

# Fuel Cells & Hybrid Technology Minor

Department of Mechanical Engineering



M.E. Fuel Cell & Hybrid Technology students get hands-on experience with fuel cell and alternative energy projects such as this GEM vehicle powered by fuel cells.

## Is it for me?

At Kettering University, the Center for Fuel Cell Systems & Powertrain Integration is poised to take the lead in preparing the current and future workforce for the fuel cell economy. Both mobile and Consumer applications powered with fuel cells will ensure a 21<sup>st</sup> Century that offers clean and sustainable energy for generations to come.

"The federal government, particularly the U.S.

Department of Energy, is conducting significant research on fuel cells to accelerate their development and successful introduction into the marketplace." ([www.national-academies.org](http://www.national-academies.org))

If you are interested in finding ways to create sustainable energy alternatives, and accelerate new technology, the Fuel Cells & Hybrid Technology Minor may be for you.

## What is a Fuel Cell?

Fuel Cells are a highly efficient, combustion-less, virtually pollution free source of electricity that can power buildings, automobiles and a host of consumer applications.

Fuel cells can be "stacked" to produce voltage levels that match specific power needs for a wide variety of uses. That makes fuel cells one of the most promising technologies for delivering clean and efficient power for automotive, industrial, residential and consumer applications.

While many technical and engineering challenges remain, fuel cells hold the potential to provide major environmental, energy and economic benefits that advance critical national goals.

Widespread use of fuel cells may hold the answers to some of our most significant energy shortage challenges for the future and could mark a historical turning point, reducing dependence on fossil fuels, improving the environment, and creating a whole new hydrogen-driven economy.

## What Courses Will I Take?

Mechanical Engineering students who wish to earn a minor in Fuel Cells and Hybrid Technology will take two additional courses to complete the program.

A representative program for a Fuel Cells and Hybrid Technology student follows on the back page of this flyer.

Kettering University



### Freshman I Term

CHEM-135/136	Principles of Chemistry/Lab
COMM-101	Written & Oral Communication I
MATH-101	Calculus I
MECH-100	Graphical Communications
ORTN-101	Learning, Success, and Teamwork

### Freshman II Term

CHEM-237/238	General Chem II/Lab
HUMN-201	Introduction to the Humanities
IME-100	Interdisciplinary Design & Manufac.
MATH-102	Calculus II

### Sophomore I Term

ECON-201	Economic Principles
MATH-203	Multivariate Calculus
MECH-210	Mechanics I
PHYS-114/115	Newtonian Mechanics/ Lab

### Sophomore II Term

MATH-204	Differential Equations
MECH-212	Mechanics II
PHYS-224/225	Electricity and Magnatism/Lab
SSCI-201	Introduction to the Social Sciences

### Junior I Term

CHEM-337/338	Chem. of Fuel Cells/Lab
EE-212	Applied Electrical Circuits
MATH-305	Numerical Methods
MECH-231L	Signals for Mechanical Sys. Lab
MECH-311	Introduction to Mech. Sys. Des. I
MECH-320	Thermodynamics

### Junior II Term

COMM-301	Written & Oral Comm. II
MECH-300	Computer Aided Engineering
MECH-310	Mechanics III
MECH-312	Mechanical Component Des. I
MECH-322	Fluid Mechanics

### Senior I Term

EE-322	Applied Power Electronics
IME-301	Engineering Materials
MECH-330	Dynamic Systems I
MECH-420	Heat Transfer
MECH-526	Fuel Cell Science and Eng.

### Senior II Term

MATH-408	Probability & Statistics
MECH-430	Dynamic Systems II
MECH-545	Hybrid Electric Vehicles
	Advanced Social Science Elective
	Advanced Humanities Elective

### Senior III Term

BUSN-571	Alt. Energy Business Dev.
EE-524	Fuel Cell Packaging
LS-489	Seminar
MECH-422	Energy Systems Lab
MECH-521	Energy & Env. Sys. Design



Many exciting opportunities are opening up in fuel cells and alternative energy solutions.

“Whatever happens, three developments are certain. First, fossil fuels will be a major part of the world’s energy portfolio for decades to come because no single technology will provide all of tomorrow’s energy and because it takes time and money to change the distribution and consumption patterns of large populations. Second, the invention and development of more cost-effective, low-carbon energy sources will become more urgent. And third, bringing those new technologies to market in convenient and affordable forms will pose a challenge even more daunting than the research itself.” – to read more go to [www.national-academies.org](http://www.national-academies.org) “What you need to know about energy”

<sup>3</sup>Approximately one-half of the students take MECH-100 FR-I and IME-100 FR-II, the other one-half take IME-100 FR-I and MECH-100 FR-II.

<sup>4</sup>Approximately one-half of the students take MECH-300 JR-II and MECH-311 JR-I, the other one-half take MECH-311 JR-II and MECH-300 SR-I.

<sup>5</sup>Students select a Specialty Related Elective with approval of their M.E. Specialty Advisor.

<sup>8</sup>Elective courses may vary in lecture and/or laboratory credits and terms from those shown.