Injury biomechanics is a well-known field in automotive safety and constitutes the scientific basis for automotive safety design. All safety improvements made over the last half century use research data generated by workers in injury biomechanics. Wayne State University has an almost 70-year history in injury biomechanics research – including development of the safety windshield, the collapsible steering column and the restraint system -- and has an international reputation for advances in this field.

Although safety is an overriding concern in the civilian automotive business, the defense industry up to now has not had a tradition of designing for the safety of occupants of military vehicles. However, it is being increasingly called upon to emphasize safety in the vehicles it produces, both against road accidents and against vehicular crashes and rollovers due to hostile action. The Certificate program aims to provide the specialized skills and training engineers will need to work on improving vehicular safety design in the defense industry.

This program is designed for students with an engineering or a mathematics-based science background. The training consists of discourses in the fundamentals of impact injury both for the automotive as well as for the military environment. Topics include mechanisms of injury to various parts of the body from head to toe, human response to impact loading, human tolerance to impact and the use of human surrogates in testing for vehicular safety. Computer models are also taught because they can serve as a human surrogate.

Applicants must meet requirements for admission to the Graduate School. Students may enroll on a full-time or part-time basis but must complete requirements within three years of admission. Students must hold Bachelor’s degrees in engineering, or in a mathematics-based science program. A minimum grade point average for regular admission to the Graduate Certificate Program is 3.0. This certificate program consists of 16 credit hours of course work with three required courses (12 credit hours) and an elective 4-credit hour course. The required courses are in engineering physiology, computer modeling of impact injury and injury biomechanics.

As is the case with all Bridge Graduate Certificates, students will be permitted to apply all Certificate credits with at least a B grade toward the Biomedical Engineering Master’s degree if they later seek admission to that program.

For more information, please contact the Biomedical Engineering Dept. at 313-577-1345 or email us at bme@rrb.eng.wayne.edu.
Curriculum Requirements

This certificate program consists of 16 credit hours of course work with three required courses (12 credit hours) and an elective 4-credit hour course. The required courses are in engineering physiology, computer modeling of impact injury and injury biomechanics.

Required Courses: 12 Credits

- BME 5010 – Engineering Physiology
- BME 7100 – Mathematical Modeling in Bioengineering
- BME 7160 – Impact Biomechanics

Electives from among the Following: 4 Credits

- BME 6480 – Biomedical Instrumentation
- BME 7120 – Applied Finite Element Methods in Biomechanical Analysis
- BME 7170 – Experimental Methods in Impact Biomechanics
- BME 7180 – Advanced Topics in Impact Biomechanics

You will find a description and a current schedule of these classes for the next two years listed on our website, [www.bme.wayne.edu](http://www.bme.wayne.edu) under Courses.