

Battery and Hydrogen Technologies

“The global hydrogen energy storage market is projected to reach \$23.7 billion by the end of 2029 with a CAGR of 72.1% from 2024 to 2029.”

BCC Research (2025)

“Investors and businesses navigating the energy transition face rising complexity and uncertainty against a backdrop of elevated policy risk and geopolitical tension. Yet key clean energy technologies continue to enjoy strong fundamentals, with favorable economics and rising technology maturity driving adoption in diverse geographies across the globe. At the same time, accelerated power demand growth from rising adoption of artificial intelligence presents both a challenge and an opportunity.”

*“New Energy Outlook,”
Bloomberg NEF (2025)*

UC Irvine
Master of Engineering

Program Overview:

The University of California, Irvine (UCI) Professional Master of Engineering (M.Eng) program’s Battery and Hydrogen Technologies Concentration is designed to provide rigorous and practical hands-on team-based training in advanced energy systems, entrepreneurship/intrapreneurship, and technology commercialization. Through experiential learning, students will develop the expertise to become innovators and leaders in designing, scaling, and deploying next-generation battery and hydrogen platforms that drive the global transition to sustainable energy.

Program Features:

- 3-course sequence focused on the innovation, building, and launching of a high technology business.
- Dedicated staff and seminar course to facilitate job searches, industrial networking, and professional career development.
- Students choose 6 technical courses on timely, relevant chemical engineering topics, taught by experts in the field.
- 2-quarter Capstone design course where interdisciplinary student teams design, build, and test new energy technologies, together with faculty and industry mentors.
- Regularly interact and network with industry through symposia, lectures, design projects, and company site visits.
- Access world-class prototyping facilities and engineering centers.
- Earn a Master of Engineering degree from UCI in as soon as 9 months.



PROFESSIONAL MASTER OF ENGINEERING PROGRAM

Battery and Hydrogen Technologies

FALL

Entrepreneurship,
Leadership

Professional
Development Seminar

Technical Elective

Technical Elective

WINTER

Entrepreneurship,
Leadership

Professional
Development Seminar

Technical Elective

Technical Elective

Capstone Project*

SPRING

Entrepreneurship,
Leadership

Professional
Development Seminar

Technical Elective

Technical Elective

Capstone Project*

SUMMER/FALL (optional)

Capstone Project*

Engineering Leadership (3 quarters / 12 units):

Topics include: product ideation, design, manufacturing, marketing, writing proposals and business plans, successful team building, project management, revenue generation, quality assurance, and securing intellectual property.

Professional Development Seminar:

Topics include: resumes, job search strategies, salary negotiations, interviews, presentation skills, career advising.

Technical Elective Courses*:

CBE 295P Batteries I: Fundamentals

CBE 295P Batteries II: Production, Testing, and Applications

CBE 295P Fuel Cells: Fundamentals and Applications

CBE 295P Electrolyzers: Fundamentals and Applications

ENGR 295P Introduction to Machine Learning

ENGRMAE 218P Sustainable Energy Systems

ENGRMAE 219P Solar and Renewable Energy Systems

CBE 249 Advanced Electrochemical Engineering

CBE 249 Electrochemical Energy Storage

CBE 272 Applied Spectroscopy

*Course offerings subject to change

Capstone Project (* 2 quarters/ 8 units):

Hands-on design project tackling real-world challenges. Student teams, mentored by faculty and industry, will:

- Perform competitive analysis and develop market entry strategies towards new product commercialization.
- Define technical requirements and product specifications; determine optimal solution.
- Design, fabricate, and test a prototype in UC Irvine's world class facilities and laboratories.
- Present project results to faculty and industry at the end-of-term Project Showcase.
- Option to do project in Winter/Spring or Summer/Fall.



Apply online: <https://meng.eng.uci.edu/>

Contact us: m.eng@uci.edu, (949) 824-8090

For more information, scan QR code

UC Irvine
Master of Engineering

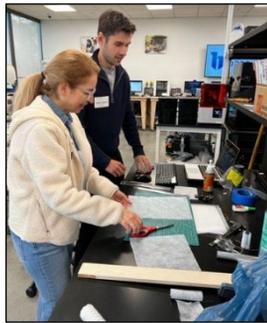


PROFESSIONAL MASTER OF ENGINEERING PROGRAM

Battery and Hydrogen Technologies

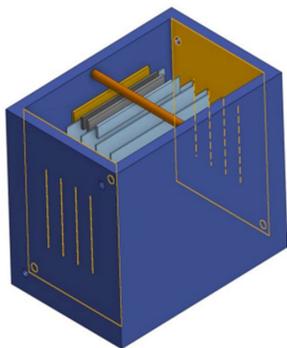
Capstone Design Projects

- Mentored by UCI faculty and companies.
- Multidisciplinary teams, 4 – 5 students.
- 6 months duration
- Perform competitive analysis.
- Define optimal requirements and specifications.
- Develop implementation plan.
- Design, fabricate, and test a prototype.
- Present project results at year-end showcase.

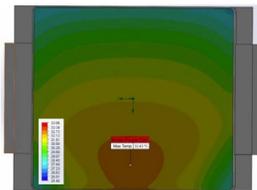


SAMPLE PROJECTS

Fast-Charging Battery Module/Pack and Embedded Automotive Code Generation



CAD design



Simulation



Prototype

Built a liquid-cooled fast charging battery module, tested current generation battery cells with silicon anodes and battery pack, and created an automatic embedded automotive code generator. Mentored by UCI and Brelle & Co.

Innovative Cooling Solutions for Commercial Hydrogen Fueling Stations

Characterized (a) heat transfer efficiency of gaseous hydrogen for zero emission cars, and (b) storage brine efficiency via freezing point testing. Mentored by UCI and True Zero.



1. Ice Build Up from Poor Insulation



2. Collect overnight melt

3. Weigh the ice melt

Energy losses in hydrogen pipes measured by collecting overnight ice melts



Brine test system



Access all Capstone projects:
sites.uci.edu/mengprojects



Gain Hands-on, Real World Experience.

PROFESSIONAL MASTER OF ENGINEERING PROGRAM

Battery and Hydrogen Technologies

Facilities & Centers

MODONNELL
DOUGLAS
ENGINEERING

HENRY SAMUELI SCHOOL OF ENGINEERING

Horiba Institute for Mobility & Connectivity



HIMaC drives sustainable zero-emission mobility with advanced battery and fuel cell testing to automotive standards. Four unique labs provide cutting-edge capabilities for performance, durability, and safety evaluation of next-generation energy storage systems. himac.uci.edu

National Fuel Cell Research Center



Pioneering R&D in next-gen hybrid fuel cell-gas turbine technology and systems, NFCRC maintains state-of-the-art test and measurement facilities to support the development of fuel cell and other energy conversion devices. www.nfcrc.uci.edu

FABworks



Comprehensive rapid prototyping facility, providing access to a host of machines, tools, and technical staff ready to offer training and design assistance. Includes 3D printing, milling, laser cutting, electronics, and more. manufacturing.uci.edu/fabworks

UCI Beall Applied Innovation



The commercialization hub of UCI that brings campus-based inventions and entrepreneurship together with Orange County's business community to support company creation and economic growth. innovation.uci.edu