UCSD Jacobs | School of Engineering

Master of Advanced Study Degree

Computer Science and Engineering - Electrical and Computer Engineering

Wireless Embedded Systems

Graduate Education for Engineering Professionals

Vision

The next step in the wireless revolution is the connection of everyday devices through wireless technology (so-called embedded wireless). This technology is expected to explode in the next decade, and touch nearly every market sector from personal electronics and medical devices, to transportation infrastructure and manufacturing.

Next-generation embedded wireless devices have unique requirements that demand a holistic approach to their design. Their form factor, cost and power consumption must be dramatically lower than existing cellular phones. The design of these devices requires a unique interdisciplinary background in systems, software, hardware and communication theory.

The Master of Advanced Study in Wireless Embedded Systems offers a new interdisciplinary education paradigm, designed to provide high-level training for professional engineers who plan to become technical leaders in this burgeoning field.

GAIN A DEEP AND BROAD EDUCATION IN THE MULTIDISCIPLINARY FUNDAMENTALS OF WIRELESS COMMUNICATIONS AND EMBEDDED SYSTEM DESIGN.

Understand the tradeoffs between the hardware/software capabilities in embedded devices, and the limitations of the communications channel and communications algorithms.

Courses taught by UC San Diego's world-class electrical engineering, computer science, and computer engineering faculty.

Earn a master's degree in two years. Courses conveniently offered Friday/Saturday.

UC SAN DIEGO IS RECOGNIZED AS THE FOREMOST WIRELESS RESEARCH UNIVERSITY IN THE U.S., AND IS HOME TO THE CENTER FOR WIRELESS COMMUNICATIONS AND CENTER FOR NETWORKED SYSTEMS, WHICH ARE SUPPORTED BY THE LEADING COMPANIES IN THE WIRELESS FIELD.

Wireless Embedded Systems

Master of Advanced Study Degree

About the Master of Advanced Study

The Master of Advanced Study (MAS) is a unique multidisciplinary degree program focused on emerging technology areas that will be crucial for the future of engineering advancements. Courses will be taught by faculty in the departments of Electrical and Computer Engineering and Computer Science and Engineering at the UC San Diego Jacobs School of Engineering.

This high quality degree program is offered to working engineering professionals in industry or government. Courses will be conveniently delivered on alternating weekends, on a Friday/Saturday schedule, with instructional materials available online.

Who Should Apply

The MAS program in Wireless Embedded Systems is designed for engineering professionals with a background in computer science and/or electrical engineering. These professionals are often on a technical leadership track within their companies, in the area of engineering design.

How to Apply

Visit http://maseng.ucsd.edu/wes for complete application procedures.

Faculty Directors

George Papen
Professor and Vice Chair
Electrical and Computer Engineering

Ryan Kastner
Associate Professor
Computer Science and Engineering

Coursework

The MAS in Wireless Embedded Systems is a 36-unit degree to be taken over two years in consecutive fall, winter and spring quarters. The curriculum consists of nine 4-unit courses, including a capstone project course.

Fall Quarter-Year One

Digital Signal Processing
Review of discrete-time systems and signals, Discrete-Time Fourier Transform and its properties, the Fast Fourier Transform, design of Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters, and implementation of digital filters.

Winter Quarter-Year One

Introduction to Embedded Systems Design
Embedded system technologies including processors, DSP, memory, and software. System interfacing basics, communication strategies, sensors and actuators. Mobile and wireless technology in embedded systems. Design case studies in wireless, multimedia and/or networking domains.

Spring Quarter-Year One

Software for Embedded Systems
Embedded computing elements, device interfaces, time-critical I/O handling. Embedded software design under size, performance, and reliability constraints. Software timing and functional validation. Programming methods and compilation for embeddable software. Embedded runtime systems. Case studies of real-time software systems.

Wireless Communications Circuit Systems
Link budgets and wireless propagation. Concepts of noise and distortion limits in wireless systems. Review of system architectures and simple modulation and demodulation concepts. Source coding and channel coding. Overview of popular wireless standards.

Fall Quarter-Year Two

Validation and Prototyping of Embedded Systems
Embedded system building blocks including IP cores. Co-simulation. Formal verification using model checking. Verification environments. Test challenges in core integration: compliance, feature, random and collision testing. Core access and test integration. Interface-based verification and standards.

Digital Communications Systems
Experiments in the modulation and demodulation of baseband and pass-band signals. Statistical characterization of signals and impairments.

Winter Quarter-Year Two

Wireless Embedded Systems on a Chip
VLSI implementations of wireless embedded systems. Architecture considerations, design techniques for optimized power consumption. Hardware/software tradeoffs.

Digital Communications Systems II
Plan and implement design projects in communications systems: complete end-to-end communications systems project.

Spring Quarter-Year Two

Capstone Project: Intended to be a 2-3 person team design project conducted with people who work in the same company.

Contact

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