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>
</tr>
</thead>
<tbody>
<tr>
<td>67943</td>
<td>Online</td>
<td>CC1</td>
<td>ARRANGED -</td>
<td>-</td>
<td></td>
<td>Farivar, R</td>
</tr>
<tr>
<td>43812</td>
<td>Lecture-Discussion</td>
<td>DHP</td>
<td>09:30 AM - 10:45 AM</td>
<td>WF</td>
<td>1103 - Siebel Center for Comp Sci</td>
<td>Padua, D</td>
</tr>
<tr>
<td>67944</td>
<td>Online</td>
<td>DM1</td>
<td>ARRANGED -</td>
<td>-</td>
<td></td>
<td>Zhai, C</td>
</tr>
<tr>
<td>68084</td>
<td>Online</td>
<td>DM2</td>
<td>ARRANGED -</td>
<td>-</td>
<td></td>
<td>Zhai, C</td>
</tr>
<tr>
<td>68277</td>
<td>Lecture-Discussion</td>
<td>ETC</td>
<td>04:00 PM - 05:20 PM</td>
<td>MW</td>
<td>106B3 - Engineering Hall</td>
<td>Bashir, M</td>
</tr>
</tbody>
</table>

Credit Hours: 4 hours
Cloud Computing Capstone
Restricted to MCS:Computer Sci Online -UIUC or NDEG:Computer Science Onl-UIUC.
This course is only for students that are in the Computer Science MCS-DS Program. Additional Coursera ID verification and ProctorU fees may apply. Prerequisites: CS 498 Cloud Computing Applications and one other Cloud Computing breadth course must have been completed.

Credit Hours: 4 hours
Compiler Tech for Parallelism
Restricted to Graduate - Urbana-Champaign.
Topic: Compiler Techniques for Parallelism The focus of this course is compiler transformations to map computations onto parallel computing devices and systems including microprocessor SIMD vector extensions, multicores, and distributed memory computers. Specific topics include: dependence analysis, loop restructuring techniques for parallelism and locality, transformation of recursive computations, analysis and optimization of explicitly parallel constructs, optimization heuristics, and autotuning strategies for compiler optimization.

Credit Hours: 4 hours
Data Mining Capstone
Restricted to MCS:Computer Sci Online -UIUC or NDEG:Computer Science Onl-UIUC.
This course is only for students that are in the Computer Science MCS-DS Program. Additional Coursera ID verification and ProctorU fees may apply. Pre-requisites: CS 410 and CS 412

Credit Hours: 4 hours
Data Mining Capstone
Restricted to MCS:Computer Sci Online -UIUC or NDEG:Computer Science Onl-UIUC.
This course is only for students that are in the Computer Science MCS-DS Program. Additional Coursera ID verification and ProctorU fees may apply. Pre-requisites: CS 410 and CS 412

Credit Hours: 4 hours
Ethical Thinking-Cyber Space
Restricted to Graduate - Urbana-Champaign.
"It isn’t enough for cyber-professionals to be technologically knowledgeable; they must also be ethically minded and capable of meeting the heavy burden of responsibility that comes with having technological skills and access to sensitive data. This course will address this need through a case-study-based ethics curriculum for cybersecurity. The curriculum will immerse students in
real-life ethical dilemmas inherent to cybersecurity and engage them in open dialogue and debate within a community of ethical practice. The curriculum will be designed to develop critical reasoning skills in addition to other “soft skills” vital for cybersecurity professionals. Specific curricular objectives include: Increased awareness of the complex web of consequences that cybersecurity professionals are prone to encounter, Development of critical reasoning skills that will allow students to become more sophisticated in their ethical reasoning abilities and responses, Development of collaborative problem solving and communication skills, and Fostering and establishing a culture of dialogue around complex ethical dimensions of cybersecurity.”

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Type</th>
<th>Time</th>
<th>Days</th>
<th>Location</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>68347</td>
<td>Lecture-Discussion</td>
<td>HDA</td>
<td>W</td>
<td>01:00 PM - 02:50 PM</td>
<td>1103 - Siebel Center for Comp Sci</td>
</tr>
<tr>
<td>65175</td>
<td>Lecture-Discussion</td>
<td>HS</td>
<td>WF</td>
<td>11:00 AM - 12:15 PM</td>
<td>1131 - Siebel Center for Comp Sci</td>
</tr>
<tr>
<td>54551</td>
<td>Lecture-Discussion</td>
<td>KT4</td>
<td>TR</td>
<td>03:30 PM - 04:45 PM</td>
<td>1131 - Siebel Center for Comp Sci</td>
</tr>
<tr>
<td>48261</td>
<td>Lecture-Discussion</td>
<td>KT9</td>
<td>TR</td>
<td>02:00 PM - 03:15 PM</td>
<td>1131 - Siebel Center for Comp Sci</td>
</tr>
</tbody>
</table>
### Computational Cancer Genomics

**Credit Hours:** 4 hours  
**Description:** This course focuses on recent algorithmic methods in cancer genomics, including somatic variant calling, phylogeny inference and identification of driver mutations. Students will study the underlying principles of these methods and the application of these methods to cancer genomics data. This course is appropriate for graduate students in computer science, bioengineering, mathematics and statistics. Familiarity with basic statistics, probability and algorithms is expected.

**El-Kebir, M**

### Parallel Algorithms

**Credit Hours:** 4 hours  
**Description:** The course will cover topics in the theory of parallel algorithms and parallel programming models. Topics include: parallel computation complexity -- work and depth, communication complexity, parallel reduction and parallel prefix, parallel sorting algorithms, parallel graph algorithms, Networks and routing, and FFT.

**Snir, M**

### Stat Reinforcement Learning

**Credit Hours:** 4 hours  
**Description:** Theory of reinforcement learning, with a focus on sample complexity analyses. The course will provide the necessary background and the mathematical tools for understanding the statistical properties of RL algorithms and the challenges. Specific topics include: (1) MDP basics, (2) finite sample analyses of batch RL (tabular and func approx), (3) state abstractions, (4) importance sampling, (5) PAC exploration (tabular and func approx), (6) Intro to POMDPs and PSRs. Prerequisites: probability and statistics, linear algebra, and basic concepts of machine learning. Some familiarity with Markov chains and numerical analysis are also recommended. For more info, refer to the course website for Fall 2018 (on instructor's homepage).

**Jiang, N**

### Reliable Software Systems

**Credit Hours:** 4 hours  
**Description:** This course teaches the principles and practices of building reliable software systems. We will look into how software systems fail in the real world, study practical, widely-adapoped reliability techniques and practices, and discuss the state-of-the-art research of software and system reliability. This is a research-oriented seminar course with a major course project. Prerequisite: CS 241 (System Programming) or CS 423 (Operating Systems Design).

**Xu, T**