

# ADVANCED MECHANICS AND FAILURE ANALYSIS - GRADUATE CERTIFICATE

Other electives may be considered in consultation with the certificate director.

The certificate provides training in engineering mechanics that goes beyond the typical undergraduate curriculum in two aspects. First, students will have the opportunity to establish systematic fundamental knowledge in advanced engineering mechanics through the courses on solid mechanics, finite element analysis and continuum mechanics. Second, students will be able to learn specialized methods in failure analysis, composite materials, soft materials, and vibration to address challenging problems in engineering design.

Students who complete this certificate will have the necessary knowledge and skills for a broad range of industrial sectors that involve structural design and reliability assessment.

## Requirements

To complete the certificate program, students will be required to complete 9 graduate level credits. These credits can be chosen by the student, in consultation with certificate program faculty and the graduate advisors, based on the available courses and description of curriculum in subsection b) below. Courses offered each semester will depend on the availability of faculty. At least one relevant course will be offered each fall and spring semester to ensure that students are able to make progress toward completion of the certificate. In accordance with university policy, degree-seeking students will only be eligible for award of the certificate upon completion of their MS degree.

All degree and non-degree seeking certificate students must meet the following minimum academic standards for successful completion of the certificate:

- Students must receive a minimum grade of a B or higher in each course applied towards certificate requirements; and
- A cumulative GPA of 3.0 or higher in certificate courses.

## Required Courses and Credits

Code	Title	Credit Hours
<b>Required Courses</b>		
Students must take two of the following three courses:		
MCEN 5228/6228	Special Topics in Mechanical Engineering (Continuum Mechanics)	
MCEN 5023	Solid Mechanics 1	
MCEN 5173	Finite Element Analysis	
<b>Electives</b>		
Strongly recommended electives:		
MCEN 5174	Failure of Engineering Materials	
MCEN 5183	Mechanics of Composite Materials	
MCEN 5228	Special Topics in Mechanical Engineering (Vibrations)	
MCEN 5228	Special Topics in Mechanical Engineering (Fracture Mechanic)	
MCEN 5293	Mechanics of Soft Matter	