

# School of Materials Engineering

## Foundational Coursework

There are no formal course requirements or any minimum number of course credit hours, although a PhD plan of study will typically include 30 credit hours of course work. The plan of study is tailored to each student's specific research area and background and is submitted by the end of the second semester. Although there are no required courses, the School recommends sets of general or "foundational" courses, especially for the first semester when students are registering for classes before they have an advisor and specific research direction.

Since the Materials field is very broad and many students do not come from an MSE undergraduate background, we have introduced an introductory graduate materials course, **MSE 600 Fundamentals of Materials Engineering**. The course is based on the well-established undergraduate introductory materials course, but more comprehensive. Although this course is not required, the final exam in **MSE 600** is the MSE General Exam (PhD Qualifier), which is required for all PhD students in order to advance to the Preliminary Exam in the second year. All students will be automatically enrolled in this course and are recommended to complete the course. With their advisor's approval, however, students may drop the course and prepare for the General Exam by self-study.

In addition the MSE 600 you are recommended to enroll at least 2 additional lecture courses (4 lectures course maximum). Since you don't have an advisor or clear research direction at the beginning of the first semester, the School recommends you chose from the **Foundational Courses** listed below. These courses in core areas are intended to provide a basis for more specific courses to support your research area. Two tracks are defined, hard materials (metals and ceramics) or soft materials (polymers). Again, these courses are not required, but recommended, depending on your background and direction you think your research is headed. Finally, some advisors will have higher expectations for research in the first semester than a heavy course load will allow, in which case you can always drop a class and take it later.

### **Foundational Course Recommendations:**

#### **Hard Materials (Metals and Ceramics)**

The following Thermodynamics-type classes:

#### **MSE 559 Phase Equilibria in Multicomponent Systems (Fall)**

One of the following Kinetics-type classes:

#### **MSE 508 Phase Transformations in Solids (Fall)**

#### **MSE 597K Materials Kinetics (Spring)**

One of the following Structure-type classes:

#### **MSE 531 Quantitative Analysis of Microstructure (Fall)**

#### **MSE 502 Defects in Solids (Spring)**

#### **Soft Materials (Polymers)**

#### **MSE 597 Polymer Physics (Fall)**

#### **MSE 525 Structure and Properties of Engineering Polymers (Spring)**