**BIOE 498/598 ST1 and STO - Surgical Technologies**

**Fall 2024**

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**In-Person Classroom: Everitt 2233**

**Synchronous Zoom:**

Zoom Lectures: BIOE498/598 ST1 and STO - Surgical Technologies

Time: Tue and Thu, 5:00 PM – 6:20 PM Central Time (US and Canada)

Join Zoom Meeting

https://illinois.zoom.us/j/88155305028?pwd=RNX11d5bmUGxfwEaYcxCuBlXjTbOF2.1

Meeting ID: 881 5530 5028

Password: 442113

**Description:**

This is an in-depth elective course open to undergrad and grad students in the emerging areas of surgical and robotic technologies. It will cover a broad range of engineering principles, basic surgical techniques, as well as cutting-edge technologies for minimally invasive and robotic surgery. It will also discuss recent advances in intraoperative molecular imaging, artificial intelligence (AI), augmented reality (AR), and virtual reality (VR) for medical diagnostic and surgical applications. Clinical areas of focus will include general surgery, surgical oncology, thoracic surgery, and neurosurgery.

**Objectives**:

After completing this course, students will gain new knowledge and insights in the following areas: (1) integration of engineering principles and medical applications; (2) basic surgical techniques and practices; (3) cutting-edge technologies for image-guided, minimally invasive, and robotic surgery; (4) medical device regulations and clinical trials.

**Organization:**

1. **Basic Lectures**:  background and fundamentals: in-person lectures, synchronous Zoom lectures, and recorded lectures/videos for asynchronous viewing.
2. **Invited Lectures**: Zoom or in-person lectures delivered by guest speakers (engineers, clinicians/surgeons, and industrial experts).
3. **Project Reports:** small-group or individual projects for in-depth studies of major surgical procedures (such as mastectomy and lumpectomy) or cutting-edge technologies (such as robotic and image-guided surgery.

**Detailed Course Outline:**

(1) Fundamentals of anatomy, physiology and pathology.

(2) Introduction to surgery: past, present, and future.

(3) Basic surgical techniques and current practices.

(4) Cutting-edge surgical technologies:

- Minimally invasive surgery (including laparoscopic surgery, endoscopic surgery, etc).

- Image guided surgery

- Robotic surgery

- Computer vision, 3D visualization, and surgical simulation.

1. Clinical practices – general and GI surgery, surgical oncology, thoracic surgery, and neurosurgery.

**Hours and Credits**: Two Lectures (1.5 hours each) per Week (Tue and Thu), 3-4 Credits.

**Classroom Location**: Everitt Room 2233

**Time:** 5:00 – 6:20 pm, Tue and Thu.

**Office Hour**: Everitt Room 2116, by individual appointments (Zoom or in-person)

**Course Materials:**

1. **Textbooks (Optional)**:

[**Surgical Technology – Principles and Practice,** 8th Edition, Saunders, 2021,](https://www.amazon.com/Surgical-Technology-Joanna-Kotcher-BSN/dp/0323394736/ref%3Dsr_1_1?crid=30V1UHWSWM6IN&keywords=978-0323394734&qid=1680209531&s=books&sprefix=978-0323394734+%2Cstripbooks%2C65&sr=1-1) Author: J. K. Fuller, ISBN: **978-0323680189.**

**Surgical Technology for the Surgical Technologist: A Positive Care Approach**, Fifth Edition, AST, Cengage Learning, 2018.

1. **Reading Assignments and Online Videos** – Historical accounts, review articles, online videos of surgical procedures, and other special items of interests.
2. **Lecture Notes and Handouts** – In-class and electronic distribution.

**Online Learning Platforms:**

1. **Zoom –** for synchronous and pre-recorded lectures.
2. **Canvas will be the main online platform** for electronic distribution of lecture materials (including lecture notes, announcements, homework, video lectures, etc).
3. **Gradescope –** for submission of homework assignments, written exams, project reports, etc.

**Attendance:** In-person or synchronous online attendance is encouraged, but not required.

**Mask and COVID-19 Cautions:** Follow university and BIOE department policies.

**Grading**: Homework assignments (20%), project reports (20%), mid-term quiz (20%), final written exam (40%).

**Final Grades**: Based on total scores, not curved.