Nature of Work:
The world faces a shortage of critical technical skills. There is a huge demand for talented, educated people who dream big and are inspired by the idea of changing the world. Choosing an academic program in the applied science, computing, engineering, or technology field opens doors to creative, challenging, and well-paying careers. Not only are jobs in these professions in demand, they're vitally important to solving the many challenges facing our world. Some of our past technological achievements are legendary, spanning decades and a variety of professions. Inventions such as the automobile, airplane, and computer top the list, as do life-changing systems such as electrification, water distribution, interstate highways, and advanced medical devices. Technology continuously transforms our everyday lives. Engineers use their imagination and analytical skills to invent, design, and build things that matter. They are team players with independent minds. Engineers are changing the world all the time by dreaming up creative and practical solutions.

Grand Challenges
The National Academy of Engineering has developed a list of what it considers the greatest technological issues facing our world today. Tomorrow's quality of life will depend on the ability of today's graduates to address these Grand Challenges. Interdisciplinary teams of engineers, scientists, computer professionals, and technologists will be required to develop solutions to the many contemporary challenges facing our world.

Explore the Grand Challenges listed here. Are you inspired to help solve one or more of them?

- Make solar energy economical: Solar energy provides less than 1 percent of the world's energy. How can we realize its potential in a cost-effective way?
- Provide energy from fusion: Scientists have managed fusion on a small scale. Can it be implemented in an efficient, economical, and environmentally benign way?
- Develop carbon sequestration methods: How can excess carbon dioxide be captured and stored to prevent global warming?
- Manage the nitrogen cycle: Humans have thrown the nitrogen cycle out of balance. Can we rebalance it by improving fertilizers and capturing and recycling waste?
- Provide access to clean water: The world's clean water supply is threatened and in short supply. Can we develop affordable technologies to help millions of people around the world?
- Restore and improve urban infrastructure: Our urban infrastructures are outdated and in need of repair. Can advanced design and materials improve our systems and create sustainable urban environments?
- Advance health informatics: Can computerized health information systems safeguard us in times of crises and improve our everyday medical services?
- Engineer better medicines: Can new systems take advantage of genetic advances, sense body changes, assess new drugs, and deliver vaccines?
- Reverse-engineer the brain: Can intensely studying the way the brain works lead to advances in health care, manufacturing, and communication?
- Prevent nuclear terror: Can technology help us prevent and respond to a nuclear attack?
- Secure cyberspace: Can we secure our critical systems - such as banking, national security, and physical infrastructure - from a cyber-attack?
- Enhance virtual reality: Can we maximize the promise of true virtual reality for training, treatment, and communication?
- Advance personalized learning: Can we move from the one-size-fits-all educational approach to learning based on personal styles, speeds, interests, and capabilities?
- Engineer the tools of scientific discovery: In the century ahead, can technology develop the tools necessary to better understand the many unanswered questions of science?
Pre-Engineering and Dual Physics/Engineering Programs

UWEC Pre-Engineering
The pre-engineering program at UW-Eau Claire consists of four semesters of study including the beginning science and math courses which are required in all engineering specialties. During this time students take approximately 15 credits per semester, so at the end of four semesters they should have about 60 credits of college work. Following four semesters at UW-Eau Claire, students transfer to an engineering school to finish the specialized course work required to obtain a degree in the engineering field they have chosen. Engineering schools in the region include the University of Minnesota, UW-Madison, UW-Platteville, UW-Milwaukee, Marquette University, and the Milwaukee School of Engineering.

UWEC Physics and Engineering Dual Degree
Get the best of two disciplines with the Physics and Engineering Dual Degree Program. In this program students receive a UW-Eau Claire physics degree in conjunction with a bachelor’s degree in engineering from either UW-Madison or University of Minnesota. Students will spend at least 3 years at UW-Eau Claire finishing up the requirements for a physics degree and then they transfer to their Engineering School and spend approximately 2 years finishing an Engineering degree. For more information about this option: www.uwec.edu/Physics/academics/dualdegree/index.htm

Quality of the UW-Eau Claire Program: In recent years, on average, students from Eau Claire maintained their grade point averages after transferring to UW-Madison or UM-Twin Cities.

Helpful Tips

- Courses in these program are sequential; Math, Physics and Chemistry courses need to be taken in the correct order (follow prerequisites for each course). Math 114 (Calculus I) should be started as soon as possible and Phys 231 (University Physics I) should be started as soon as the student is ready. It is important to consult a pre-engineering or Dual Physics/Engineering Degree adviser as soon as possible if you are considering these programs.

- Meet at least once a semester with your engineering advisor to ensure that you are aware of any changes.

- PROGRAM READINESS
  Math, Physics, Chemistry: The time spent before transferring is determined by how long the student takes to get through the Calculus and Physics sequences. Students normally begin in the math course indicated by the math placement score. This is usually Math 112, Math 113 or Math 114. Students need to be enrolled in Math 114 to start Phys 231. Students who qualify for Math 114 may not be ready for Phys 231. A strong High School Physics class and strong Math placement is required.
  Chem 115 is not offered in the spring semester; Phys 231 and Chem 115 should not normally be taken in the same semester.
  Motivation: Interest in the subject and maturity for disciplined study (40-50 hours/week) are important.
Engineering School Admission Requirements

Preparation:
Admission requirements vary from one engineering school to another and from one engineering program to another. Students should consult with an Engineering adviser to ensure that a particular UW-Eau Claire course will be accepted by a specific engineering program. UWEC does not have an engineering program; however we can prepare you for successful transfer. Transfer admissions requirements and GPAs are specific for each Engineering School. Please contact your UW-Eau Claire advisor to discuss specific admissions requirements.

Suggested UW-Eau Claire courses to take in first year:

- CHEM 103 – General Chemistry I (or CHEM 115 – Chemical Principles)
- CHEM 104 – General Chemistry II (Required for all UW-Madison programs – not required for most UM-Twin Cities programs)
- WRIT 114, 116, 118 or 120 – Critical Reading & Writing (as determined by your placement)
- MATH 114 – Calculus I
- MATH 215 – Calculus II
- PHYS 186 – Introductory Seminar
- PHYS 231 – University Physics I
- PHYS 232 - University Physics II
- CS 163 – Introduction to Programming in C++ (Required for most but not all programs)

Suggested course schedule for students who took pre-calculus or calculus in high school, math placement test permits enrollment in Math 114, a strong academic record, and ACT of 25 or above.

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<thead>
<tr>
<th>Freshman—Fall</th>
<th>Sophomore—Fall</th>
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<tbody>
<tr>
<td>Math 114</td>
<td>MATH 216</td>
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<td>PHYS 231</td>
<td>PHYS 332</td>
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<tr>
<td>WRIT 116</td>
<td>Phys 255 (depends on program)</td>
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<tr>
<td>PHYS 186 (Liberal Arts Majors)</td>
<td>GE Courses</td>
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<tr>
<td>Freshman—Spring</td>
<td>Sophomore—Spring</td>
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<tr>
<td>MATH 215</td>
<td>Contact advisor – dependent on field</td>
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<td>PHYS 232</td>
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<td>CHEM 103</td>
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<td>GE Course</td>
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Suggested course schedule for students starting at or repeating pre-calculus (MATH 112 or MATH 113)

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<td>GE courses</td>
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**Engineering Advisors**

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**Resources**

**Accreditation Board for Engineering and Technology**
www.abet.org/

**ABET Exploring Careers**
www.abet.org/explore-technical-careers/

**American Society for Engineering Education**
www.asee.org/

**UWEC Pre-Engineering**
www.uwec.edu/Physics/academics/preengin.htm

**UWEC Dual Degree Engineering**
www.uwec.edu/Physics/academics/dualdegree/index.htm