

**Pathway to Masters Program (3+1+1 Program)**  
**Engineering Science and Mechanics Department**

For Pathway Program students intending to apply to the **Engineering at the Nano-scale** One Year M.S. Degree

**Prerequisites for entry into the Pathway Program**

Participating Departments will fully inform applicants of the prerequisite knowledge they need in order to be prepared for the required Penn State coursework, as demonstrated on their transcripts from the home institution.

*Required prerequisite preparation to enroll in undergraduate Pathway Program courses*

- Wave motion and quantum physics
- Strength of materials
- Differential equations
- Electric circuit analysis
- Physics, electricity and magnetism
- Calculus and vector analysis

*Additional recommended prerequisite preparation to enroll in undergraduate Pathway Program courses*

- Computer programming

**Pathway Program Admission Requirements\***

- Copies of Transcripts showing all previous coursework. Transcripts plus translated transcripts.
- Resume

*\*Students will be required to officially apply to the one year master's program in the fall semester of Year 1 once enrolled in Penn State courses.*

**Courses offered through the Program for undergraduate students in Year 1**

The Engineering Science and Mechanics Department has identified and will ensure availability in a minimum of 12 credits per semester for Pathway Program students. Courses for Pathway students intending to apply to the Engineering at the Nano-scale One Year M.S. Degree are listed below:

**FALL SEMESTER: Take the following three courses, and 9 credits Required**

<b>COURSE</b>	<b>CREDITS</b>	<b>TITLE</b>
E SC 312	3	Engineering Applications of Wave, Particle, and Ensemble Concepts
E SC 414M	3	Elements of Material Engineering
E SC 433H	1	Engineering Science Research Laboratory Experience

**Select 9 credits from the following courses\*:**

E SC 407H	3	Computer Methods in Engineering Science, Honors
E SC 412	3	Nanotechnology: Materials, Infrastructure, and Safety
E SC 404H	3	Analysis in Engineering Science
E SC 450	3	Synthesis and Processing of Electronic and Photonic Materials
E SC 481	3	Elements of Nano/Micro-electromechanical Systems Processing and Design

**SPRING SEMESTER: Take E SC 400H and 12 credits**

<b>COURSE</b>	<b>CREDITS</b>	<b>TITLE</b>
E SC 400H	3	Electromagnetic Fields

**Select 12 credits from the following courses\*:**

E SC 419	3	Electronic Properties and Applications of Materials
E SC 482	3	Micro-Optoelectromechanical Systems (MOEMS) and Nanophotonics
E SC 483	3	Simulation and Design of Nanostructures
E SC 450	3	Synthesis and Processing of Electronic and Photonic Materials
E SC 445	3	Semiconductor Optoelectronic Devices

\* Other courses may be selected with permission from the Undergraduate Officer