Class Schedule - Fall 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>67363</td>
<td>Lecture</td>
<td>AM</td>
<td>11:00 AM - 12:15 PM</td>
<td>TR</td>
<td>4070 - Electrical &amp; Computer Eng Bldg</td>
<td>Miller, A</td>
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</tbody>
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Credit Hours: 4 hours
Cryptocurrency Security
Restricted to Graduate - Urbana-Champaign.
Prerequisites: ECE 428 / CS 425 (Distributed Systems) or equivalent, or consent of instructor.
Decentralized cryptocurrencies, such as Bitcoin and Ethereum, have gained rapid popularity, attracting the attention of academics, entrepreneurs, economists, and policymakers. They promise to create new disruptive markets, and revolutionize how we think of money and financial infrastructure. The goal of this course is to introduce students to current research in cryptocurrencies. We'll cover the technical background of applied cryptography and incentive mechanisms. The bulk of the course will consist of reading and discussion of recent research papers from top security conferences. Assignments will involve hands-on practice with cryptocurrency tools, such as sending and receiving cryptocurrency payments, and programming smart contracts. The course will culminate with an original research project.

| 66519| Lecture | HH      | 03:00 PM - 04:20 PM| TR   | 3013 - Electrical & Computer Eng Bldg | Al-Hassanieh, H |

Credit Hours: 4 hours
Wireless Networks & Mobile Sys
Restricted to Graduate - Urbana-Champaign.
Prerequisites: Maturity in understanding of computer networking and digital communications. One of the following courses: ECE 361 (Digital Communications) or ECE 438 (Communication Networks) or ECE 439 (Wireless Networks). Wireless and mobile systems have become ubiquitous; playing a significant role in our everyday life. However, the increasing demand for wireless connectivity and the emergence of new areas such as the Internet of Things presents new research challenges. This course introduces advanced research topics in wireless networks and mobile communication systems. In each lecture, we will discuss recent research papers that introduce new wireless designs, algorithms, protocols and applications. The papers are systems oriented and focus on practical challenges and solutions for building wireless and mobile systems. The course will cover the latest research topics including the Internet of Things, cross layer design, interference management, multi-antenna systems, distributed wireless systems, network coding, backscatter communication, full-duplex radios, wireless localization and sensing, wireless security, wireless charging… Student will also learn how to design and build wireless systems through a research oriented course project that focuses on the implementation aspects of practical systems.

| 66386| Lecture | NS      | 09:30 AM - 10:50 AM| TR   | 3015 - Electrical & Computer Eng Bldg | Shanbhag, N   |

Credit Hours: 4 hours
Machine Learning in Silicon
Restricted to Graduate - Urbana-Champaign.
Prerequisites: ECE 310, 313, and 482, or instructors consent. This course will introduce the design and implementation of robust and energy-efficient machine learning systems on nanoscale CMOS, with particular focus on emerging sensor-rich energy-constrained embedded platforms such as wearables, IoTs, autonomous vehicles, and biomedical devices. Algorithm-to-architecture mapping techniques to reduce energy consumption will be studied and applied to machine learning algorithms to optimize energy. Energy, delay and behavioral models of machine learning kernels in nanoscale silicon operating at the limits of energy efficiency (low-SNR fabrics) will be developed, and the impact of errors due to low-SNR circuit operation on system behavior studied. Statistical Shannon-inspired error compensation techniques based on estimation and detection techniques will be discussed and...
compared with conventional fault tolerance and error resiliency techniques. Case studies of integrated circuit realizations of machine learning kernels in silicon will be presented.

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<tr>
<th>66385</th>
<th>Lecture</th>
<th>PM</th>
<th>02:00 PM - 03:20 PM</th>
<th>TR</th>
<th>3015 - Electrical &amp; Computer Eng Bldg</th>
<th>Moulin, P</th>
</tr>
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Credit Hours: 4 hours
Comput. Inference and Learning
Restricted to Graduate - Urbana-Champaign.
Prerequisites: ECE 490, ECE 534. Computational inference and machine learning have seen a surge of interest in the last 15 years, motivated by applications as diverse as computer vision, speech recognition, analysis of networks and distributed systems, big-data analytics, large-scale computer simulations, and indexing and searching of very large databases. This course introduces the mathematical and computational methods that enable such applications. Topics include computational methods for statistical inference, sparsity analysis, approximate inference and search, and fast optimization.