Credit Hours: 4 hours
Topic: Symplectic Integrators and Discrete Mechanics
Symplectic integrators are widely used in science and engineering for numerically integrating Hamiltonian differential equations. While they have been around for decades, a relatively recent technique for deriving symplectic integrators is based on a variational approach. In this approach the variational principle, rather than the differential equations are discretized. This technique generates not just symplectic integrators but a larger class that is sometimes called variational integrators. The techniques for creating and studying such methods are firmly grounded in a geometric, variational approach to mechanics (both Lagrangian and Hamiltonian). We will carefully study a few recent papers in discrete mechanics and variational integrators. Graduate students in numerical analysis, mathematics, engineering, physics and computational science may find this class useful. This will be a discussion type class. Participation in the discussions will be the major component of the grade.

Credit Hours: 4 hours
Topic: Advanced Computer Security. Prerequisite: a 400 level course in security or consent of instructor. Research projects in security in the areas of monitoring and surveillance, critical infrastructure protection, unwanted traffic on the Internet, secure web services, tamper-resistant security architectures.

Credit Hours: 4 hours
Topic: Approximation Algorithms. Approximation algorithms are heuristics for hard problems that have provably good guarantees on the quality of their solutions. This course will provide a broad introduction to results and techniques in this area.

Credit Hours: 4 hours
Restricted to Doctor of Philosophy.
Topic: Computer Supported Cooperative Work. PhD seminar; other graduate students may enroll with consent of instructor. (twidale@uiuc.edu)

Credit Hours: 4 hours
Topics in Statistical Learning This graduate seminar will read and discuss papers dealing with major techniques and ideas in statistical learning. Grading by participation and class project.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Class Type</th>
<th>Location</th>
<th>Time</th>
<th>Days</th>
<th>Building</th>
<th>Instructor</th>
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<td>Lecture-Discussion</td>
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<td>10:00 AM - 12:50 PM</td>
<td>F</td>
<td>11 - Smith Memorial Hall</td>
<td>Gasser, L</td>
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Credit Hours: 4 hours
Topic: Advanced Topics on Wireless Networks. Prerequisite: CS 438 or equivalent. Topics: wireless communication basics, access technologies, medium access control, naming and addressing, routing and forwarding, wireless transport, mobility support and management, security, and power management. We will examine and discuss challenges and solutions to these problems in the contexts of 2/3G cellular networks, wireless LANs, ad-hoc networks, and mesh networks.

Credit Hours: 4 hours
Topic: Social Spaces.

Credit Hours: 4 hours
Topic: Advanced Topics in Real-Time Embedded Systems. Prerequisite: CS 424 (Real-Time Systems), or CS 431 (Embedded System Architecture), or consent of the instructor. In this course, we will discuss topics about the design and theoretical analysis of distributed real-time embedded systems. The goal of this course is to provide a deep understanding about resource management in modern networked embedded systems composed of diverse activities with different degrees of criticality and with different forms of timing requirements. This course is structured to improve students’ research skill and their ability of critical thinking. Specifically, the course will include the following topics: (T1) design of predictable and efficient soft real-time systems; (T2) real-time resource management for multi-processor platforms; (T3) principles of real-time wireless networking.

Credit Hours: 4 hours
Restricted to Doctor of Philosophy.
Topics in Self-Organizing Information Systems. Doctoral seminar; other graduate students may enroll with permission of instructor (gasser@uiuc.edu). Meets with LIS590 (SOS).