



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Materials in Medicine

MATSCEN 5611

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

The materials science of plastics, metals and ceramics currently used to replace or supplement tissues within the human body.

Prerequisites and Co-requisites:

Prereq: 2010 and 3611; or Grad standing; or permission of instructor.

Course Goals / Objectives:

- Learn how metals, polymers and ceramics are characterized and how these concepts relate to performance of a given material within the human body
 - Learn materials concepts relating to (a) what implant surfaces present to their immediate environment within the body and (b) specific techniques used to quantify these surface characteristics
 - Learn about the consequences of inadequate materials design and the extremely narrow window that exists for the design and application of new biomaterials
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Course Topics:

- Bulk biomaterials – metals, polymers (synthetic and natural) and ceramics
 - Microstructure and phase control
 - Biomaterials characterization
 - Corrosion and biodegradation
 - Properties and failure – metals, ceramics and polymers
 - Wear and degradation, legal and societal aspects; demonstration
 - Materials for tissue engineering, in vitro and in vivo evaluation
 - In vitro control of tissue development
 - In vivo synthesis of tissues and organs
 - Skin, adipose tissue engineering
 - Cartilage tissue engineering
 - Bone tissue engineering
 - Nervous system, cardiovascular tissue engineering
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Designation:

Elective