

Atmosphere/Energy Masters of Science Program (2019-20)

<https://cee.stanford.edu/programs/atmosphereenergy/masters-science-program/academic-year-2019-2020>

Requirements for the M.S. degree in Civil and Environmental Engineering:

- 45 units total, taken at Stanford
- 30 of the 45 units must be graduate level (numbered 200 or above)
- 24 of the 45 units must be from the School of Engineering
- No courses numbered below 100 can count
- A minimum 2.75 grade point average (GPA)
- No thesis is required

Additional requirements for the MS with an emphasis on Atmosphere/ Energy:

- A minimum of 30 units in combined atmosphere- and energy-related courses
- Of these 30 units, a minimum of 4 energy-core courses taken for letter grades.
- Of these 30 units, a minimum of 4 atmosphere-core courses taken for letter grades.
- The remainder of the 30 units may be from either atmosphere- or energy-related courses
- 15 additional units to fulfill the 45-unit M.S. degree requirement

Energy Core (select four of the following)

Autumn

CEE 207A Understanding Energy (4-5 u)

CEE 226 Life Cycle Assessment for Complex Systems (3-4 u)

CEE 292X Battery Systems for Transportation and Grid Services (3 u)

EE 255 Green Electronics (4 u, not offered 2019/2020, last offered Aut 2018)

ENERGY 203: Stanford Energy Ventures (3 u only)*

Winter

CEE 176A Energy Efficient Buildings (3-4 u)

CEE 207R Extreme Energy Efficiency (spring break course) (3 u)

CEE 273S Electricity Economics (3 u)

EE 253 Power Electronics (3-4 u)

EE 293B Fundamentals of Energy Processes (3 u)

ENERGY 203: Stanford Energy Ventures (3 u only)*

GSBGEN 335 Clean Energy Project Development and Finance (3 u, not offered 2019/2020, last offered Win 2018)

MATSCI 256: Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution (3-4 u)

Spring

CEE 207A Understanding Energy (4-5 u)

CEE 272R Modern Power Systems Engineering (3 u)

CEE 276B 100% Clean, Renewable Energy and Storage for Everything (3-4 u)

EarthSys 296 Implementing Climate Solutions at Scale (3 u, not offered 2019/2020, last offered Spr 2018)

EE 293 Energy Storage & Conversion: Solar Cells, Fuel Cells, Batteries, Supercapacitors (3-4 u)

ENERGY 203: Stanford Energy Ventures (3 u only)*

ENERGY 269 Geothermal Reservoir Engineering (3 u, not offered 2019/2020, last offered Spr 2019)

Law 2509 Clean Energy Project Development and Finance (3 u, not offered 2019/2020, last offered Spr 2019)

MS&E 243 Energy and Environmental Policy Analysis (3 u)

Summer

CEE 207S Understanding Energy: Essentials (3-4 u)

*Although ENERGY 203 can be taken multiple quarters for credit, it only counts as an energy core course one time, and must be taken for 3 units

Energy Electives (may be taken beyond the four required energy courses)

Autumn

CEE 241A Infrastructure Project Development (3 u)
CEE 299 Independent Study in CEE (1-3 u)
CEE 263S Atmosphere/Energy Seminar (1 u)
CEE 272T SmartGrids and Advanced Power Systems Seminar (1-2 u)
CEE 301 The Energy Seminar (1 u)
ENERGY 253 Carbon Capture and Sequestration (3-4 u)
LAW 2503 Energy Law (3 u)
MATSCI 302 Solar Cells (3 u)
MATSCI 303 Principles, Materials and Devices of Batteries (3 u)

Winter

CEE 256 Building Systems (3-4 u)
CEE 263S Atmosphere/Energy Seminar (1 u)
CEE 272T SmartGrids and Advanced Power Systems Seminar (1-2 u)
CEE 299 Independent Study in CEE (1-3 u)
CEE 301 The Energy Seminar (1 u)
ENERGY 291 Optimization of Energy Systems (3-4 u, not offered 2019/2020, last offered Win 2019)
GSBGEN 336 Energy Markets and Policy (3 u)
GSBGEN 532 Clean Energy Opportunities (2 u)
GSBGEN 569: The Open Road: Innovation in Cars, Driving and Mobility (2 u)

Spring

CEE 226E Advanced Topics in Integrated, Energy-Efficient Building Design (2-3 u)
CEE 255 Introduction to Sensing Networks (3-4 u)
CEE 263G Energy Policy in California and the West (1 u)
CEE 263S Atmosphere/Energy Seminar (1 u)
CEE 272T SmartGrids and Advanced Power Systems Seminar (1-2 u)
CEE 277S Engineering and Sustainable Development (1-3 u)
CEE 299 Independent Study in CEE (1-3 u)
CEE 301 The Energy Seminar (1 u)
ENERGY 104 Sustainable Energy for 9 Billion (3 u)
ENERGY 204 Achieving Univ. Energy Access 2030: Can it be done? (2-3 u, not offered 2019/2020, last offered Spr 2018)
ENERGY 295: Electrochemical Energy Storage Systems: Modeling/Estimation (not offered 2019/2020, last offered Spr 2019)
MATSCI 144 Thermodynamic Evaluation of Green Energy Technologies (4 u)
MATSCI 316 Nanoscale Science, Engineering, and Technology (3 u)
ME 302C: The Future of Automobile-Mobility Entrepreneurship (1 u)
PHYSICS 199 The Physics of Energy and Climate Change (3 u)

Atmosphere Core (select four of the following)

Autumn

AA 210A Fundamentals of Compressible Flow (3 u)
CEE 261A The Atmospheric Boundary Layer: Fundamental Physics and Modeling (3 u)
CEE 261I Atmosphere, Ocean, and Climate Dynamics: Atmospheric Circulation (3 u)
CEE 263C Weather and Storms (3 u)
CEE 276 Introduction to Human Exposure Analysis (3 u)

Winter

AA 214 Numerical Methods for Compressible Flows (3 u)
CEE 262I Atmosphere, Ocean, and Climate Dynamics: Ocean Circulation (3 u)
CEE 263D Air Pollution and Global Warming: History, Science, & Solutions (3 u)
CEE 278A Air Pollution Fundamentals (3 u)
EarthSys 242 Remote Sensing of Land (4 u)

Spring

CEE 172 Air Quality Management (3 u)
CEE 261C Wind Engineering for Sustainable Cities (3 u)
CEE 263A Air Pollution Modeling (3-4 u, not given 2019-20)
CEE 263B Numerical Weather Prediction (3-4 u, not given 2019-20)
ESS 247 Tropical Meteorology (3-4 u, not offered 2019/2020, last offered Spr 2019)
Law 2520 Climate Law and Policy (3 u)

Atmosphere Electives (may be taken beyond the four required atmosphere courses)**Autumn**

CS 315B Parallel Computing Research Project (3 u, not offered 2019/2020, last offered Aut 2018)
CEE 263S Atmosphere/Energy Seminar (1 u)
CEE 265 Adaptation to Sea Level Rise and Extreme Weather Events (3 u)
CEE 299 Independent Study in CEE (1-3 u)
CME 211 Software Development for Scientists and Engineers (3 u)
EarthSys 144 Fundamentals of Geographic Information Science (3-4 u)
EE 292H Engineering, Entrepreneurship and Climate Change (1 u)
ESS 305 Climate Change: An Earth Systems Perspective (2 u)
ME 351A Fluid Mechanics (3 u)
ME 352A Radiative Heat Transfer (3 u, not offered 2019/2020, last offered Aut 2018)
ME 362A Physical Gas Dynamics (3 u)

Winter

CEE 263S Atmosphere/Energy Seminar (1 u)
CEE 265F Environmental Government and Climate Resilience (3 u)
CEE 299 Independent Study in CEE (1-3 u)
EarthSys 111 Biology and Global Change (4 u)
EarthSys 243 Environmental Advocacy and Policy Communication (3 u, not offered 2019/2020, last offered Win 2019)
EarthSys 288 Social & Env. Tradeoffs in Climate Decision-Making (1-2 u, not offered 2019/2020, last offered Win 2019)
Econ 155 Environmental Economics and Policy (5 u)

Spring

CEE 263S Atmosphere/Energy Seminar (1 u)
CEE 299 Independent Study in CEE (1-3 u)
ME 361 Turbulence (3 u)
ChemEng 432 Electrochemical Energy Conversion (3 u)