

**Fall 2021**

## **EEC 289Q - Performance Engineering of Software Systems**

Time: MW 10:30 AM – 11:50 AM

Location: TBA

Instructor: John Owens

CRN: 53504

Units: 4

### **Course Description:**

Hands-on, project-based introduction to building scalable and high-performance software systems. Topics include performance analysis, algorithmic techniques for high performance, instruction-level optimizations, caching optimizations, parallel programming, and building scalable systems. The course programming language is C.

The primary means for evaluation in this course is programming assignments, both smaller weekly homeworks and larger (but fewer) projects. Submissions will be graded on both correctness and performance. The instructor has not yet decided whether exams will be part of this course but the majority of the assessment will be through programming assignments.

Required prereq: ECS 36B

Required coreqs: ECS 36C, 122A

Recommended prereq: EEC 170

### **Planned lectures:**

- Intro and Matrix Multiplication
- Bentley Rules
- Bit Hacks
- Architecture and Vectorization
- C to Assembly
- Compilers
- Multicore Programming
- Races and Parallelism
- Analysis of Parallel Algorithms (2 lectures)
- Measurement and Timing
- Cilk Runtime System
- Caching and Cache Efficient Algorithms
- Cache Oblivious Algorithms
- Synchronization
- Speculative Parallelism