Fall 2018 – CS Special Topics Courses

1. CS 491 - Virtual, Augmented and Mixed Reality
2. CS 491 - High-Performance Concurrent Computing
3. CS 594 – Visual Data Science
4. CS 594 – Empirical Methods in Human-Centered Computing
5. CS 594 – Artificial Intelligence Safety
6. CS 594 - Artificial Intelligence Applications: Innovation and Entrepreneurship Practicum
7. CS 594 – Data Center Networking *** NEW – Added 8/21/18****

CS 491 - Virtual, Augmented and Mixed Reality
• Instructor: Prof. Johnson
• Meeting time: TR 11-1215
• CRNs: 30757 (ugrad) & 30285 (grad)
• Course page: https://www.evl.uic.edu/aej/491/
• Notes: Undergrads have to submit modification of major to use this as technical elective

Learn about virtual and augmented reality hardware and software and how to develop applications that take advantage of their unique affordances

CS 491 - High-Performance Concurrent Computing
• Instructor: Prof. Eriksson
• Meeting time: TR 1230-145
• CRNs: 38956 (ugrad) & 38963 (grad)
• Notes: Undergrads have to submit modification of major to use this as technical elective

The course objective is to provide a good understanding of how fast you might expect a small program to run, what might cause it to go much slower, and how to make the program go as fast as possible, usually without changing or even discussing the underlying complexity of the algorithm. In other words, this course is about the minimizing the constants that complexity analysis ignores.

To achieve this goal, we will study, evaluate and experiment with concurrent computing in several forms, as it exists in common off-the-shelf computers today: pthreads, lock designs and lock-free data structures, hyper-threading, multi-core, multi-socket, instruction-level, vectorized, and GPGPU parallelism, and more. The course will consist primarily of several large projects, with accompanying lectures covering the topics necessary to complete each project, as well as mid-term and final exams.

For undergraduates, CS 361 Computer Systems is a pre-requisite, or consent of instructor. For graduate students, a good understanding of low-level C programming and debugging, and some experience with multi-threading and synchronization, as well as assembly language programming is necessary.
CS 594 – Visual Data Science
- Instructor: Prof. Marai
- Meeting time: TR 2-315 pm
- CRNs: 29095
- Course page: [https://www.evl.uic.edu/cs594/](https://www.evl.uic.edu/cs594/)

This course is an introduction to key design principles and techniques for interactively visualizing and analyzing data in data science. The major goals of this course are to understand how human perception and cognition can help in the analysis and understanding of complex data, how to design and evaluate effective visual representations of data to support analysis, how to tell a compelling data story, and how to create your own interactive visual data analysis using web-based frameworks.

CS 594 – Empirical Methods in Human-Centered Computing
- Instructor: Prof. Chattopadhyay
- Meeting time: MW 430-545 pm
- CRNs: 42607

Learn empirical methods, such as experiment design, hypothesis testing, grounded theory, and log analysis to (1) systematically evaluate human-computer interactions and (2) drive design innovation of human-centered computing systems.

CS 594 – Artificial Intelligence Safety
- Instructor: Prof. Ziebart
- Meeting time: W 6-830 pm
- CRNs: 40393

Whether advances in artificial intelligence will be harnessed for the good of individuals and societies, will cause existential risks for humanity, or lead to something in-between is a matter of frequent debate. This course seeks to expose research-focused students working in artificial intelligence, broadly construed, to the societal concerns surrounding artificial intelligence and technical problems that arise from those concerns. We will focus on open problems and research problems relating to the robustness, fairness, privacy, and transparency of artificial intelligence systems.
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CS 594 – Artificial Intelligence Applications: Innovation and Entrepreneurship Practicum
- Instructor: Prof. Petrov
- Meeting time: Saturday 10am – 12:30 pm
- CRNs: 27441

This is a hands on and experiential course teaching students how to apply advanced Artificial Intelligence (AI) and Machine Learning (ML) methods and technologies to develop commercially successful business solutions. The course teaches students how to identify and qualify promising business opportunities that are made possible by AI and ML, how to structure a viable business model, and how to select and apply available AI and ML technologies for the rapid development of a working Minimum Viable Product (MVP). Students will be introduced to tools and methods that have a successful track record helping launch technology ventures and will work in project teams to develop winning business models and early AI product prototypes. The course is fast based, hands on and requires commitment and dedication throughout the semester. The course involves significant software development working in teams. The course will culminate in a business proposal pitch and MVP presentation in front of a judging panel of experienced technology and business executives and entrepreneurs from the local business community.

Attending the course is by approval by the instructor. Students must register first for the course and then submit an application form as PDF or Word attachment via email to the instructor at ppetro2@uic.edu by 6:00pm CT on Friday August 24th.

The completed application form must include -
1. Student Name:
2. Academic Standing with CS Department-
   a. Program – Ph.D. or MS:
   b. Semester / year when started program:
   c. Semester / year when expecting to graduate:
3. Relevant courses taken at UIC (e.g. ML, AI, NLP):
4. Relevant courses taken outside UIC (e.g. Institution, Course Title):
5. Relevant non-academic experience:
6. Paragraph describing an idea for a business opportunity enabled by AI technology

Students / applicants are required to attend a pre-session on August 25th - the Saturday before beginning of classes - to introduce themselves, present their idea, and start the process of team formation and idea selection. Students approved to attend the course are asked to commit to completing the course.
**CS 594 – Data Center Networking**
- Instructor: Prof. Stephens  
- Meeting time: TR 11-12:15 pm  
- CRNs: 43136

Course Description:
This class explores technologies, techniques, and designs for cloud data center networking, using real production networks at cloud providers like Google, Microsoft, and Amazon as an example. Topics include multipath topologies and routing, load balancing, network virtualization, fault-tolerance, performance isolation, network acceleration (e.g. RDMA), in-network computing, explicit congestion control, and protocol independent programmable networking hardware. Ultimately, the goal is to foster an understanding of the many different aspects of data center networking in a way that is both comprehensive and current.
Students will "build their own cloud network" for experimentation (via CloudLab) throughout the duration of the class. Additionally, students will present previous research efforts on data center networking. The number of presentations will depend on the class size, though will not be more than 2 or 3. The course will also include reading and/or programming assignments.

Student deliverables:
Students will be expected to read approximately one paper per session, present at least one previously completed project over the semester, complete between 2 and 4 homework assignments, and conduct one group analysis project which will include both a written and presentation component. The final project will be graded based on its correctness, thoroughness, clarity, and soundness of the analysis.

Prerequisites:
Programming skill amenable to programming virtual and physical networks (in a language like C) is required. Completion of the student skills and interest survey. Students who are not thesis option MS students or PhD students are encouraged to contact the instructor prior to enrollment. CS 450 is also recommended.