Class Schedule - Spring 2016

Electrical and Computer Engineering

ECE 598  Special Topics in ECE  credit: 0 TO 4 hours.
Subject offerings of new and developing areas of knowledge in electrical and computer engineering 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.

<table>
<thead>
<tr>
<th>CRN</th>
<th>Type</th>
<th>Section</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>60719</td>
<td>Lecture</td>
<td>MAB</td>
<td>02:00 PM - 03:20 PM</td>
<td>TR</td>
<td>3013 - Electrical &amp; Computer Eng Bldg</td>
<td>Belabbas, M</td>
</tr>
<tr>
<td>60436</td>
<td>Lecture</td>
<td>RPP</td>
<td>09:30 AM - 10:50 AM</td>
<td>TR</td>
<td>3013 - Electrical &amp; Computer Bldg</td>
<td>Pilawa Podgurski, R</td>
</tr>
<tr>
<td>59635</td>
<td>Laboratory</td>
<td>SV</td>
<td>ARRANGED -</td>
<td>-</td>
<td>-</td>
<td>Vasudevan, S</td>
</tr>
<tr>
<td></td>
<td>Lecture</td>
<td>SV</td>
<td>11:00 AM - 12:20 PM</td>
<td>TR</td>
<td>-</td>
<td>Vasudevan, S</td>
</tr>
<tr>
<td>63778</td>
<td>Lecture</td>
<td>YW</td>
<td>03:30 PM - 04:50 PM</td>
<td>TR</td>
<td>3015 - Electrical &amp; Computer Bldg</td>
<td>Wu, Y</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours

Geometric Control Theory
Prerequisites: ECE 515. This course introduces methods for the study of linear and nonlinear input-output dynamical systems from a geometric viewpoint. Topics include controllability, observability, feedback linearization, stability, and qualitative behavior of nonlinear dynamical systems. Concepts from differential geometry, topology and from Lie theory will be developed as needed. A special emphasis will be given to the study of decentralized control systems and the study of classical and quantum mechanical systems.

Credit Hours: 4 hours

Advanced Power Electronics
Prerequisites: ECE 464 or equivalent. This course covers advanced topics in power electronics, including control, circuit topologies, inductor and transformer design, and high efficiency techniques such as resonant power conversion and light-load operation. Numerous application examples will be provided, such as solar photovoltaics, power-supply on a chip, and low-voltage, low-power converters used in portable electronic devices.

Credit Hours: 4 hours

Hardware Verification
Prerequisites: CS 473 or ECE 462 or equivalent (Basic knowledge of discrete structures, algorithms and hardware design). Verification is the biggest bottleneck in hardware and embedded system development utilizing about 70% of time and resources in the system design cycle. This course introduces the most scalable and efficient verification algorithms researched in the past 30 years and used widely in contemporary industry. The course will teach model checking, SAT-based verification, symbolic simulation, compositional verification, BDD-based verification, equivalence checking and abstraction based verification. In the course project, the students will use state-of-the-art tools to specify and verify a real-life system. This course is intended for (1) graduate students looking to pursue research in verification (2) graduate students who want to apply verification to their research (3) graduate students to learn scalable algorithms that can solve complex search problems.

Credit Hours: 4 hours

Information-Theoretic Methods
Prerequisites: Maturity with probability theory at the level of ECE 534 or Math 561. ECE 563 will NOT be required. The goal of this course is to understand the fundamental limits of high-dimensional statistical problems via information-theoretic methods. We will discuss foundational topics on information-theoretic methods, such as information measures, Fano's inequality, Le Cam's method.
and generalizations, metric entropy and volumetric methods, aggregation, as well as their applications on specific problems, such as sparse linear regression, estimating high-dimensional matrices, principal component analysis, functional estimation, statistical estimation on large alphabets and large graphs, etc.