscopic responses.

Reason for addition:

This class covers much of my current research interests and will help train students in this important area. I have taught this as a “599” class with an enrollment of 12 students.