



# Microscopy in Biomechanics

## MECHENG 6711

**Credit Hours:**

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:**

Physical principles and modes of light microscopy and atomic force microscopy and their applications for probing biomechanical properties.

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**Prerequisites and Co-requisites:**

Prereq: Grad standing in Engineering

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**Course Goals / Objectives:**

- Describe the physical principles involved in light and atomic force microscopy image formation. -Derive Gauss's lensmaker equation and use it to ascertain chromatic aberration. -Determine spring constant of a AFM cantilever from its geometry
  - Label components and carry out alignment procedures for microscopes. -Perform Koehler alignment on inverted and upright light microscopes. -Mount and align an AFM cantilever in a Multimode AFM
  - Propose methods for nano and micro-scale biomechanical testing. -Describe experimental approaches to measure persistence length of single molecules and fibers -Analyze AFM-nanoindentation curves via Hertz or Oliver-Pharr models
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**Course Topics:**

- Transmitted and Reflected Light Microscopy
  - Light microscopy in Biomechanics
  - Atomic Force Microscopy
  - AFM in Biomechanics
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**Designation:**

Elective