Class Schedule - Fall 2019

Computer Science

CS 498  **Special Topics**  credit: 1 to 4 hours.
Subject offerings of new and developing areas of knowledge in computer science intended to augment the existing curriculum. See Class Schedule or departmental course information for topics and prerequisites. 1 to 4 undergraduate hours. 1 to 4 graduate hours. 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>
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<tbody>
<tr>
<td>71075</td>
<td>Lecture-Discussion</td>
<td>AM1</td>
<td>11:00 AM - 12:15 PM</td>
<td>TR</td>
<td>1404 - Siebel Center for Comp Sci</td>
<td>Forsyth, D Walker, T</td>
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<tr>
<td>68911</td>
<td>Lecture</td>
<td>AM3</td>
<td>02:00 PM - 03:20 PM</td>
<td>TR</td>
<td>2013 - Electrical &amp; Computer Eng Bldg</td>
<td>Miller, A</td>
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<td></td>
<td>Applied Cryptography</td>
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<td>68912</td>
<td>Lecture</td>
<td>AM4</td>
<td>02:00 PM - 03:20 PM</td>
<td>TR</td>
<td>2013 - Electrical &amp; Computer Eng Bldg</td>
<td>Miller, A</td>
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<td></td>
<td>Applied Cryptography</td>
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<td>70185</td>
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<td>03:30 PM - 04:45 PM</td>
<td>TR</td>
<td>1404 - Siebel Center for Comp Sci</td>
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<td>43753</td>
<td>Lecture</td>
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<td>TR</td>
<td>1103 - Siebel Center for Comp Sci</td>
<td>Gunter, C</td>
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Credit Hours: 3 hours
Applied Machine Learning
Restricted to Computer Science or Computer Sci & Linguistics major(s).

Credit Hours: 3 hours
Applied Cryptography
Restricted to Graduate - Urbana-Champaign.

Credit Hours: 3 hours
Applied Machine Learning
Restricted to Undergrad - Urbana-Champaign.

Credit Hours: 3 hours
Cyber Dystopia
Restricted to Undergrad - Urbana-Champaign.

Section Info: Analyzing the Adverse Impacts of Advances in Computer Technology. The information revolution is bringing changes that are not always seen as positive to the people they affect. Nevertheless there is a strong feeling that the changes it brings are inevitable and that our efforts should be devoted to advancing, enjoying, and profiting from cyber technologies rather than restraining them. But do our efforts in this direction risk the emergence of a cyber dystopia in which many, perhaps most, people are significantly harmed by technology advances? This course focuses on insights into the downsides of this technological progress. We will characterize key aspects of the problem, assess their severity, predict their future, speculate on how much of what we are facing is inevitable, and think about what steps might avoid the most undesirable outcomes. This will be guided by reading and class discussion of recent works on the topic and a project. Learn more from the course web site https://tinyurl.com/cyberdystopia.
Restricted to Undergrad - Urbana-Champaign.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Type</th>
<th>Location</th>
<th>Credits</th>
<th>Title</th>
<th>Description</th>
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<tr>
<td>70961</td>
<td>Online</td>
<td>CNO</td>
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<td>WF</td>
<td>1310 - Digital Computer Laboratory</td>
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<td>HS4</td>
<td>11:00 AM - 12:15 PM</td>
<td>WF</td>
<td>1310 - Digital Computer Laboratory</td>
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Credit Hours: 4 hours
Cloud Networking
Restricted to MCS:Computer Sci Online -UIUC.
Course description: Computer communication networks are among the most important and influential global infrastructures that humanity has created. The goal of this course is to provide a foundational view of communication networks, with a focus on networks enabling modern hyperscale cloud computing. In the first part of this course, we'll study the principles upon which the Internet and other computer networks are built, and how those principles translate into deployed protocols. In the second part of this course, we build on those principles to learn how to build a network infrastructure that provides the agility to deploy virtual networks on a shared infrastructure, that enables both efficient transfer of big data and low latency communication, and that enables applications to be federated across countries and continents. Topics will include: switching; intradomain routing; the Internet Protocol and interdomain networking; reliability, flow control, congestion control, and their embodiment in TCP; quality of service; network applications; cloud network requirements and traffic patterns; data center network architecture; virtualized and software-defined networks; and wide-area connectivity. The course will involve a significant amount of Unix-based network programming and assumes some familiarity with C or C++. One shorter programming project employs Python. Students will implement realistic network protocols, and gain the perspective of real-world networking challenges through interviews with industry professionals and academic researchers. This course is only for students that are in the Computer Science MCS/MCS-DS Program offered on the Coursera platform. Additional Coursera ID verification and ProctorU fees may apply.

Credit Hours: 3 hours
Computational Advertising
This class will survey the emerging landscape of computational advertising. It will provide students with a thorough understanding of the technologies including web-search, auctions, behavioral targeting, mechanisms for viral marketing, that underpin the display of advertisements on a variety of locations. These locations include web pages (banner ads), on prominent search engines (text ads), on social media platforms, as well as cell phones. The students shall also learn about new research areas in computational advertising including electronic billboards, moving objects (banners atop taxi cabs) and algorithmic synthesis of personalized advertisements. This class will also discuss issues related to consumer privacy.

Credit Hours: 4 hours
Computational Advertising
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Credit Hours: 4 hours
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Restricted to Graduate - Urbana-Champaign. Restricted to MCS:Computer Sci Online -UIUC.
Additional Coursera ID verification and ProctorU fees may apply

Credit Hours: 3 hours
Reinforcement Learning
Reinforcement learning (RL) is a machine learning paradigm for sequential decision-making, which has enabled the recent successes in video/board game playing (e.g., AlphaGo). In this course we will introduce the fundamental concepts and some
basic algorithms for RL. Most of the course will be highly mathematical, and the goal is to enable students to (1) understand the mathematical framework of RL, (2) tell what problems can be solved with RL, and how to express these problems using the RL formulation, (3) understand why and how RL algorithms are designed to work in theory, and (4) know how to experimentally and mathematically evaluate the effectiveness of an RL algorithm. There will be both programming and written assignments.

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Credit Hours: 3 hours
Virtual Reality

Fundamentals of virtual reality systems, including geometric modeling, transformations, graphical rendering, optics, the human vision system, the vestibular system, interface design, human factors, developer recommendations, and technological issues. Implementation exercises and a final project are included. Extensive programming background not required

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Credit Hours: 3 hours
Wireless Network Lab

Wireless networks are everywhere in our world, one laptops, smartphones, sensor and the new IoT devices popping up everywhere. Understanding how wireless networks work and why they break is the key to their successful deployment and integration. In the first half of this class, we focus on the basics of wireless networking, from the physical transmission of radio signals to the impact of lossy communication on higher layer routing and transport protocols. The second half of the class is dedicated to student led topics, including sensor networks, IoT, security and privacy, energy conservation and general performance improving techniques. Over the course of the semester, students design and implement a group project using a variety of wireless devices and technologies, ending with a project report and a poster presentation of their work.

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