

# Bio-Mechanical Engineering Certificate in Mechanical Engineering

Northeast Indiana (actually Warsaw, IN) is known as the “Orthopedic Capital of the World” and is home to Zimmer Biomet and Depuy Sythes, as well as numerous other smaller biomedical companies. This region has an unparalleled concentration of medical device industry jobs and is responsible for nearly one-third of the world’s orthopedic sales.

Developed with input from our advisory board, this six-course (20-credit hour) certificate offers focused coursework and an integrated, individual research project that introduce engineering students to concepts and models specifically used in the bio-mechanical industries. Specific course requirements\* include:

- BIOL 20300 – Human Anatomy and Physiology
- BIOL 20400 – Human Anatomy and Physiology
- ME 44500 – Bio-materials
- ME 48000 – Finite Element Analysis
- ME 49800 – Research – Bio-mechanical Project



Students must also select one elective course from the following:

- ME 54400 – Modeling and Simulation of Mechanical Engineering Systems
- ME 54500 – Finite Element Analysis: Advanced Theory & Applications
- ME 55000 – Advanced Stress Analysis
- ME 47100 – Vibrations or ME 56300 – Mechanical Vibrations

This curriculum exposes students to fundamental concepts in anatomy, physiology, and mechanics and then requires students to apply engineering principles to analyze and solve problems involving bio-mechanical systems.

It should be noted that students graduating with B.S. degree in mechanical engineering at IPFW would need only two extra courses (BIOL 20300 – Human Anatomy and Physiology and BIOL 20400 – Human Anatomy and Physiology) to get this certificate. The other four courses could count for the four technical elective courses required for the BSME degree.

Students interested in a credential to prepare for a career in the orthopedic industry, for graduate study in the field bio-medical engineering, or even for a medical degree should strongly consider this certificate.

For more information contact Dr. Don Mueller ([don.mueller@ipfw.edu](mailto:don.mueller@ipfw.edu)).

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\* With approval of the mechanical engineering curriculum committee, course substitution may be permitted.