

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/>)).

48 units are required. The course requirements are as follows:

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| 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. Complete 16 units from the following elective courses: | |
| 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 295 | Special Topics in CPS |
| C. Complete 8 units of the following project course: | |
| ECPS 210 | Cyber-Physical Systems Project |

Normative time to degree is five quarters.