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>3217 - Everitt Laboratory</td>
<td>Nie, S</td>
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<td>60236</td>
<td>Lecture</td>
<td>DP</td>
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<td>TR</td>
<td>2101 - Everitt Laboratory</td>
<td>Pan, D</td>
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<td>60232</td>
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<td>66022</td>
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<td>MW</td>
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<td>Gaj, T</td>
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Credit Hours: 4 hours
Cancer Nanotechnology
Restricted to Graduate - Urbana-Champaign.
Restricted to students in the Bioengineering department.
This is a graduate level course for students who are interested in learning nanotechnology and its applications in biology and medicine. Key topics include: (1) cancer biology and clinical oncology, (2) fundamentals of nanoscience, (3) principles of nanoscale engineering, (4) major classes of nanoparticles and nanostructures, and (5) nanomedicine - technologies and applications

Credit Hours: 4 hours
Imaging & Therapeutic Probes
Restricted to Graduate - Urbana-Champaign.
Restricted to students in the Bioengineering department.
This course will introduce the principles and prerequisites for clinical (MRI, CT, US, PET-SPECT) and pre-clinical (PAT, Optical) imaging modalities and chemical strategies to develop exogenous probes for the early detection of molecular changes responsible for disease pathogenesis such as cardiovascular, inflammatory, cancer and neurological disorders. We will also discuss in depth the strategies for site-specific delivery of therapeutic agents (chemotherapeutic, thrombolytic, and biologics) with biochemically triggered release mechanisms. The course is designed to teach various aspects of translational medicine from imaging and therapeutic standpoint. Students will be introduced to the fundamentals of various clinical and preclinical imaging modalities, prerequisites for developing probes for these modalities, their application in current clinical practice, and preclinical development in various animal models of cancer, cardiovascular and neurological diseases. We will also explore therapeutic approaches (chemo- and biologics) to these diseases and identify opportunities for personalized preemptive medicine. The course is uniquely tailored for students interested in interdisciplinary translational research with direct clinical focus.

Credit Hours: 4 hours
Stem Cell Bioengineering
Restricted to Graduate - Urbana-Champaign.
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 biomaneufacturing.
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.