ECE 6200 – Biomedical Applications of Microelectromechanical Systems

Topical Outline

Introduction to MEMS Devices and Applications, Biomedical Applications of MEMS

Materials & Biocompatibility

MEMS Fabrication Technologies
- Design of MEMS Fabrication Processes
- Driving Forces for Biomedical Relevant Actuators and Geometrical Scaling Effects

Sensing Mechanisms for Biosensors and Geometrical Scaling Effects

Microfluidic Systems Design
- Micropumps
- Microvalves
- Flow Rate Sensors
- Integrated Fluid Mixers

DNA Analysis Systems – PCR, Electrophoresis and Arrays

DNA-based Sensors

Sample Pretreatment Systems, Integrated Sample Manipulation

Cellular Analysis Systems

Nano-Particle Separation Systems

Neural Stimulation and Recording Arrays

Bead based Biosensors, Magnetic Sensors for Biomedical Applications

Magnetics & Microfluidics

Cantilever based Biosensors

Chemical Sensors

Immunoassays

Technical Presentations