# Class Schedule - Spring 2018

## Bioengineering

**BIOE 598  **Special Topics  **credit: 1 TO 4 hours.  
Subject offerings of new and developing areas of knowledge in bioengineering intended to augment the existing curriculum. See Class Schedule or departmental course information for topics and prerequisites. May be repeated in the same or separate terms if topics vary to a maximum of 12 hours, but no more than 8 in any one term.

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<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
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<tbody>
<tr>
<td>64638</td>
<td>Lecture-Discussion</td>
<td>AMS</td>
<td>12:30 PM - 01:50 PM</td>
<td>TR</td>
<td>ARR - Digital Computer Laboratory</td>
<td>Nie, S</td>
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Credit Hours: 4 hours  
App in Cancer & Mechanobiology  
Applications in Cancer and Mechanobiology will provide an introduction to basic concepts in applications of nanotechnology in mechanobiology and in cancer. This is a highly interdisciplinary field of research where knowledge from various discipline need to be presented and integrated. The course will be a team taught course by faculty from Engineering and LAS. There will be 4 main sections of the course: (i) biological concepts and cancer biology, (ii) introduction to bottom nanotechnology and nanomedicine, (iii) microfluidics, Lab on Chip, and Top Down Nanotechnology, and (iv) applications in cellular mechanics, i.e. mechanobiology and nanotechnology. The course will be targeted for first year graduate students and senior undergraduate students. Prerequisite: Graduate student standing.

| 60232| Lecture                  | GU      | 12:30 PM - 01:50 PM | TR   | 305 - Materials Science & Eng Bld | Sirk, S    |

Credit Hours: 4 hours  
Stem Cell Bioengineering  
Restricted to Graduate - Urbana-Champaign. Restricted to MS:Bioengineering - UIUC or PHD: Bioengineering/UIUC.  
Application of engineering approaches for the quantitative analysis of stem cell biology, including stem cell genetics and stem cell microenvironments. Design principles underlying stem cell-based therapies and diagnostics. Stem cell biomanufacturing.

| 60234| Lecture                  | PII     | 12:30 PM - 01:50 PM | TR   | 225A - Talbot Laboratory        | Imoukhuede, P |

Credit Hours: 4 hours  
Systems Bioengineering  
Restricted to Graduate - Urbana-Champaign.  
Systems Biology and Bioengineering are emerging fields that require new minds that are adept in integrating biology with mathematics and computation. In this course you will receive training in bimodal systems biology: (1) Translating experimental observations to mathematical representations. (2) Deterministic network model development, mathematical solution techniques, simulation, and prediction. These approaches will be presented in the context of tumor angiogenesis. Here students will examine the angiogenic signaling pathways, and apply systems biology and bioengineering approaches to design new therapeutics targeting tumor vasculature. **Pre-reqs: MCB 150 and one of the following courses: BIOE 201, CHBE 221, or TAM 210/212.

| 66022| Lecture                  | PS      | 09:30 AM - 10:50 AM | MW   | ARR - Digital Computer Laboratory | Gaj, T     |

Credit Hours: 4 hours  
Quantitative Biotechnology  
Restricted to students in the Bioengineering department.  
Restricted to Graduate - Urbana-Champaign.  
Offers first year graduate students in Bioengineering an opportunity to be exposed to the modern biotechnologies which sparked a Renaissance in current biology and biomedicine. For each weekly topic, we will do an in-depth review of various methods including the conventional/traditional protocols and the newly developed techniques. The scientific articles to be reviewed in class emphasize...
high precision, high spatial/temporal resolution, high-throughput, molecular accuracy, sensitivity and real-time imaging. Two students will be paired up to present each week's article and lead the discussion. The course consists of studies on the Central Dogma of Biology (DNA, RNA, and Protein) as well as cellular organelles and cell imaging.

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<th>64989</th>
<th>Lecture</th>
<th>RXB</th>
<th>12:30 PM - 01:50 PM</th>
<th>TR</th>
<th>104 - Talbot Laboratory</th>
<th>Bhargava, R</th>
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**The Tissue Microenvironment**

Advanced concepts of the complexity and heterogeneity of tissue microenvironments and their role in directing cell behavior and function in health and disease. Emphasis will be on comparing and contrasting the physio-chemical rate processes that govern the function of stem cell niches and solid tumor microenvironments. Topics will include: (i) Cell migration, mitosis, apoptosis, and differentiation; (ii) Cellular responsiveness to soluble and immobilized factors that mediate interactions between cells, with extracellular matrix, and growth factor communication; (iii) Biophysical and bioengineering aspects of mechanotransduction, the process through which living cells sense and respond to their mechanical environment. Students will conduct a semester-long team project for additional credit. Prerequisite: Prior coursework in and working knowledge of cellular and molecular biology.