WHY CHOOSE MICHIGAN TECH?

Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.

Michigan Tech offers more than 130 undergraduate and graduate degree programs in engineering; forest resources; computing; technology; business; economics; natural, physical and environmental sciences; arts; humanities; and social sciences.

ENGINEERING FUNDAMENTALS

Michigan Technological University
Department of Engineering Fundamentals
112 Dillman Hall
1400 Townsend Drive
Houghton, MI 49931-1295
T: 906-487-3057
F: 906-487-1620
E: engfun@mtu.edu

Typical Engineering Student Schedule*

1ST SEMESTER CREDITS
Calculus I** 4-5
Engineering Analysis & Problem Solving** 3
Physics Lab I** 1
Chemistry I 4
Perspectives on Inquiry 3

2ND SEMESTER CREDITS
Calculus II 4
Engineering Modeling & Design 3
Physics Lecture 3
Elective 1-3
World Cultures 4

*For students who have Advanced Placement (AP) credit for Calculus, or for those not ready for Calculus, alternate schedules are available.

**Learning cohorts

Learning Cohorts
Being part of a learning cohort will be an invaluable aspect of your first-year engineering studies at Michigan Tech. Each cohort is made up of 20-24 students who take the same core courses together throughout the year. There are four options: 6-12 students. You and your classmates will sit together in class, and divide homework and design projects as a group. You’ll collaborate, engage in group work, and learn to function like an engineering professional once you graduate.

Team Projects and Study Topics

■ 3D solid modeling
■ Projectile launcher
■ New Orleans flood control
■ Ethics case studies
■ Statistics
■ Human-powered vehicle
■ Chemical batch reactions
■ Programming
■ Engineering history and achievements
■ And much more

Concerned about which area of engineering to pursue? No problem. You’ll have a chance to explore them all. Every engineering student at Michigan Tech takes the same core courses, and chooses a major after two or three semesters. You’ll get exposure to all the engineering fields before choosing a career path. While you’re at it, you’ll gain the fundamental skills for success.

CREATE THE FUTURE
Typical Engineering Student Schedule*

1ST SEMESTER  CREDITS

Calculus I** 4-5
Engineering Analysis & Problem Solving** 3
Physics Lab I** 1
Chemistry I 4
Perspectives on Inquiry 3

2ND SEMESTER  CREDITS

Calculus II 4
Engineering Modeling & Design 3
Physics Lecture 3
Elective 1-3
World Cultures 4

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**Learning cohorts

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Team Projects and Study Topics

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- Projectile launcher
- New Orleans flood control
- Ethics case studies
- Statistics
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- And much more

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WHY CHOOSE MICHIGAN TECH?

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Typical* Engineering Student Schedule

1ST SEMESTER CREDITS
Calculus I 5
Engineering Analysis & Problem Solving 3
Physics Lab I 1
Chemistry I 4
Composition 3

2ND SEMESTER CREDITS
Calculus II 4
Engineering Statics & Design 3
Physics Lecture 3
Elective 3-5
Global Issues 3

*For students who have Advanced Placement (AP) credit for Calculus, or for those not ready for Calculus, alternate schedules are available.

**Learning cohorts

Being part of a learning cohort will be an invaluable aspect of your first-year engineering studies at Michigan Tech. Each cohort is made up of 20-24 students who take the same core courses together throughout the year. Within each cohort are teams of 3-4 students. You and your teammates will sit together in class, and tailor coursework and design projects as a group. You will collaborate, inspire one another, and come to rely on each other—much the same way you’ll function as engineering professionals once you graduate.

Team Projects and Study Topics

- 3D solid modeling
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- Ethics case studies
- Statistics
- Human-powered vehicle
- Chemical/batch reactions
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- Engineering history and achievements
- And much more

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Create the future.

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Discovery-based Learning

In a lecture-based class, it can often take weeks to get feedback from the professor. That feedback is typically based on graded homework assignments. By then, the whole class has moved on to something else. At Michigan Tech, engineering classes aren’t like that. Instead of spending 15-20 minutes talking to the class, the professor goes from team to team, offering feedback right on the spot. Engineering talent develops naturally as a result—along with important teamwork and communication skills.

DISCOVER YOUR INTERESTS

- **BIOMEDICAL**
  - Apply engineering approaches to understand living systems.
  - Design new medical devices for diagnosis and therapy.
  - Establish methods to replace damaged or diseased organs, image the internal structures of the body, and discover many ways to make our lives healthier and safer.

- **CIVIL**
  - Plan, build, and manage the facilities essential to our civilization—bridges, dams, highways, sidewalks, runways, airports, and more.
  - Meet the challenges of deteriorating infrastructure, traffic congestion, and energy needs.

- **CHEMICAL**
  - Combine chemistry and engineering to produce chemicals and discover new ways to use them.
  - Take on environmental challenges, such as desalination of seawater and refining petroleum more efficiently.

- **COMPUTER**
  - Learn how hardware and software interact and how to combine these technologies into complete, innovative systems.
  - Master a continuum that spans both sides of traditional hardware/software, and analog/digital boundaries.

- **ELECTRICAL**
  - Improve traditional uses of electricity and design its role in new, sustainable technologies, such as solar and wind power, circuitry for a pacemaker or sophisticated telecommunications equipment.

- **ENGINEERING DISCIPLINES**
  - Pursue your own unique path in engineering, or enter an emerging field. Customize your degree to fit your career goals, or select from several defined BSE paths, such as industrial engineering (manufacturing systems); geospatial engineering (Earth observation technologies); or service systems engineering (service sector efficiency).

- **ENVIRONMENTAL**
  - Create systems that provide safe drinking water, maintain or improve air quality, control pollution in rivers and lakes, clean up contaminated land and water resources, and help industry minimize pollution in many ways.

- **GEOLOGICAL**
  - Understand, explore, and safely manage the Earth and its resources for the future. Uncover groundwater supplies; stabilize rock and soil structures for dams, highways, and property development; and minimize the danger from landslides, earthquakes, and volcanoes.

- **MATERIALS**
  - Use high-tech equipment to examine materials at the atomic level, considering their properties, processes, applications and performance.
  - Invent new materials, leading to major technological breakthroughs in industries ranging from aerospace to biotechnology.

- **MECHANICAL**
  - Design or work with everything from cell phones, power systems, and factory production lines to vehicles for sea, land, air, and space.
  - Employ the latest technologies to help solve today’s problems in energy, transportation, world hunger, space travel, and global warming.

- **ENGINEERING EXPLORATIONS**
  - Outside of class, first-year students sign up for Engineering Explorations—two-hour, hands-on courses offered by each of Michigan Tech’s engineering departments. Explorations are designed to show you what different engineering careers will be like.
  - A few sample Explorations:
    - Remote sensing of the earth and solar system
    - Changing light into electrical energy with photovoltaic cells
    - Choosing the best materials for bike frame construction
    - Measuring atmospheric pollutants
    - Determining internal forces with wind tunnels
    - Restoring lake health by aeration
    - Learning the basics tools of medical diagnosis

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In a lecture-based class, it can often take weeks to get feedback from the professor. That feedback is typically based on graded homework assignments or exams. By then the whole class has moved on to something else. At Michigan Tech, engineering classes aren’t like that. They are discovery-based. Your professor will spend 15-20 minutes talking to the class. You’ll spend the rest of the time working on in-class activities with your team. Meanwhile, your professor will go from team to team, offering feedback right on the spot. Engineering talent develops naturally as a result—along with important teamwork and communication skills.

DISCOVER YOUR INTERESTS

BIOMEDICAL
Apply engineering approaches to understand living systems. Design bio-inspired components to diagnose and treat illness. Apply fundamental science and engineering principles to develop new medical devices, tools, and techniques for surgery, and health monitoring.

CIVIL
Plan, build, and manage the facilities essential to our civilization—bridges, dams, highways, waterworks, wastewater systems, and more. Learn the technical aspects of construction and explore new methods of infrastructure development.

CHEMICAL
Combine chemistry and engineering to produce chemicals and discover new ways to use them. Take on environmental challenges, such as water pollution, waste disposal, and energy production. Tackle the ever-growing need for more efficient processes and products.

COMPUTER
Learn about hardware and software--both sides of the equation. These technologies make up the foundation of our digital world, from smartphones and computers to tablets and laptops.

ELECTRICAL
Understand the principles of electricity and discover how they are used in everyday life. From semiconductors to superconductors, learn about electronic devices and circuits.

ENVIRONMENTAL
Create systems that provide safe drinking water, maintain or improve air quality, control pollution in rivers and lakes, clean up contaminated land and water resources, and help industry minimize pollution.

GEOLOGICAL
Understand, explore, and safely manage the Earth and its resources for the future. Uncover and restore groundwater supplies; stabilize rock and soil slopes for dams, highways, and property development; and minimize the danger from landslides, earthquakes, and volcanoes.

MATERIALS
Use high-tech equipment to examine materials at the atomic level, considering their properties, processes, applications, and performance. Invent new materials, leading to major technological breakthroughs in industries ranging from aerospace to biotechnology.

MECHANICAL
Design and work with everything from small plastics, computer materials, and electronic components to large structures like bridges, machines, and automobiles. Learn about the principles of mechanics and thermodynamics, and the role of materials in society.

ENGINEERING DISCIPLINES

ECONOMIC
Explore the economic aspects of engineering, including cost-benefit analysis, project management, and risk assessment. Learn how to balance technical and economic considerations to make informed decisions.

ENGINEERING EXPLORATIONS
Outside of class, first-year students sign up for Engineering Explorations—two-hour, hands-on courses offered by each of Michigan Tech’s engineering departments. Explorations are designed to show you what different engineering careers will be like.

CHOOSE YOUR FIELD

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In a lecture-based class, it can often take weeks to get feedback from the professor. That feedback is typically based on graded homework and exams. By then, the whole class has moved on to something else. At Michigan Tech, engineering classes aren’t like that. Here in discovery-based courses, students spend 15-20 minutes listening to the lecture. Then, you spend the rest of the hour working on an activity with your team. Meanwhile, your professor will go from team to team, offering feedback right on the spot. Engineering talent develops naturally as a result—along with important teamwork and communication skills.

**Engineer your future at Michigan Tech.**

**Discovery-based Learning**

**Engineering Disciplines**

**Discovery-based Learning**

- **Applications:** An introduction to understanding how systems, language, and physical environments are designed, developed, and evaluated. Students work in teams to design and build prototypes. Projects lead to presentations for class, instructors, and peers.

- **Feedback:** The professor will spend 15-20 minutes talking to the class. You'll spend the rest of the hour working on an activity with your team. Meanwhile, your professor will go from team to team, offering feedback right on the spot. Engineering talent develops naturally as a result—along with important teamwork and communication skills.

**Engineering Disciplines**

- **Biomedical:** Apply engineering approaches to understand living systems. Design new medical devices for diagnosis and therapy. Establish new concepts as opportunities are presented, explore the experimental and empirical aspects of biological functions. Understand normal and pathological behaviors.

- **Civil:** Plan, build, and manage the facilities essential to our civilization—bridges, dams, highways, water management, and environmental systems, and understand the interactions among them. Learn how to design safe and sustainable structures and systems to meet the energy needs of tomorrow.

- **Chemical:** Combine chemistry and engineering to produce chemicals and discover new ways to use them. Take on environmental challenges such as waste management, pollution, and pollution control. Work on ways to improve the world through chemical engineering.

- **Computer:** Learn how hardware and software interact and how to combine these technologies into complete, innovative systems. Develop an understanding of software engineering, computer architecture, and programming.

- **Electrical:** Application of electrical and magnetic concepts to create electrical devices and circuits, and then integrate them into communication systems and energy conversion systems. Understand the principles of electricity and magnetism and their applications in everyday life.

- **ENVIRO:** Lead the revolution in sustainability. **NEW** degree program focuses on advanced environmental science and technology. Learn how to design sustainable systems that meet human needs while preserving the planet.

- **Environmental:** Create systems that provide safe drinking water, maintain or improve air quality, control pollution in rivers and lakes, clean up contaminated land and water resources, and help industry minimize pollution in many ways.

- **Geological:** Understand, explore, and safely manage the Earth and its resources for the future. Uncover and restore groundwater supplies; stabilize rock and soil slopes for dams, highways, and property development; and minimize the danger from landslides, earthquakes, and volcanoes.

- **Materials:** Use high-tech equipment to examine materials at the atomic level, considering their properties, processes, applications and performance. Invent new materials, leading to major technological breakthroughs in industries ranging from aerospace to biotechnology.

- **Mechanical:** Design or work with everything from cell phones, computer networks, and transportation to the climate, the earth, and space exploration. Understand how to design, analyze, and test mechanical systems and structures, and solve complex problems in a variety of fields.

**Engineering Explorations**

Outside of class, first-year students sign up for Engineering Explorations—two-hour, hands-on courses offered by each of Michigan Tech’s engineering departments. Explorations are designed to show you what different engineering careers will be like.

- **Remote sensing of the earth and solar system**
- **Changing light into electrical energy with photovoltaic cells**
- **Choosing the best materials for bike frame construction**
- **Measuring the atmospheric pressure on Mars**
- **Determining optimal times and techniques for fishing**
- **Restoring lake health by aeration**
- **Learning the basic tools of medical diagnosis**

**CHOOSE YOUR FIELD**

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**DISCOVER YOUR INTERESTS**

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**CIVIL**
Plan, build, and manage the facilities essential to our civilization—bridges, dams, highways, water and waste treatment systems, and power generation and delivery. Improve the environment through the application of civil engineering principles.

**CHEMICAL**
Combine chemistry and engineering to produce chemicals and discover new ways to use them. Take on environmental challenges, such as the hazardous by-products of a nuclear power plant, and develop new methods for converting carbon dioxide to useful materials.

**COMPUTER**
Learn how hardware and software interact and how to combine these technologies into complete, innovative systems. Master a continuum that spans both sides of traditional hardware/software, and analog/digital boundaries.

**ELECTRICAL**
Improve traditional uses of electricity and design its role in new, sustainable technologies, such as solar and wind power, medical technologies, and transportation systems.

**ENGINEERING DISCIPLINES**

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**Learning cohorts

Learning Cohorts

Being part of a learning cohort will be an invaluable aspect of your first-year engineering studies at Michigan Tech. Each cohort is made up of 20-24 students who take the same core courses together throughout the first year. The cohorts are made up of 4-6 students. You and your teammates will interact together in class, and tackle homework and design projects as a group. You’ll collaborate, learn new material, and create a community through a learning cohort. You will have an engineering professional mentor your first year.

Team Projects and Study Topics

- 3D solid modeling
- Projectile launcher
- New Orleans flood control
- Ethics case studies
- Statistics
- Human-powered vehicle
- Chemical batch reactions
- Programming
- Engineering history and achievements
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