

**Michigan Technological University**  
**Interdisciplinary Minor in Alternative Energy Technology**

Program Code IMAE, Academic Year 2023-24

Department of Chemical Engineering

Total Credits Required: 18

*The interdisciplinary minor in alternative energy technology prepares students for careers in energy and related fields by providing students with relevant technical expertise in alternative energy technologies, and a knowledge of how energy intersects with society and/or the environment.*

**Required THERMODYNAMICS course: select one course, 2 to 4 credits**

- CEE 3200 Thermodynamics/Fluid Mechanics (4) *Prereqs: CH1112 or (CH1150 and CH1151) and PH2100 and ENG1102 and MA2160*
- CM 3230 Thermodynamics for Chemical Engineers (4) *Prereqs: CM2110 and MA2160 and PH2100*
- MEEM 2201 Introductory Thermodynamics (3) *Prereqs: MA2160 and CH1150 and CH1151*
- MET 3700 Applied Thermodynamics (3) *Prereqs: MET3400*
- MSE 3100 Materials Processing I (4) *Prereqs: (MY2100 or MSE2100 or BE2800) and MA2160*
- PH 2300 University Physics III – Fluid and Thermodynamics (2) *Prereqs: PH1160 or PH2100*

**Required CIRCUITS course: select one course, 3 credits**

- EE 2111 Electric Circuits I (3) *Prereqs: MA2160*
- EE 3010 Circuits and Instrumentation for Cyber Physical Systems (3) *Prereqs: none*
- EET 1121 Circuits I (3) *Prereqs: MA1031 or MA1032 or MA1120 or MA1121 or MA1135 or MA1160 or MA1161*
- EET 1411 Basic Electronics (3) *Prereqs: MA1031 or MA1032 or MA1120 or MA1121 or MA1135 or MA1160 or MA1161*

**Required ENERGY TECHNOLOGY course: select 3 or more credits**

- CM/ENT 3979 Alternative Energy Tech and Processes (1) *Prereqs: CH1112 or (CH1150 and CH1151) and (MA1121 or 1160 or MA1161)*
- EE 3120 Electric Energy Systems (3) *Prereqs: EE2110 or EE3010 or (EE2111 and EE2112(C))*
- EE/MEEM 4295 Introduction to Propulsion Systems for Hybrid Electric Vehicles (3) *Prereqs: MEEM2200 or CEE3200 or MEEM2201*
- EE/MEEM 4296 Experimental Studies in Hybrid Electric Vehicles (3) *Prereqs: none*
- MEEM 4200 Principles of Energy Conversion (3) *Prereqs: MEEM4201 or MEEM3230 or CM3230 or CEE3200 or MY3100 or MSE3100*
- MEEM 4235 Wind Energy (3) *Prereqs: MEEM3201*
- MEEM 4260 Fuel Cell Technology (3) *Prereqs: MEEM3201 or CM3110*

**Required ENERGY & SOCIETY course: select 3 or more credits**

- CM 3980 Sustainable Chemical Engineering (1) *Prereqs: CM2110 and (MA3520 or MA3521 or MA3530 or MA3560)*
- EC 4620 Energy Economics (3) *Prereqs: EC2001 and UN1015 and UN1025*
- ENG 4515 Introduction to Sustainability and Resilience (3) *Prereqs: none*
- ENG 4525 System Analysis for Sustainability and Resilience (3) *Prereqs: none*
- MEEM 4240 Combustion and Air Pollution (3) *Prereqs: MEEM2200 or MEEM2201 or CEE3200*
- MEEM 4685 Env Resp Design & Manufacturing (3) *Prereqs: none*
- SS 3280 Anthropology of Energy (3) *Prereqs: UN1015 and UN1025*
- SS 3800 Energy Technology and Policy (3) *Prereqs: UN1015 and UN1025*
- SS 3811 Energy Security and Justice (3) *Prereqs: UN1015 and UN1025*
- SS 3815 Energy and Society (3) *Prereqs: UN1015 and UN1025*

## Interdisciplinary Minor in Alternative Energy Technology, continued

Select remaining credits from the Energy Technology and Energy & Society on page 1, or the optional elective courses below. Credits to total 18.

### Optional ELECTIVE courses:

- CM 4080 Undergraduate Research in Biofuels Engineering (1 to 6) *Prereqs: none*
- EE 4219 Introduction to Electric Machinery and Drives (3) *Prereqs: (EE2112 or EE3010) and EE3120*
- EE 4226 Power Engineering Laboratory (1) *Prereqs: EE4221 and EE4222*
- EE 4227 Power Electronics (3) *Prereqs: EE3120 and (EE3130 and EE3131)*
- EET 3390 Power Systems (3) *Prereqs: EET2233*
- ENT 29xx/39xx/49xx Enterprise Project Work (*AEE or by approval*)
- MEEM 4220 Internal Combustion Engines I (3) *Prereqs: MEEM4201*
- MEEM 4250 Heating/Ventilation/Air Conditioning (3) *Prereqs: MEEM3201*
- MEEM 4820 Introduction to Aerospace Propulsion (3) *Prereqs: MEEM4230*
- MET 4350 Principles and Application of Heating, Ventilation, and Air Conditioning Systems (3) *Prereqs: MET4300*
- MET 4390 Internal Combustion Engines (3) *Prereqs: MET4300 or (MET3700 and MET4360)*
- MSE 4410 Science of Ceramic Materials (3) *Prereqs: MY2100 or MSE2100 or BE2800*
- Undergraduate Research by approval (1 to 6) *Prereqs: none*