

ENGINEERING THERMAL ENERGY SYSTEMS, CERTIFICATE

REQUIREMENTS

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The certificate, geared toward UW–Madison undergraduate students, requires a total of 18 completed credits. Up to 9 of the credits can be thermal-energy-related courses that are required in the student's undergraduate major. The additional 9 credits must be selected from an assortment of approved elective courses in the College of Engineering.

COURSES

Courses not on this list must be specifically approved by the certificate curriculum committee.

Code	Title	Credits
Mechanical Engineering		
M E 460	Applied Thermal / Structural Finite Element Analysis	3
M E 461	Thermal Systems Modeling	3
M E 466	Air Pollution Effects, Measurements and Control	3
M E 469	Internal Combustion Engines	3
M E 471	Gas Turbine and Jet Propulsion	3
M E/N E 520	Two-Phase Flow and Heat Transfer	3
M E 561	Intermediate Thermodynamics	3
M E 563	Intermediate Fluid Dynamics	3
M E 564	Heat Transfer	3
M E/N E 565	Power Plant Technology	3
M E/E P 566	Cryogenics	3
M E/CBE 567	Solar Energy Technology	3
M E 569	Applied Combustion	3
M E 572	Intermediate Gas Dynamics	3
M E 573	Computational Fluid Dynamics	3
Chemical and Biological Engineering		
CBE 320	Introductory Transport Phenomena	4
CBE 430	Chemical Kinetics and Reactor Design	3
CBE 440	Chemical Engineering Materials	3
CBE/M E 567	Solar Energy Technology	3
CBE 535	Heterogeneous Catalysis: Principles and Applications	3
Civil and Environmental Engineering		
CIV ENGR 423	Air Pollution Effects, Measurement and Control	3
Engineering Mechanics and Astronautics		
E M A 521	Aerodynamics	3
E M A 522	Aerodynamics Lab	3
E M A 524	Rocket Propulsion	3

Nuclear Engineering

N E 411	Nuclear Reactor Engineering	3
N E/M E 520	Two-Phase Flow and Heat Transfer	3
N E 550	Advanced Nuclear Power Engineering	3
N E/M E 565	Power Plant Technology	3
E P/M E 566	Cryogenics	3

Biological Systems Engineering

BSE 460	Biorefining: Energy and Products from Renewable Resources	3
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Materials Science and Engineering

M S & E 463	Materials for Elevated Temperature Service	3
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CERTIFICATE COMPLETION REQUIREMENT

This undergraduate certificate must be completed concurrently with the student's undergraduate degree. Students cannot delay degree completion to complete the certificate.