## Class Schedule - Fall 2020

### Computer Science

**CS 498  Special Topics  credit: 0 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>
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</thead>
<tbody>
<tr>
<td>63294</td>
<td>Lecture-Discussion</td>
<td>ABD</td>
<td>09:30 AM - 10:45 AM</td>
<td>TR</td>
<td>0216 - Siebel Center for Comp Sci</td>
<td>Chekuri, C</td>
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Credit Hours: 4 hours
Algorithms for Big Data
Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign.
This course will describe some algorithmic techniques that have been developed for handling large amounts of data which may not fit in memory or is available in limited ways. Topics include data stream algorithms, sampling and sketching techniques, sparsification methods, and parallelization with applications to signals, matrices, and graphs. Emphasis will be on theoretical aspects of the design and analysis of such algorithms. Strongly suggested Prerequisites: grades of at least B+ in CS 374 and CS 361, or comparable understanding and facility with algorithms and probability.
Not intended for First Time Freshman students.

| 63295   | Lecture-Discussion | ABD     | 09:30 AM - 10:45 AM | TR   | 0216 - Siebel Center for Comp Sci | Chekuri, C |

Credit Hours: 4 hours
Algorithms for Big Data
Restricted to Computer Science or Bioinformatics major(s). Restricted to Graduate - Urbana-Champaign.
This course will describe some algorithmic techniques that have been developed for handling large amounts of data which may not fit in memory or is available in limited ways. Topics include data stream algorithms, sampling and sketching techniques, sparsification methods, and parallelization with applications to signals, matrices, and graphs. Emphasis will be on theoretical aspects of the design and analysis of such algorithms. Strongly suggested Prerequisites: grades of at least B+ in CS 374 and CS 361, or comparable understanding and facility with algorithms and probability.

| 71075   | Lecture-Discussion | AM1     | 12:30 PM - 01:45 PM | TR   | 1320 - Digital Computer Laboratory |            |

Credit Hours: 3 hours
Applied Machine Learning
Restricted to Computer Science or Computer Sci & Linguistics major(s). Restricted to Undergrad - Urbana-Champaign.
Not intended for First Time Freshman students.

| 68911   | Lecture           | AM3     | 11:00 AM - 12:20 PM | TR   | 2013 - Electrical & Computer Eng Bldg | Miller, A  |

Credit Hours: 3 hours
Applied Cryptography
Not intended for First Time Freshman students.

<p>| 68912   | Lecture           | AM4     | 11:00 AM - 12:20 PM | TR   | 2013 - Electrical &amp; Computer Eng Bldg | Miller, A  |</p>
<table>
<thead>
<tr>
<th>Credit Hours: 4 hours</th>
<th>Applied Cryptography</th>
<th>70185</th>
<th>Lecture-Discussion</th>
<th>AML</th>
<th>12:30 PM - 01:45 PM</th>
<th>TR</th>
<th>1320 - Digital Computer Laboratory</th>
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<tbody>
<tr>
<td>Restricted to Graduate - Urbana-Champaign.</td>
<td>Not intended for First Time Freshman students.</td>
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<tr>
<th>Credit Hours: 3 hours</th>
<th>Applied Machine Learning</th>
<th>43753</th>
<th>Lecture</th>
<th>CD</th>
<th>11:00 AM - 12:15 PM</th>
<th>TR</th>
<th>1131 - Siebel Center for Comp Sci</th>
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<tbody>
<tr>
<td>Restricted to Computer Science or Bioinformatics major(s). Restricted to Graduate - Urbana-Champaign.</td>
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<tr>
<th>Credit Hours: 3 hours</th>
<th>Cyber Dystopia</th>
<th>70961</th>
<th>Online</th>
<th>CNO</th>
<th>ARRANGED -</th>
<th>-</th>
<th>Gunter, C</th>
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<tr>
<td>Restricted to Undergrad - Urbana-Champaign.</td>
<td>Not intended for First Time Freshman students.</td>
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<tr>
<th>Credit Hours: 4 hours</th>
<th>Cloud Networking</th>
<th>70363</th>
<th>Lecture</th>
<th>DL3</th>
<th>03:30 PM - 04:45 PM</th>
<th>WF</th>
<th>1320 - Digital Computer Laboratory</th>
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<tr>
<th>Credit Hours: 3 hours</th>
<th>Introduction to Deep Learning</th>
<th>70707</th>
<th>Lecture</th>
<th>DL3</th>
<th>03:30 PM - 04:45 PM</th>
<th>WF</th>
<th>1320 - Digital Computer Laboratory</th>
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<tr>
<td>Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign.</td>
<td>Topics covered will include linear classifiers, multi-layer neural networks, back-propagation and stochastic gradient descent, convolutional neural networks,</td>
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recurrent neural networks, generative networks, and deep reinforcement learning. Coursework will consist of programming assignments in TensorFlow or PyTorch. Those registered for 4 credit hours will have to complete a project. Prerequisites: multivariable calculus, linear algebra, CS 361 or STAT 400. No previous exposure to machine learning is required. Not intended for First Time Freshman students.

| Credit Hours: 4 hours | Introduction to Deep Learning | Restricted to Computer Science or Bioinformatics major(s). Restricted to Graduate - Urbana-Champaign. This course will provide an elementary hands-on introduction to neural networks and deep learning. Topics covered will include linear classifiers, multi-layer neural networks, back-propagation and stochastic gradient descent, convolutional neural networks, recurrent neural networks, generative networks, and deep reinforcement learning. Coursework will consist of programming assignments in TensorFlow or PyTorch. Those registered for 4 credit hours will have to complete a project. Prerequisites: multivariable calculus, linear algebra, CS 361 or STAT 400. No previous exposure to machine learning is required. |

| Credit Hours: 3 hours | Social & Information Networks | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. Topic: Networks are to be found everywhere: from your familiar social networks to buyer-seller markets to protein-protein interactions. This class is an introduction to network science and we shall cover a broad range of concepts including: random graphs; networks and social contexts, networks and game theory, information diffusion and community detection. We shall discuss both classic questions about networks (how to model the spread of disease, what kinds of networks support decentralized search?) as well as more recent questions on networks with attributes and how to analyze massive networks efficiently. Not intended for First Time Freshman students. |

| Credit Hours: 3 hours | Internet of Things | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. | Internet of Things | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. | Internet of Things | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. | Internet of Things | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. | Internet of Things | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. | Internet of Things | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. | Internet of Things | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. | Internet of Things | Restricted to Computer Science major(s). Restricted to Undergrad - Urbana-Champaign. | Internet of Things | Restricted to Computer Science major(s). 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### Course Information:

**Course Description:**

The Internet of Things (IoT) stands to be the next revolution in computing. Billions of data-spouting devices connected to the Internet are already fundamentally changing the way we live and work. This course teaches a deep understanding of IoT technologies from the ground up. Students will learn IoT device programming (Arduino and Raspberry Pi), sensing and actuating technologies, IoT protocol stacks (Zigbee, 5G, NFC, MQTT, etc), networking backhaul design and security enforcement, data science for IoT, and cloud-based IoT platforms such as AWS IoT. Students will be guided through laboratory assignments designed to give them practical real-world experience, where they will deploy a distributed wifi monitoring service, a cloud-based IoT service platform serving tens of thousands of heartbeat sensors, and more. Students will emerge from the class with a cutting-edge education on this rapidly emerging technology segment, and with the confidence to carry out tasks they will commonly encounter in industrial settings.

**Course Details:**

- **Credit Hours:** 4 hours
- **Course Title:** Internet of Things
- **Restrictions:** Restricted to Computer Science or Bioinformatics major(s). Restricted to Graduate - Urbana-Champaign.

### Course Schedule:

#### Lecture-Discussion IT4

- **Time:** 09:30 AM - 10:45 AM
- **Days:** MW
- **Location:** 0216 - Siebel Center for Comp Sci
- **Instructor:** Caesar, M

#### Online ITO

- **Time:** ARRANGED
- **Credit Hours:** 4 hours
- **Course Title:** Internet of Things
- **Restrictions:** Restricted to MCS:Computer Sci Online -UIUC.

#### Lecture VR3

- **Time:** 02:00 PM - 03:15 PM
- **Days:** WF
- **Location:** 1404 - Siebel Center for Comp Sci
- **Instructor:** Shaffer, E

#### Lecture Discussion VR4

- **Time:** 02:00 PM - 03:15 PM
- **Days:** WF
- **Location:** 1404 - Siebel Center for Comp Sci
- **Instructor:** Shaffer, E

#### Lecture WN3

- **Time:** 09:30 AM - 10:45 AM
- **Days:** TR
- **Location:** -
- **Instructor:** Kravets, R

**Course Description:** 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 let 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.

**Restrictions:** Not intended for First Time Freshman students.
Wireless IoT Lab
Restricted to Graduate - Urbana-Champaign.

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 let 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.
Not intended for First Time Freshman students.