## 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. May be repeated in the same or separate terms if topics vary.

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<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>61482</td>
<td>Laboratory</td>
<td>AB1</td>
<td>01:00 PM - 01:50 PM</td>
<td>W</td>
<td>0222 - Siebel Center for Comp Sci</td>
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**Digital Forensics**

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<tbody>
<tr>
<td>61483</td>
<td>Laboratory</td>
<td>AB2</td>
<td>03:30 PM - 04:20 PM</td>
<td>W</td>
<td>0222 - Siebel Center for Comp Sci</td>
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<tbody>
<tr>
<td>61457</td>
<td>Lecture</td>
<td>AL1</td>
<td>11:00 AM - 12:15 PM</td>
<td>WF</td>
<td>1105 - Siebel Center for Comp Sci</td>
<td>Campbell, R</td>
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</table>

**Credit Hours: 4 hours**
**Digital Forensics**
Instructor Approval Required
Digital forensics concerns the acquisition and investigation of evidence from all devices capable of storing digital data and is often related to the prosecution of cyber crime and fraud. The class introduces the process of forensic investigation, chain of custody, forensics analysis, court proceedings and the legal justice system. It includes examination of digital storage and network traffic from personal computers, enterprise systems, embedded devices, and mobiles. Laboratory student exercises will use the tools and techniques of digital forensics investigators. Prerequisite: permission of instructor and a basic knowledge of computer science concepts including operating systems and networking.

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<tr>
<td>42376</td>
<td>Lecture</td>
<td>DAF</td>
<td>11:00 AM - 11:50 AM</td>
<td>MWF</td>
<td>119 - Materials Science &amp; Eng Bld</td>
<td>Forsyth, D</td>
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</table>

**Credit Hours: 3 hours**
**Probability in Computer Sci**
Restricted to Computer Science major(s). Restricted to students with Junior class standing. Restricted to Undergrad - Urbana-Champaign.
Topic: Probability in Computer Science. Introduction to probability theory with applications to computer science. Topics include conditional probability, independence, Bayes theorem, random variables, joint and conditional distributions, expectation, variance and covariance, central limit theorem, law of large numbers, Markov chains, entropy, maximum likelihood estimation, Bayes estimation, linear regression, principal component analysis, hypothesis testing, and confidence intervals. Prerequisite: Math 241.
NOTE: students taking this course in the CS curriculum in the College of Engineering will not need to take Math 461 or Math 463.

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<tr>
<td>55964</td>
<td>Lecture</td>
<td>DH3</td>
<td>11:00 AM - 12:15 PM</td>
<td>TR</td>
<td>1214 - Siebel Center for Comp Sci</td>
<td>Hoiem, D</td>
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</table>

**Credit Hours: 3 hours**
**Computational Photography**
Topic: Computational Photography. This course explores how to use computer vision techniques to enhance, manipulate, and create media from photo collections. Topics will include photo stitching, face morphing, texture synthesis, recoloring, and 3D
Computational Photography

- **Course Description:** This course explores how to use computer vision techniques to enhance, manipulate, and create media from photo collections. Topics will include photo stitching, face morphing, texture synthesis, recoloring, and 3D reconstruction. This projects-based course is intended for advanced undergraduates; some programming ability and knowledge of linear algebra will be assumed. This section is for either undergraduate or graduate students.

- **Course Code:** 55965
- **Lecture Time:** 11:00 AM - 12:15 PM TR
- **Location:** 1214 - Siebel Center for Comp Sci
- **Instructor:** D. Hoiem
- **Credit Hours:** 4 hours

Undergraduate Research Lab

- **Course Description:** In this apprenticeship-style, hands-on laboratory, students discover what it means to be a computational researcher. Students will learn to i) Pose testable research questions; ii) Write competitive grant proposals; iii) Create novel solutions using software and/or hardware; iv) Draw valid scientific conclusions; and v) Present and publish results, conclusions and other materials. This team-based undergraduate-only course requires the consent of the instructor.

- **Course Code:** 42700
- **Lecture Time:** ARRANGED
- **Location:** 1109 - Siebel Center for Comp Sci
- **Instructor:** E. Shaffer
- **Credit Hours:** 3 hours

Socio-Computer Interaction

- **Course Description:** With the growth of social technologies like Twitter, Facebook, Wikipedia, blogs, and online support groups, information technology is no longer just about information. This course will examine a sampling of the social and technical challenges social technologies must solve to be successful. Students will learn to apply basic social science theories to analyze and understand the social impact of socio-computer interfaces, as well as how to design and implement socio-computer applications. Students will engage in weekly class design activities and are required to do individual and group projects throughout the course. Students with technical skills in implementing user interfaces and knowledge in human-computer interactions are preferred. This section is for either undergraduates or graduate students.

- **Course Code:** 58253
- **Lecture Time:** 09:30 AM - 10:45 AM WF
- **Location:** 1109 - Siebel Center for Comp Sci
- **Instructor:** W. Fu
- **Credit Hours:** 3 hours

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- **Location:** 1109 - Siebel Center for Comp Sci
- **Instructor:** W. Fu
- **Credit Hours:** 4 hours

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- **Course Code:** 61298
- **Lecture Time:** 01:00 PM - 03:50 PM F
- **Location:** 1109 - Siebel Center for Comp Sci
- **Instructor:** J. Hart
- **Credit Hours:** 3 hours
Mobile Augmented Reality

Topic: Mobile Augmented Reality for Pedestrian Navigation. In this course we will be concentrating on recent technology that facilitates the development of augmented reality pedestrian navigation applications: geo-referenced data (maps, LiDAR point clouds, panoramic images and depth maps, 3D models), smartphones (phone sensors: camera, GPS, accelerometer, compass), graphics engines (OpenGL ES) to overlay relevant information in the viewfinder, and, more recently, vision engines that perform natural feature detection and tracking in the video data captured with the phone camera. This is a project-focused class. We will build prototype applications for Nokia mobile phones using Commercial GIS/Map data. We will also read and present relevant papers. Several presenters from the Geospatial industry will come to talk about the latest relevant technology. This section is for either undergraduate or graduate students.

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<td>61940</td>
<td>Lecture</td>
<td>RC3</td>
<td>10:00 AM - 11:20 AM</td>
<td>MW</td>
<td>203 - Transportation Building</td>
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Credit Hours: 3 hours

Smartphone Computing and App

Prerequisites: CS 225 (Data Structures) and the student should either be a senior undergraduate or a graduate student. This course "Meets With ECE 498 (CRN 61466/61467)" This course will introduce cross-disciplinary ideas, techniques, and algorithms in mobile computing, with an emphasis on how they can be composed to build systems and applications. Topics of interest include multi-modal sensing, energy efficiency, localization, context-awareness, gesture recognition, CPU-offloading, and data analytics. As an example, students will consider problems in indoor navigation, understand how ?signal correlation? may be an effective technique to solve the problem, and later utilize the same technique for a different application, say health monitoring. The course will end with a discussion of the longer-term challenges in mobile computing, and how techniques from different disciplines may need to come together to eventually solve them.

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