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

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

Designation:

Elective