



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# **Mechanobiology of the Musculoskeletal System in Development and Disease**

## **BIOMEDE 6430**

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**Credit Hours:**

3.00 - 3.00

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**Course Levels:**

Graduate (5000-8000 level)

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**Course Components:**

Lecture

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**Course Description:**

Provides a general overview of mechanobiology in development and disease followed by a more in-depth assessment of the specific mechanical signals and pathways that are involved in shaping development of the intervertebral disc, cartilage, and bone.

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**Prerequisites and Co-requisites:**

Prereq: Grad standing in Engineering, or permission of instructor.

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**Course Goals / Objectives:**

- The students will describe the multiple mechanisms (extrinsic and intrinsic) involved in translation of biomechanical signals to biological signals in musculoskeletal development and disease.
  - The students will evaluate and critique ethical considerations in MSK research
  - The students will enhance their communication skills through presentation of current and new scientific ideas
  - The students will write a grant proposal that translates the concepts they learned from development and disease to tissue engineering strategies and identify targeted therapeutics based on engineering solutions
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**Course Topics:**

- Overview of the Musculoskeletal system
  - Development of Musculoskeletal system
  - Mechanobiology/Mechanotransduction
  - Developmental Mechanobiology/Mechanotransduction
  - Developmental concepts to tissue engineer tissues
  - Developmental Mechanobiology of the Intervertebral Disc, Cartilage and Bone
  - Disease and Mechanobiology/Mechanotransduction
  - Model systems for studying Mechanobiology/Mechanotransduction
  - Changes in Mechanobiology/ Mechanotransduction with Disease – Intervertebral disc, Cartilage and Bone
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**Designation:**

Required