

POWERTRAIN ELECTRIFICATION, CAPSTONE CERTIFICATE

Electrification of automotive powertrains has become the main technology path to enhance fuel economy and reduce greenhouse gas emissions. The Powertrain Electrification capstone certificate is fully online and deals with systems, components and their interactions. Based on the degree of electrification, the topology of powertrain can change in complexity and controllability. This capstone certificate spans micro, mild, full and plug-in hybrid vehicle architectures, with delineations for matching performance specifications and component sizing. A deep immersion will be taken into the fundamental characteristics of engines, transmission, batteries, motors, generators and power electronics such as inverters, DC-DC converters and on-board chargers.

HOW TO GET IN

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This certificate is geared toward those with an academic background in Mechanical Engineering.

Applicants must possess a baccalaureate degree. Applications are accepted for Fall, Spring and Summer on a rolling basis. Adult Career and Special Student Services (ACSSS) is the admitting office for all University Special students, including capstone certificate students. However, the department offering the capstone certificate program makes the final admission decision upon review of all applicant materials.

ADMISSION REQUIREMENTS FOR THE CAPSTONE CERTIFICATE

- Hold bachelor's degree in Mechanical Engineering or equivalent credential from an accredited college or university.
- A minimum undergraduate grade-point average (GPA) of 3.00 on the equivalent of the last 60 semester hours (approximately two years of work) or a master's degree with a minimum cumulative GPA of 3.00.
 - Applicants from an international institution must have a strong academic performance comparable to a 3.00 for an undergraduate or master's degree.
- International degree-seeking applicants must demonstrate English proficiency by providing official results of an English proficiency exam. Scores must be within two years of the anticipated start of enrollment.
 - TOEFL: 92 internet (iBT)
 - IELTS: 7.0
 - Duolingo English Test: 125
- GRE: Not required but may be considered if available.

Exceptions to standard admission requirements are considered by the admissions committee on an individual basis. Applicants may be admitted with deficiency, but will be expected to complete the necessary leveling courses.

ADMISSION

Applications are accepted for admission to all three terms (fall, spring, summer).

- Fall deadline: Aug 1
- Spring deadline: Dec 1
- Summer deadline: June 1

APPLICATION STEPS

- Submit an online application for admission (<http://continuingstudies.wisc.edu/advising/apply.htm>) as a University Special student, selecting UNCS Capstone Certificate and the program: Powertrain Electrification Capstone. This application is received and processed by Adult Career and Special Student Services with final decision held for approval from the specific capstone certificate coordinator.
- Submit the following materials to gradadmissions@interpro.wisc.edu.
 - Resume/CV that includes educational history and professional experience.
 - Transcripts of all previous college work
 - Two letters of recommendation submitted by the recommender. Use this recommendation form (<https://uwmadison.box.com/s/104t5ce1rvo4qaccsbepe1qlwhd1sakw/>).
- After a decision has been made, the Graduate Advisor will contact you by email to inform you of the decision and inform you of next steps.

REQUIREMENTS

REQUIREMENTS GRADE REQUIREMENTS

- Students must maintain a 3.00 GPA in the capstone to continue to the next class.

REQUIRED COURSES

Students must select 9 credits from the following courses:

Code	Title	Credits
E P D 620	Electrified Powertrain Systems	2
E P D 621	Batteries for xElectrified Vehicles	2
E P D 629	Powertrain Systems and Controls	3
E P D 645	Electric Machines for Traction Applications	2
E P D 646	Electric Drives for Traction Applications	2
E P D 647	Trends in Electrification Seminar	1

MINIMUM REQUIREMENTS FOR CAPSTONE CERTIFICATE COMPLETION

- Students must earn a minimum grade of C in each course used to meet Capstone Certificate requirements.
- Courses in which a student elects the pass/fail or audit option will not count toward completion of Capstone Certificate requirements.

- All of the Capstone Certificate credits must be earned "in residence" (which includes on campus and distance-delivered courses) at UW-Madison.
- All of the Capstone Certificate credits must be earned while enrolled in the Capstone Certificate program.

Individual Capstone Certificate programs may have additional requirements for completion, which will be listed above as/if applicable.

LEARNING OUTCOMES

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1. Develop control systems for electrified powertrain systems.
2. Comprehend and be able to analyze working principles of all components in electrified powertrain systems.
3. Describe how cells are connected to make modules and packs for power and energy applications
4. Develop systems thinking at vehicle level and drive cycle analysis, by recognizing energy flows and losses in a vehicle and identify the main contributors for them, and quantifying losses and impact of specific technologies on vehicle fuel economy