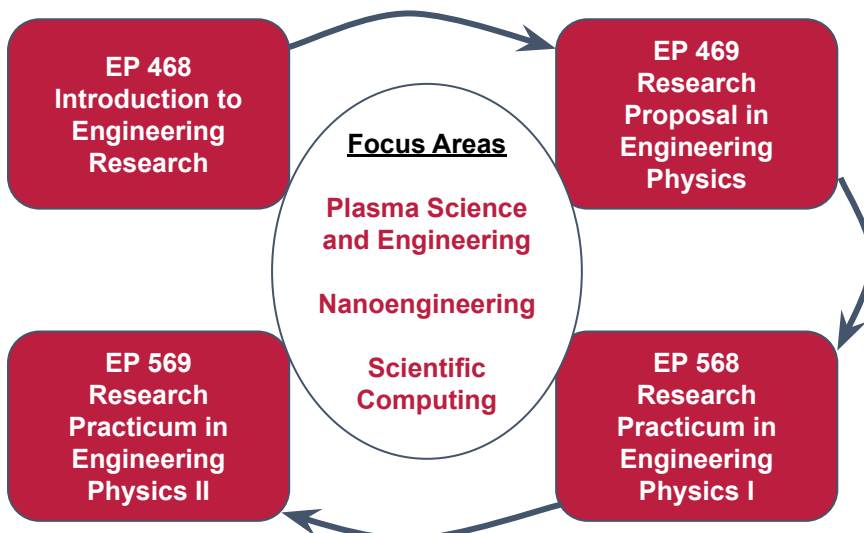


What is Engineering Physics? (EP)

The engineering physics (EP) degree is specially designed to prepare outstanding students for research career paths in industry, national laboratories, and academia. Students complete an in-depth research experience with the guidance of a research mentor that culminates in a senior research thesis. Students from this elite program are highly successful at obtaining fellowships and paid graduate research assistant positions at universities across the United States and beyond.

EP majors engage with a community of like-minded scholars within the major and obtain a mentored research experience within one of the engineering and science research groups that the UW-Madison campus has to offer.

Rather than a focus on design and a capstone design experience, Engineering Physics majors complete the EP Research Sequence which culminates in a senior research thesis.



Focus Area Coursework

Each focus area provides the ability for students to gain a depth of knowledge in their chosen area of study beyond the fundamental breadth of engineering studies. Example course topics include:

Plasma Science and Engineering

- Intro to Plasmas
- Plasma Confinement and Heating
- Plasma Processing and Technology
- Laboratory Course in Plasmas
- Ionizing Radiation
- Thermal Physics
- Electronic Aids to Measurement

NanoEngineering

- Solid State Physics
- Continuum Mechanics
- Heterogeneous and Multiphase Materials
- Applied Optics
- Crystallography and X-Ray Diffraction
- Microelectronic Devices
- Processing of Electronic Materials
- Atomistic Modeling

Scientific Computing

- Intro to Scientific Computing
- Monte Carlo Radiation Trans
- Comp. Fluid Dynamics
- Intro to Finite Elements
- Comp. Methods in Electromagnetics
- Numerical Analysis
- Linear Programming Methods



The EP degree is designed to provide graduates with skills in emerging technological areas. These graduates are highly prepared to pursue advanced graduate degrees and will become a source of qualified employees for high-tech start-up companies and traditional engineering firms, as well as positions in academia, government, and national laboratories. Distinguishing features of the engineering physics degree include a strong emphasis on math, physics, and engineering fundamentals; choice of a technical focus area; and emphasis on research culminating in a senior thesis.

Sample EP Thesis Titles

Nanoengineering

- A Measurement of the Flexoelectric Coefficient of ZnO Wires
- Effects of Electric Fields on the Properties of Thin Films Grown with Atomic Layer Deposition
- Hydrothermal Synthesis of Hierarchically Structured Tungsten Trioxide Nanomaterials for Energy Storage Applications

Plasma Science and Engineering

- Electron Temperature Fluctuations During Magnetic Reconnection in the Reversed-Field Pinch
- Optical Emission Spectroscopy in Laboratory Astrophysical Plasmas
- Analysis of Simple Charged Particle Systems That Exhibit Chaos
- The Influence of Field Structure Over Potential Origins of Observable High-Energy Astroparticle Anisotropies

Scientific Computing

- Accelerating Electron Microscopy Simulation Using Polynomial Regression
- AHAB – OR – The Hunt for Automated Shock Timing
- Attribute Management in ACIS Based Geometry Files

Sample Employers



Smooth Transition to Graduate Study after B.S. Degree Completion

The Engineering Physics degree involves a research experience and skill development in emerging technology areas, which prepares students for a range of opportunities from high-tech startups to advanced graduate degrees.

Graduate School trajectories have included:

- Cornell (Theoretical and Applied Mechanics; Materials Science)
- MIT (Plasma Physics; Mechanical Engineering; Materials Science)
- Stanford University (Materials Science and Engineering)
- Universidad Politécnica de Valencia (Advanced Materials and Processes)
- UW-Madison (Physics; Electrical Engineering; Materials Science; Nuclear Engineering and Engineering Physics)
- University of California Los Angeles (Physics)
- University of California San Diego (Nanoengineering)
- University of Colorado – Boulder (Physics)
- University of Illinois-Urbana/Champaign (Materials Science)
- University of Maryland (Physics)
- University of Michigan (Materials Science)
- University of Minnesota (Materials Science)