# ELECTRICAL ENGINEERING

http://www.uvm.edu/~cems/soe/

## OVERVIEW

The Electrical Engineering (EE) program at the University of Vermont is at the forefront of research in the areas of digital signal processing, control systems, power and energy systems, wireless communications, and electronic circuit and system design and testing. This rigorous and focused program offers competitive funding and prepares graduate students for careers in research and technical leadership. Graduate students can contribute to interdisciplinary research within a broad range of applications, including power/energy, biomedical, aerospace, and transportation. In addition, the EE program partners with other academic units to offer M.S. and Ph.D. degrees in Materials Science and a Ph.D. degree in Biomedical Engineering.

## DEGREES

Electrical Engineering AMP

Electrical Engineering M.S.

Electrical Engineering Ph.D.

## FACULTY

**Almassalkhi, Mads;** Associate Professor, Department of Electrical and Biomedical Engineering; PHD, University of Michigan
**Bates, Jason H. T.;** Professor, Department of Electrical and Biomedical Engineering; DSC, Canterbury University; PHD, University of Otago
**Chevalier, Samuel;** Assistant Professor, Department of Electrical and Biomedical Engineering; PhD, Massachusetts Institute of Technology
**Cipolla, Marilyn Jo;** Professor, Department of Neurological Sciences; Chair, Department of Electrical and Biomedical Engineering; PHD, University of Vermont
**Duffaut Espinosa, Luis;** Assistant Professor, Department of Electrical and Biomedical Engineering; PHD, Old Dominion University
**Frolik, Jeff L.;** Professor, Department of Electrical and Biomedical Engineering; PHD, University of Michigan
**Lee, Byung S.;** Professor, Department of Computer Science; PHD, Stanford University
**Ossareh, Hamid-Reza;** Associate Professor, Department of Electrical and Biomedical Engineering, PHD; University of Michigan
**Pandey, Amritanshu;** Assistant Professor, Department of Electrical and Biomedical Engineering, PHD, Carnegie Mellon University
**Wshah, Safwan;** Associate Professor, Department of Computer Science; PHD, State University of New York at Buffalo
**Xia, Tian;** Professor, Department of Electrical and Biomedical Engineering; PHD, University of Rhode Island

### Computer Engineering Courses

**CMPE 5220. Advanced Computer Architecture. 3 Credits.**
Provides a thorough and sophisticated examination of various hardware aspects of modern computers, including: virtual memory, instruction-set architectures, instruction-level parallelism through pipelining, caches and cache coherence, threads, vector processors, and GPUs. Prerequisites: Familiarity with topics of computer organization as would come from the equivalent of CS 2210 or CMPE 2210; Graduate student. Credit not awarded for both CMPE 5220 and CS 3220 or CMPE 3220. Cross-listed with: CS 5220.

**CMPE 5410. Digital VLSI Circuit Design. 0 or 3 Credits.**
Covers the techniques for the design, analysis and layout of digital CMOS circuits and systems. Major topics include MOSFET basics (structure and behavior of a MOSFET, CMOS fabrication, and design rules), detailed analysis of the CMOS circuits and systems (static behavior, ratioed vs. ratioless design), noise margins, computing rise and fall times, delay models, resistance. Prerequisite: Electrical Engineering Graduate student, Computer Science Graduate student, or Instructor permission. Cross-listed with: EE 5410.

**CMPE 5540. Real-Time Control Systems. 3 Credits.**
Digital control systems analysis and design. Topics include: difference equations, the Z-transforms, discrete-time transfer functions, state-space models, sampled-data systems, discretization, real-time control, microprocessor implementation, and optimal control. Project-based final. Prerequisite: Electrical Engineering Graduate student, Computer Science Graduate student, or Instructor permission. Cross-listed with: EE 5540.

**CMPE 5610. Information Theory. 3 Credits.**
Introduction to probability concepts of information theory; entropy of probability models; theoretical derivations of channel capacity; coding methods and theorems, sampling theorems. Prerequisite: Graduate student or Instructor permission. Cross-listed with: EE 5610, CS 5610.

**CMPE 5810. Digital Computer Design. 3 Credits.**
To gain a solid understanding of digital computer operating mechanisms and reconfigurable computing, and advance into hands-on experiences to design and debug digital computer system and embedded system. Field programmable gate arrays (FPGAs) will be utilized as the development platform. Prerequisite: Electrical Engineering Graduate student, Computer Science Graduate student, or Instructor permission. Cross-listed with: EE 5810, CS 5810.

**CMPE 5990. Special Topics. 1-18 Credits.**
See Schedule of Courses for specific titles.

**CMPE 5991. Internship. 1-18 Credits.**
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.