

# Degree Schedule – Graduate Certificate in Hybrid Electric Drive Vehicle Engineering

Due one semester prior to completing certificate requirements.

This certificate requires a total of 15 credits. Students must earn a grade of B or higher in each of the courses counting toward the certificate. A maximum of 6 credits is allowed in courses at the 4000- level.

**Students:** Complete the form in Microsoft Word and email the docx file to your [graduate program director or assistant.](https://www.mtu.edu/gradschool/prospective/directors/#certificate)

**Graduate program:** Review the information provided, indicate your approval as noted, and [submit to the Graduate School](https://sites.google.com/mtu.edu/grad-school-form-submission/home) online. (link only accessible to Graduate Program staff)

## Student Information

Complete the information requested below.

Name Last or Family Name, First Name or FNU

M-Number (M12345678) M

Your name will be printed on your certificate as it appears in our University records with either your legal or preferred first name. Please choose how you would like your name to appear on your certificate and type it in full. Students may contact the [Registrar’s Office](https://www.mtu.edu/registrar/students/information/preferred-name/) to change their preferred name; employees may contact Human Resources.

Selection for name Choose an item.

Typed name Name as it should appear on certificate

## Certificate Mailing Information

Your certificate will be mailed approximately six to eight weeks after the semester that all requirements have been met to the person and address that you provide below. If you request mailing to an address that you do not reside at, please indicate “in care of” and the name of the person living at the address. Please note that this will not update your regular mailing address at the University.

Mailing address Enter name and address of the person to mail your certificate

## Accelerated Certificates

Certificate programs may allow up to three (3) credits earned while an undergraduate at Michigan Tech to be used to fulfill the requirements of their bachelor’s degree and graduate certificate. To earn an accelerated certificate, students must:

* [apply for admission](https://www.mtu.edu/gradschool/prospective/apply-now/) to the certificate program following current procedures,
* follow all current policies regarding the reuse of credits, and
* mark the accelerated class(es) with “AC” in the “Semester and Year Taken” column in the tables below.

## Required Coursework - A (3 credits)

In the table below, mark the classes taken for the certificate with the semester the credits were earned.

| Semester and Year Taken | Course Number | Course Title | Number of Credits |
| --- | --- | --- | --- |
| Semester | EE/MEEM5295 | Advanced Propulsion Systems for Electric Drive Vehicles | 3 |

## Required Coursework - B (6 credits):

In the table below, mark the classes taken for the certificate with the semester the credits were earned.

| Semester and Year Taken | Course Number | Course Title | Number of Credits |
| --- | --- | --- | --- |
| Semester | EE 4227 | Power Electronics | 3 |
| Semester | EE 5221 | Advanced Electrical Machinery & Drives | 3 |
| Semester | EE/MEEM4295 | Intro. to Propulsion Systems for Electric Drive Vehicles | 3 |
| Semester | MEEM 4450ORMEEM 5440 | Vehicle DynamicsORAdvanced Vehicle Dynamics | 3 |
| Semester | MSE 5760 | Vehicle Battery Cells and Systems | 3 |

## Elective Coursework (6 credits)

In the table below, mark the classes taken for the certificate with the semester the credits were earned.

| Semester and Year Taken | Course Number | Course Title | Number of Credits |
| --- | --- | --- | --- |
| Semester | EE/MEEM4295 | Intro. to Propulsion Systems for Electric Drive Vehicles | 3 |
| Semester | EE/MEEM4296 | Experimental Studies in Hybrid Electric Vehicles | 3 |
| Semester | EE/MEEM5275 | Energy Storage Systems | 3 |
| Semester | EE/MEEM5296 | Powertrain Integration in HEV | 3 |
| Semester | EE/MEEM5750 | Model Based Embedded Control System Design | 3 |
| Semester | EE/MEEM5811 | Automotive Systems | 3 |
| Semester | EE 4219 | Introduction to Electric Machinery & Drives | 3 |
| Semester | EE 4220 | Introduction to Electric Machinery & Drives Lab | 1 |
| Semester | EE 4221 | Power System Analysis 1 | 3 |
| Semester | EE 4222 | Power System Analysis 2 | 3 |
| Semester | EE 4227 | Power Electronics | 3 |
| Semester | EE 5200 | Advanced Methods in Power Systems | 3 |
| Semester | EE 5221 | Advanced Electrical Machinery & Drives | 3 |
| Semester | EE 5223 | Power System Protection | 3 |
| Semester | EE 5227 | Advanced Power Electronics | 3 |
| Semester | EE 5230 | Power System Operations | 3 |
| Semester | EE 5290 | Selected Topics in Power Systems | 3 |
| Semester | MEEM 4200 /MEEM 5290 | Principles of Energy Conversion | 3 |
| Semester | MEEM 4201 | Applied Thermodynamics | 3 |
| Semester | MEEM 4220 | IC Engines 1 | 3 |
| Semester | MEEM 4260 | Fuel Cell Technology | 3 |
| Semester | MEEM 5201 | Fundamentals of SI Engines | 1 |
| Semester | MEEM 5202 | Fundamentals of Diesel Engines | 1 |
| Semester | MEEM 5203 | SI Engine Control Systems | 1 |
| Semester | MEEM 5204 | Diesel Engine Control Systems | 1 |
| Semester | MEEM 5220 | Fuel Cell Technology | 3 |
| Semester | MEEM 5250 | IC Engines 2 | 3 |
| Semester | MEEM 5255 | Advanced Powertrain Instrumentation and Experimental Methods | 3 |
| Semester | MEEM 5430 | Human Factors - Transportation | 3 |
| Semester | MEEM 5440 | Advanced Vehicle Dynamics | 3 |
| Semester | MEEM 5670 | Experimental Design in Engineering | 3 |
| Semester | MEEM 5680 | Optimization | 3 |
| Semester | MEEM 5700 | Dynamic Measurement and Signal Analysis | 4 |
| Semester | MEEM 5715 | Linear Systems | 3 |
| Semester | MSE 4320 | Corrosion and Environmental Effects | 3 |
| Semester | MSE 5110 | Thermodynamics and Kinetics 1 | 3 |
| Semester | MSE 5120 | Thermodynamics and Kinetics 2 | 3 |
| Semester | MSE 5410 | Materials for Energy Applications | 3 |
| Semester | MSE 5760 | Vehicle Battery Cells and Systems | 3 |

## Coursework Substitutions

Fully complete the table with the information requested. Include any courses for the certificate that are not named in the above tables. Approval of courses not listed above is at the discretion of the program granting the certificate.

| Semester and Year Taken | Course Numberex: CH5555 | Course TitleInclude the course number (as listed above) of the substitution and a brief rationale.The table will expand to fit your text. | Number of Credits |
| --- | --- | --- | --- |
| Semester | Course Number | Course number of substitution, and rationale | Credits |
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## Approvals

**Graduate program**: indicate your approval by typing your name below (if possible). Uploading the form to the Graduate School indicates your approval even if the form fields are not available. The Graduate School approves the form after receipt and verification.

Type name of approver

Graduate Program Director for Hybrid Electric Drive Vehicle Engineering Certificate OR Date

Department Chair, Mechanical Engineering – Engineering Mechanics

**Graduate School Use Only:** Total Credits:

[ ]  AS [ ]  ACC [ ]  RCR [ ]  SFAREGS, SHADEGR, SHADIPL, SZAGDGR