

DOCTOR OF PHILOSOPHY IN ENVIRONMENTAL ENGINEERING WITH SPECIALIZATION IN ENERGY/ ENVIRONMENT/ECONOMICS (E3)

Curriculum

Code	Title	Credit Hours
Core Courses		(18)
CHE 543	Energy, Environment, and Economics	3
Select 5 E3 courses from Groups A and/or B ¹		15
Ph.D. Research		(24)
ENVE 691	Research and Thesis Ph.D.	24

Minimum degree credits required: 84

¹ In addition to the listed E3 Group B course options, Ph.D. in Environmental Engineering students may select EMS 504 and CAE 589 as Group B course options.

Candidates must pass written qualifying and comprehensive examinations and must defend their thesis in an oral examination. The Ph.D. committee for E3 students must include at least one E3 professor from outside the student's department.

E3 Courses

See descriptions under the respective department's course listings.

Group A

Code	Title	Credit Hours
CHE 503	Thermodynamics	3
CHE 536	Computational Techniques in Engineering	3
CHE 541	Renewable Energy Technologies	3
CHE 542	Fluidization and Gas-Solids Flow Systems	3
CHE 565	Fundamentals of Electrochemistry	3
ECE 550	Power Electronic Dynamics and Control	3
ECE 551	Advanced Power Electronics	3
ECE 552	Adjustable Speed Drives	3
ECE 553	Power System Planning	3
ECE 554	Power System Relaying	3
ECE 555	Power Market Operations	3
ECE 557	Fault-Tolerant Power Systems	3
ECE 558	Power System Reliability	3
ECE 559	High Voltage Power Transmission	3
ECE 560	Power Systems Dynamics and Stability	3
ECE 561	Deregulated Power Systems	3
ECE 562	Power System Transaction Management	3
ECE 563	Computational Intelligence in Engineering	3
ECE 564	Control and Operation of Electric Power Systems	3
MMAE 517	Computational Fluid Dynamics	3
MMAE 520	Advanced Thermodynamics	3
MMAE 522	Nuclear, Fossil-Fuel, and Sustainable Energy Systems	3
MMAE 523	Fundamentals of Power Generation	3
MMAE 524	Fundamentals of Combustion	3
MMAE 525	Fundamentals of Heat Transfer	3
MMAE 526	Heat Transfer: Conduction	3

MMAE 527 Heat Transfer: Convection and Radiation 3

Group B

Code	Title	Credit Hours
CHE 541	Renewable Energy Technologies	3
CHE 560	Statistical Quality and Process Control	3
ENVE 501	Environmental Chemistry	3
ENVE 506	Chemodynamics	3
ENVE 542	Physiochemical Processes in Environmental Engineering	3
ENVE 551	Industrial Waste Treatment	3
ENVE 561	Design of Environmental Engineering Processes	3
ENVE 570	Air Pollution Meteorology	3
ENVE 577	Design of Air Pollution Control Devices	3
ENVE 578	Physical and Chemical Processes for Industrial Gas Cleaning	3
ENVE 580	Hazardous Waste Engineering	3