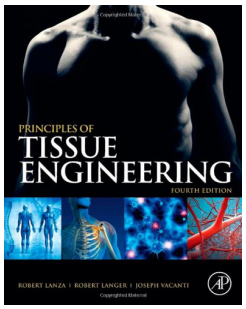
BME 779: Tissue Engineering

Instructor: **Dr. Anil Mahapatro, anil.mahapatro@wichita.edu**
Day/Time: **Tuesdays and Thursdays: 2:45pm – 4:00pm**
Prerequisite: **BME 477 or ME 651 or instructor consent**

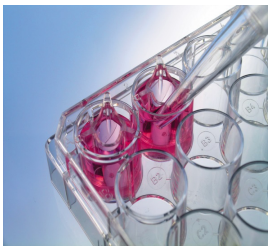


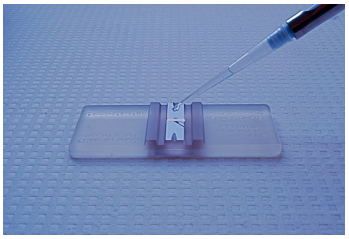
Course Description: This course will provide an introduction to the strategies and fundamental bioengineering design criteria behind the development of tissue substitutes. Principles of engineering and the life sciences toward the development of biological substitutes that restore, maintain, or improve tissue function will be discussed. Topics to be covered include cell growth and differentiation, materials for scaffolding, bioreactor design, clinical applications, regulatory and ethics.

Textbook: Tissue Engineering, 1st Edition, Edited by Clemens van Blitterswijk, ISBN 978-0-12-370869-4

Tentative Course Outline:

- Introduction to Tissue Engineering
- Cells, Cell structure, Cell injury, Cell Migration, Cellular signaling
- Cell visualization, Histology and Tissue Types
- Cell source and Stem cells
- Scaffold materials: Metals, Ceramics and Polymers
- Scaffold Design and Fabrication
- Degradation and Surface modification / tailoring of Biomaterials
- Cell culture environment and Cell nutrition
- Bioreactors
- Cryobiology and aseptic techniques
- Tissue engineering of Bone
- Tissue Engineering of Skin
- Other Tissue Engineering Examples
- Legal and ethical Issues





Representative Laboratory Exercises:

- Introduction to basic cell culture skills
  - Cell culture basics
  - Starting a cell line from a frozen stock
  - Cell visualization and cell counting
- Evaluations of cell material interactions
  - Cellular growth and cytotoxicity evaluation