Instructor: Rebecca Willits, Ph.D.
Associate Professor, Department of Biomedical Engineering, The University of Akron

Course Description
This course is intended for graduate students who will be involved in laboratories that perform tissue engineering or regenerative medicine research. Topics to be covered include basic developmental biology, description of biological processes (cell mechanics, adhesion, migration, aggregation, etc.) quantitatively, and integration of cells with materials to regenerate tissue. Course will require advanced reading from journals and relevant literature to develop current case study models.

Prerequisites
Advanced Biomaterials (4800:661) or permission of instructor

Topical Prerequisites
Fluid & Mass Transfer

Textbook
Tissue Engineering: Engineering Principles for the Design of Replacement Organs and Tissues by W. Mark Saltzman, Oxford University Press, 2004

References

Course Topics
1. Tissue Exchange and Tissue Development
   a. State of the Art in Tissue Exchange
   b. Objectives of Tissue Engineering
   c. Elements of Tissue Development and Organization
2. Tissue Engineering Fundamentals
   a. Cell Growth and Differentiation
   b. Cell and Tissue Mechanics
   c. Cell Adhesion
   d. Cell Migration
   e. Cell Aggregation
   f. Tissue Barriers to Molecular and Cellular Transport
3. Case Studies in Regenerative Medicine

Class/Laboratory Schedule
Lecture: 150 minutes per week; 15 weeks