

Master of Embedded and Cyber-Physical Systems

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The graduate program in Embedded and Cyber-Physical Systems is administered by faculty from two academic units: the Donald Bren School of Information and Computer Sciences, and the Henry Samueli School of Engineering. The program offers the Master of Embedded and Cyber-Physical Systems.

Embedded systems are now entrenched into almost every aspect of our daily life, rivaling in ubiquity anything that exists today. Currently, we have tools to help us design embedded systems, making good use of available technologies at a variety of levels and scales, from hardware to interface, operating system, middleware, and software. Cyber-Physical Systems (CPS) are systems-of-systems that tightly couple their cyber (i.e. computation, communication, and control), and physical components (sensing and actuation) in the context of applications such as (but not limited to): automotive and transportation, manufacturing, power distribution grid, medical and healthcare, robotics, civil infrastructure, avionics, etc.

Thus, these Cyber-Physical Systems marry knowledge from the fields of embedded systems, networking, sensors, real-time systems, and control, as well as domain-specific knowledge, to realize systems that are of untapped complexity and scale. The Master of Embedded and Cyber-Physical Systems (MECPS) program's goal is to train students in the foundation, skills, and practices of embedded and cyber-physical systems design, optimization, and evaluation. MECPS draws primarily from Computer Science and from Engineering.

Applicants for the MECPS Program apply through the Office of Graduate Division and indicate on their applications their interest in the program. Applicants are expected to hold a bachelor's degree in Computer Engineering, Computer Science, or Electrical Engineering.

Students from other disciplines may be considered for admission if they have sufficient background in the basics of embedded systems. Applicants are evaluated on the basis of their prior academic record and their potential for carrying out graduate-level work as demonstrated in submitted application materials. These materials include official university transcripts and a Statement of Purpose. Letters of recommendation are optional but highly encouraged.

Of particular interest are students whose background is in one of the target application areas of CPS (e.g. mechanical engineering, civil, biomedical, etc.). Students with some industry experience will be considered favorably, especially if their experience is relevant to the areas emphasized by CPS. An admissions committee composed of senate faculty members evaluates the applicant files and makes admissions decisions based on the overall file presented by the student. Overall, students are admitted using criteria similar to those used in traditional M.S. degrees from relevant departments (Electrical Engineering and Computer Science (<http://catalogue.uci.edu/thehenrysamuelischoolofengineering/departmentelectricalengineeringandcomputerscience/#text>) and Computer Science (<http://catalogue.uci.edu/donaldbrenschoolofinformationandcomputersciences/departementofcomputerscience/>)).

A minimum of 48 units are required. The course requirements are as follows:

A. Complete the following core courses:	
ECPS 202	Cyber-Physical Systems Design
ECPS 203	Embedded Systems Modeling and Design
ECPS 204	Embedded System Software
ECPS 208	Control Systems for Cyber-Physical Systems
ECPS 212	Entrepreneurship for Scientists and Engineers
ECPS 216	Internet of Things Systems and Software
B. Select four electives from the following:	
ECPS 205	Sensors, Actuators, and Sensor Networks
ECPS 206	Real-Time and Distributed Systems
ECPS 207	Security and Privacy in Cyber-Physical Systems
ECPS 209	Cyber-Physical Systems Case Studies
ECPS 211	Machine Learning and Data Mining
ECPS 215	Foundations of Autonomous Systems
ECPS 295	Special Topics in CPS
C. Complete two quarters of the project course:	
ECPS 210	Cyber-Physical Systems Project

D. Complete:	
ECPS 234	Preparation for Capstone Design
E. Complete four quarters of the proseminar course:	
ECPS 294	MECPS Proseminar

Normative time to degree is five quarters.