### Class Schedule - Spring 2014

#### Computer Science

**CS 598 Special Topics**  credit: 2 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.

<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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<tbody>
<tr>
<td>61163</td>
<td>Lecture-Discussion</td>
<td>CPS</td>
<td>11:00 AM - 12:20 PM</td>
<td>TR</td>
<td>2312 - Newmark Civil Engineering Bldg</td>
<td>Mechitov, K</td>
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**Credit Hours:** 4 hours  
**Cyber Physical-Systems Tech**  
**Restricted to Graduate - Urbana-Champaign.**

This course explores the applications of computer systems that interact with the physical world, identified as a key emerging research area by the National Science Foundation. Topics covered include hardware and software for networks of smart embedded devices, mobile and social sensing, autonomous robotics, and application case studies of these technologies, with a focus on practical issues in the design and deployment of cyber-physical systems (CPS) technology for Civil Engineering. Students will gain an in-depth understanding of current technologies and ongoing research in the field. The study of CPS fundamentals will be supplemented with detailed case studies covering the real-world application of these techniques in areas such as smart structures, environmental monitoring, and traffic monitoring. The course will provide students with the in-depth knowledge and practical experience necessary to utilize CPS technologies in conducting research.

| 60197 | Lecture-Discussion     | SVA     | 03:30 PM - 04:45 PM | TR   | 1109 - Siebel Center for Comp Sci | Adve, S Sinclair, M |

**Credit Hours:** 4 hours  
**Heterogeneity (a.k.a. specialization or customization) is widely considered the key to scaling the power wall imposed by current technology trends.**

Future systems will embrace heterogeneity in a variety of ways - big cores, little cores, GPUs, on-chip custom accelerators, FPGAs, heterogeneous memory systems, and so on. Unfortunately, it is unclear how to effectively build either the hardware or the software for future "general-purpose" heterogeneous systems. This course will cover the hardware and software challenges and recent advances in heterogeneous computing, targeting systems ranging from handheld devices to the cloud. Topics will include integrated accelerator architectures, heterogeneous memory systems, scheduling, programming (e.g., domain specific languages), and the hardware-software interface (e.g., virtual instruction sets). Students will be required to present and critique research papers and perform a substantial team project. Pre-requisites: CS 433 or equivalent or permission of the instructor.

| 60198 | Lecture-Discussion     | TX      | 12:30 PM - 01:45 PM | TR   | 1131 - Siebel Center for Comp Sci | Xie, T     |

**Credit Hours:** 4 hours  
**This course will be a graduate seminar on dynamic and static program analysis along with analytic techniques such as data mining, machine learning, natural language processing, and visualization for finding software faults.** A 2002 NIST report estimates that software faults cost the U.S. economy $59.5 billion annually and that improving testing infrastructure could save $22.2 billion. We will discuss techniques and tools that could significantly reduce this cost. The focus will be on analysis of software artifacts, including source code, software models, execution traces, and natural-language software artifacts. Students will get familiar with the technical results as well as the process of doing research in software testing, analysis, and analytics. The aim is to help students start research in this field or apply its results in their ongoing research. The course readings will include classic papers and current state-of-the-art work. Students will read papers ahead of time, participate in discussions, present at least one paper during the course, and do a research project in small teams or individually. Students will also write a paper describing their project and present their work at the end of the course. In past offerings of this course, a number of students submitted and published papers in various conferences or workshops based on their course projects. Grading will be based on participation, presentation, and project. The final
project will contribute the most to the grades. Prerequisites: Students should have basic knowledge of software engineering and programming languages. If you are not sure whether you can attend this course, please consult the instructor.