



**THE
SUMMER**

**STEM EXPERIENCE
@ NEW MEXICO TECH**

THE SUMMER STEM EXPERIENCE @NMT





2025

About

Welcome to Summer STEM 2025

Immerse yourself in the world of science and engineering during this five-day program at New Mexico Tech. Become a 'Techie' for a week, experiencing life as a college student while earning one credit hour and gaining a deep understanding of your chosen STEM field.

Discover Your Path in STEM

Join us for engaging lectures, hands-on labs, and fun field trips led by college professors. You'll learn about physics, chemistry, computer science, engineering, and more! This program will help you understand what it takes to succeed in these fields and set you on the path to a great career.

Unleash Your Potential at NMT

New Mexico Tech boasts a long-standing reputation for academic excellence, distinguished faculty, and exceptional students. Our campus is a place where you can learn and grow, surrounded by people who want to help you succeed. Tech offers degrees spanning the range of STEM, including physical and biological sciences, computer science, engineering, and mathematics, with research opportunities starting as soon as freshman year.

Cost

ALL INCLUSIVE – for \$650, you'll get everything you need for an amazing experience – food, housing, classes, and fun activities!

Check-in: June 8th or July 6th | Torres Hall | 3 PM to 5 PM

Check-out: June 13th or July 11th | Torres Hall | 10 AM to 12 PM

Requirements and Registration

To join Summer STEM 2025, you need to be a rising sophomore, junior, or senior with a GPA of at least 2.50 (on a 4.0 scale) and have completed Algebra I or higher.

Register online*: apply.nmt.edu/portal/summer_stem

*Classes are assigned on a first-come, first-serve basis. When registering, select a first and second choice, you will be placed into one of these based on availability.

Note: a class may be canceled due to low enrollment.

Course List

Choose two | Attend one

Session 1 | June 8th - June 13th

Session 2 | July 6th - July 11th

Course Name	Session 1	Session 2
Atmospheric Instrumentation for Weather and Climate	●	
Building and Testing an Engineering System		●
Chemical Engineering: Scaling Chemical Discoveries	●	●
Civil and Environmental Engineering: Building Resilient Systems for a Changing Climate		●
Discovering the Earth	●	
Drones	●	●
Intro to Astronomy	●	
Intro to Innovative Mining Engineering		●
The Lightning Discharge		●
Materials Engineering - Metals, Ceramics, Polymers, and Composites	●	
Measuring Earth on a Budget		●
Mni Wičoni (mini we-cho-nee) (Water is Life)		●
Plastic-Free Planet: 3D Printing, Biomaterials, and Eco-Friendly Solutions		●
Python for Data Science	●	
Soft Robotic System Design	●	●

Course List

Choose two | Attend one

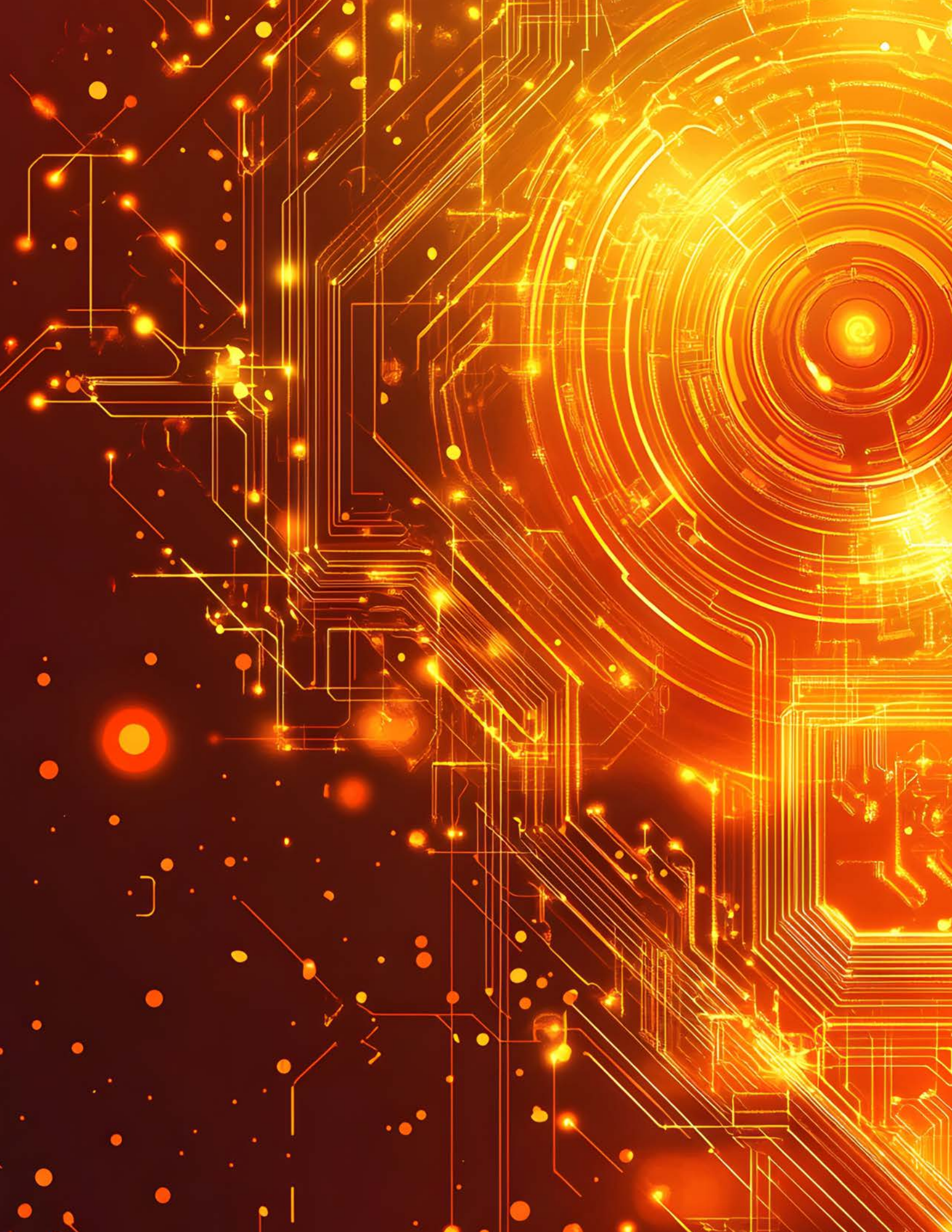
Session 1 | June 8th - June 13th

Session 2 | July 6th - July 11th

Course Name	Session 1	Session 2
The Anatomy of a Crime - Using Forensic Biology to Solve a Real-Life Crime	●	●
Transforming Solar Power to Usable Energy: Electrical Engineering in Action	●	
Understanding People and Designing Products	●	

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Atmospheric Instrumentation for Weather and Climate

SCHOLARSHIPS AVAILABLE

16

Maximum class size

June

Course dates

Dr. Kenneth Minschwaner

Instructed by

Course Description

Curious about how meteorologists predict storms or how climate scientists track long-term environmental changes? In this immersive course, you'll dive deep into the science of weather and climate monitoring. You'll learn how to use cutting-edge atmospheric instruments, from weather balloons to digital sensors, to collect and analyze real-world data.

Through hands-on activities, you'll explore key concepts like temperature, humidity, pressure, wind speed, and precipitation. You'll discover how these factors influence weather patterns and climate systems, and you'll gain insight into the tools used by professionals to track natural phenomena such as hurricanes, droughts, and heatwaves.

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Our Body – An Engineering System 10

Building and Testing an Engineering System

25

Maximum class size

SCHOLARSHIPS AVAILABLE

July

Course dates

Dr. Ashok Ghosh

Instructed by

Course Description

If you enjoy building things, there is a good chance you're considering engineering as an area of study. In this summer course, you'll learn about different types of engineering, including mechanical, civil and electrical engineering. Equipped with the technical knowledge on engineering, you will be able to build and test an interesting engineering system.

This hands-on project based instruction by subject matter expert from New Mexico tech will improve the quality of the learning for the students. This will in turn develop skilled individual to tackle future challenges.



Chemical Engineering: Scaling Chemical Discoveries

SCHOLARSHIPS AVAILABLE

20

Maximum class size

June and July

Course dates

Seth Price

Instructed by

Course Description

Discover how chemical engineers transform reactions from small lab experiments into large-scale industrial processes. In this hands-on course, you'll explore cutting-edge topics like biofuels, nanomaterials, and carbon capture. You will produce nylon fibers, and operate pilot-scale equipment (heat exchanger, distillation column and absorption column) while learning about reactions, separations and process safety.

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Civil and Environmental Engineering: Building Resilient Systems for a Changing Climate

SCHOLARSHIPS MAY BE AVAILABLE

15

Maximum class size

July

Course dates

Dr. Isabel Morris

Instructed by

Course Description

This course is focused on exploring practical approaches to addressing climate change impacts on existing and future infrastructure and the role of civil and environmental engineers in realizing sustainable solutions. Topics include recovering energy and resources from wastewater; designing infrastructure for the climate of the future; energy conservation, storage, production, and recovery; electrification, the electric grid, and energy infrastructure; construction materials and building technologies; smart and connected cities; site evaluation for new projects; and exploring practical solutions for the future. In addition to field and lab activities, rotating field trips include visits to field sites.

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Discovering the Earth

10

SCHOLARSHIPS AVAILABLE

Maximum class size

June

Course dates

Dr. Alex Rinehart

Instructed by

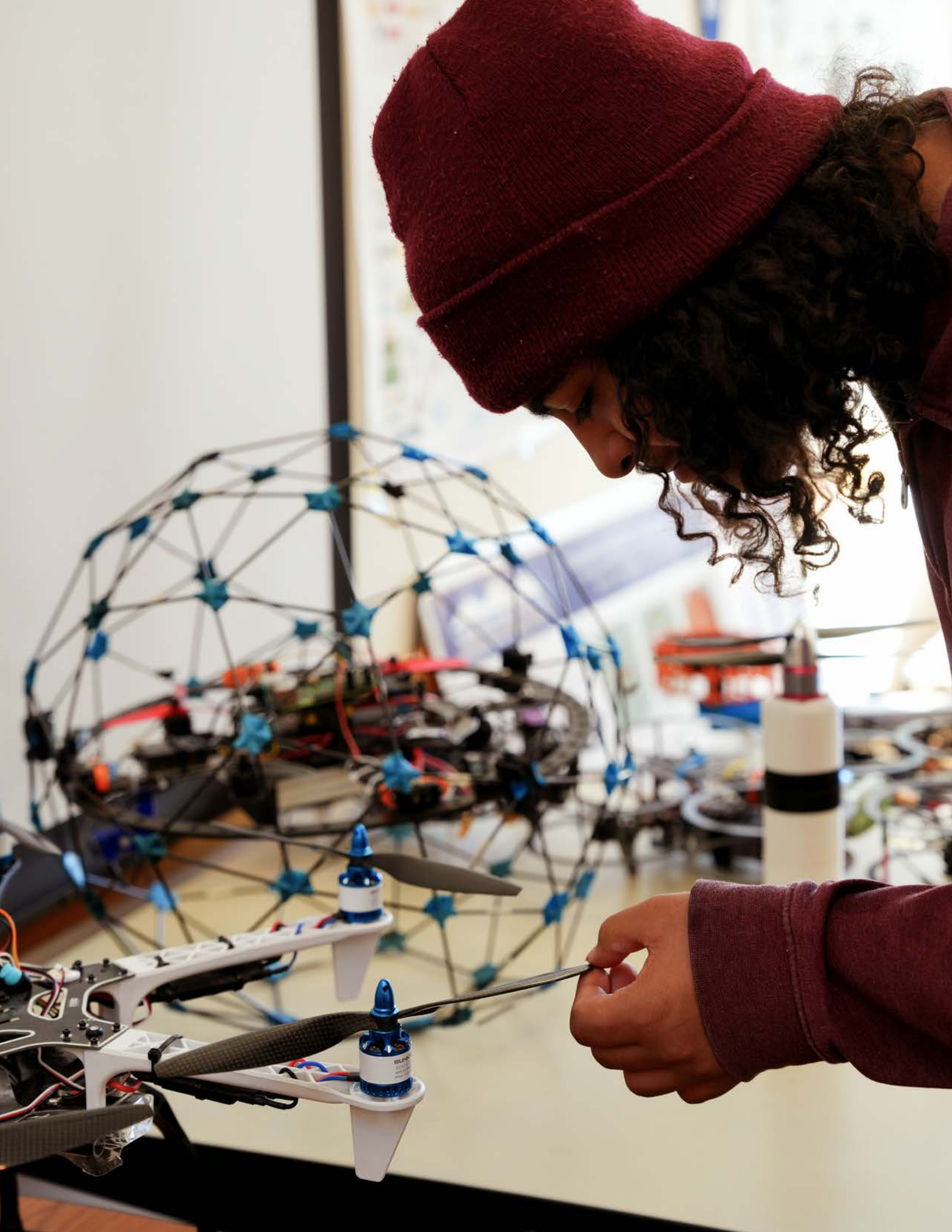
Course Description

What do the patterns in a rock mean? How do fossils tell us about how the Earth changes 300 million years ago? How do we understand what's under our feet without digging a hole? Are rivers connected to aquifers? In this class, students will learn answer these about fundamental geoscience through a series of field exercises, followed by hands-on class room projects.

At the end of the class, students will have answered these questions for themselves, using direct observations, geophysical measurements and hydrologic measurements. We start by exploring minerals, observing small and large minerals at the New Mexico Mineral Museum, and then develop hypotheses about how they form the shapes they do. This will be followed by exploring the different major rock types (igneous, sedimentary and metamorphic) in lab.

The course will start with observations in San Lorenzo Canyon, just north of town. What forms these rocks? Why are they shaped the way they are? This will be followed by an exploration of limestone and why rocks form sequences through time, starting with a field trip to the Quebradas. We will run a small geophysical survey along the Rio Grande, followed by laboratory exercises to understand what could be controlling our observations. Finally, we will return to the Rio Grande and the Quebradas, observing groundwater and surface water flows.

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Drones

SCHOLARSHIPS AVAILABLE

20

Maximum class size

June and July

Course dates

Dr. Mostafa Hassanalian

Instructed by

Course Description

In this course, students will explore various aspects of unmanned air systems, delving into the novel classification of flying drones, ranging from unmanned air vehicles to smart dusts, representing both ends of the spectrum, each with its defined applications. They will also become familiar with the design challenges of space and marine drones, learn about existing methods to enhance drone endurance, and explore various techniques for control, guidance, navigation, and manufacturing. In addition to theoretical knowledge, students will actively engage in the practical aspects of the course. They will participate in the design process, CAD modeling, aerodynamic analysis, and simulation of a small fixed-wing micro air vehicle using XFLR5 software. Moreover, students will have the exciting opportunity to build multirotor, fixed-wing, as well as bioinspired drones, gaining hands-on experience in bringing their ideas to life.



Intro to Astronomy

SCHOLARSHIPS AVAILABLE

10

Maximum class size

June

Course dates

Dr. Van Romero

Instructed by

Course Description

How did we get here? Where did we come from? How were the earth, moon, and sun created?

From ancient tribes to modern civilization, the human race has tried to answer these questions. This course will examine the myths and scientific theories of the origin of the universe. You'll learn about stars, planets, galaxies, and the mysteries of black holes and dark matter. Through engaging lessons and hands-on activities, discover how astronomers study the cosmos and uncover the science behind the night sky. Perfect for students curious about space and eager to understand our place in the universe! The course will include both afternoon classroom instruction and nighttime observations.

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Intro to Innovative Mining Engineering

SCHOLARSHIPS AVAILABLE

16

Maximum class size

July

Course dates

Dr. Navid Mojabai

Instructed by

Course Description

Discover how the mining industry plays a vital role in our everyday lives, from the materials in our smartphones to the energy powering our homes. Explore the exciting engineering challenges involved in designing and operating mines, where innovation and sustainability meet to shape the future of this essential industry.

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The Lightning Discharge

SCHOLARSHIPS AVAILABLE

12

Maximum class size

July

Course dates

Dr. Adonis Leal

Instructed by

Course Description

Discover the science behind one of nature's most powerful phenomena—lightning. Lightning is a spectacular and powerful natural phenomenon. Its temperature can reach five times the temperature of the sun's surface, its speed can be close to the speed of light, and its power can destroy equipment, burn trees, and even kill people. This discharge of electricity produces the brilliant flash of light we see as lightning, and the rapid heating of the air around it causes the loud sound of thunder. Lightning can occur within clouds, between clouds, or between clouds and the ground. This summer course covers the basics of electricity, electronics, and lightning discharge. Through hands-on activities, students will explore the use of Arduino and will develop a simple lightning detection system.

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Materials Engineering: Metals, Ceramics, Polymers, and Composites

SCHOLARSHIPS AVAILABLE

12

Maximum class size

June

Course dates

Dr. T. David Burleigh

Instructed by

Course Description

Why do plastics bend but glass breaks? Why are some metals so marvelously malleable? How is concrete different from cement? In this Materials Engineering mini-course you will learn how the structure and composition of these materials determines their properties and uses. We will explore diverse metals, polymers, ceramics, and composites through a mix of expert lectures and hands-on laboratory experiences. Materials Science sits at the intersection of chemistry, physics and engineering. You will have a fascinating week of exploration into new concepts in the world of materials.



Measuring Earth on a Budget

SCHOLARSHIPS MAY BE AVAILABLE

12

Maximum class size

July

Course dates

David Thomas

Instructed by

Course Description

The course will include multiple low-budget, hands-on methods for measuring the radius and mass of the earth, as well as the distance from earth to the moon, local latitude, axial tilt of the earth, simplified calculations of seasons and length of daylight, and more. The course will also include critical thinking applications, such as explaining why Flat Earth pseudoscience is incapable of explaining even the simplest observations of earth and sky.



Mni wičoni (Water is Life)

SCHOLARSHIPS AVAILABLE

10

Maximum class size

July

Course dates

Dr. Clint Richardson

Instructed by

Course Description

To prevent dehydration, a person needs to drink adequate amounts of water. There are many different opinions on how much water one should be drinking every day. Health authorities commonly recommend eight 8-ounce glasses, known as the 8x8 rule. This equals about 2 liters, or half a gallon. People get their daily water from a public or private water supply source, and sometimes purchase bottle water for special activities, such as sports. Federal regulations mandate the quality of water for public consumption. For example, Socorro, New Mexico get its water from a groundwater well. Louisville, Kentucky has the Ohio River as its water resource. The level of treatment required to meet EPA's Safe Drinking Regulations differs with each source water. Bottle water must also meet standards dictated by the Food and Drug Administration. Even though a person only needs 2 liters per day for drinking, per capita uses ranges between 300 and 375 liters per day for flushing the toilet, washing clothes, bathing, etc. This total usage must also meet drinking water standards. What happens to the water after we use it? What science and engineering principles and infrastructure are used to safely return it back to the environment?

Students enrolled in this class will learn about water quality from lakes, rivers, and groundwater and the science and engineering needed to produce a product water from these resources safe for human consumption. Included will be topics for treating used water to return to the environment. Students will participate in hands-on sampling and analysis activities, bench-scale unit operations for water treatment, and classroom discussions about this precious resource we need to survive. Learn about the role of the civil and environmental engineer in providing our daily need for safe drinking water and protecting the environment by treatment of used water.

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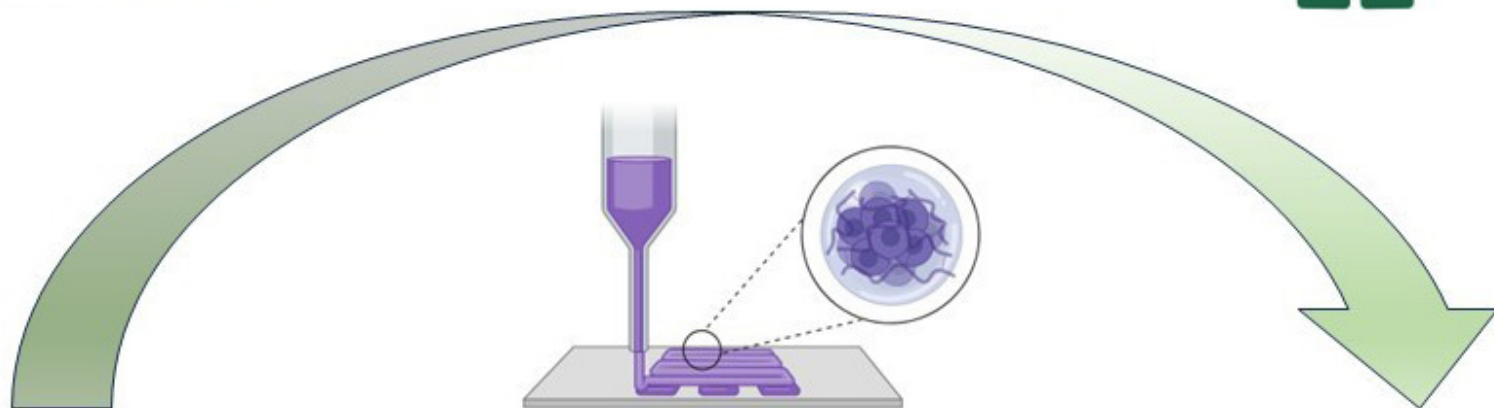
**Industrial waste
For concrete**



**Contributions to
sustainability**



**Repurposing
plastic waste**



In-house green 3D-printing



Plastic-Free Planet: 3D Printing, Biomaterials, and Eco-Friendly

Solutions

10

Maximum class size

SCHOLARSHIPS AVAILABLE

July

Course dates

Dr. Arjak Bhattacharjee

Instructed by

Course Description

Plastic pollution across the globe is a significant challenge to the environment, marine organisms, and public health. Immediate attention from the scientific community is needed for innovative and sustainable solutions to combat plastic pollution.

Did you know each year up to a billion tons of household plastic waste are disposed of the environment and pose a serious threat to environmental safety?

Is it not surprising to note that the commonly used plastic water bottles, made up of polyethylene terephthalate (PET) can take up to 500 years to completely degrade?

What is the solution then? The only solution is to repurpose these plastic wastes for various sustainable uses. The objective of this summer course is to teach students with hands-on experience in repurposing plastic waste to make 3D printing filaments, 3D print consumer products with these wastes, and use this waste plastic as a reinforcing material for sustainable concrete. Plastic waste will be collected from the NMT campus.

The United Nations environmental program describes the construction sector as the “toughest to decarbonize”. This summer training is another step forward to decarbonize the construction sector. Additionally, students will be given hands-on training related to biomaterials research, such as the fabrication of biocompatible scaffolds with plant-derived compounds like turmeric extract, tea extract, etc., and evaluation of their antibacterial potential that can be helpful in various health conditions.

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Python for Data Science

SCHOLARSHIPS AVAILABLE

15

Maximum class size

June

Course dates

Dr. Sana Algaraibeh

Instructed by

Course Description

This mini-course introduces newcomers to the world of data science and teaches the fundamental skills of using Python. It covers Python's data types: lists, dictionaries, and tuples. It shows how to use the must-have Python data science libraries, including NumPy, Pandas for data analysis, and Matplotlib for creating visuals of the results. Once students understand how to format and clean their data, they will work on two hands-on projects on astronomy datasets..

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Soft Robotic System Design

SCHOLARSHIPS AVAILABLE

20

Maximum class size

June and July

Course dates

Dr. Curtis O'Malley

Instructed by

Course Description

Design and programming of compliant robotic end effector systems (arm manipulator attachments). The students in this class will learn to work with robotic hardware and software. They will learn to select appropriate equipment for specific tasks and integrate system hardware. Students will develop coding systems from taking sensor data and using it to make motion control decisions. Students will also learn about 3D printing techniques. The projects will interact with a graduate research project developing soft robotic systems for use in the remote exploration of cave systems and monitor bat populations. Students will learn concepts regarding research skills, engineering design and problem solving, and the specifics of soft robotic mechanisms.

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The Anatomy of a Crime: Using Forensic Biology to Solve a Real-Life Crime

SCHOLARSHIPS AVAILABLE

16

Maximum class size

June and July

Course dates

Casia Esparza

Instructed by

Course Description

In 1842, two farmers were brutally murdered in their home while enjoying their evening cup of tea. News of the crime appalled the New York community because the victims were a very well-known and respected couple. Who could have done this? How did it happen? In this Biology mini-course, students will learn basic forensic techniques such as DNA fingerprinting, blood typing, hair analysis, and much more. While working in the lab, students will test evidence, create hypotheses based on their results, and collaborate together to determine who the killer is. If you're up for a challenge and enjoy a good whodunit, then this course is for you!



Transforming Solar Power to Usable Energy: Electrical Engineering in Action

12

SCHOLARSHIPS AVAILABLE

Maximum class size

June

Course dates

Christopher Pauli

Instructed by

Course Description

We are living in a world where solar energy is exploding in popularity, but there is more to using the power of the sun to make electricity than just setting up solar panels. This mini course covers the basics of solar energy production, looks at how it is implemented, and explores the role of solar in the greater world of renewable energy.



Understanding People and Designing Products

SCHOLARSHIPS AVAILABLE

16

Maximum class size

June

Course dates

Dr. Taylor Dotson

Instructed by

Course Description

We use technologies daily. But have you ever thought about what separates a bad product from a great one? Why do users like one design but hate another? In this short course, you will be introduced to the theories, research strategies, and other techniques that user experience researchers at firms like Apple, Ford, Oracle, and General Electric use everyday. You will learn how they try to make sure that users are happy with how their products look, function, and feel.

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SCAN ME!



FOR MORE INFO

\$650

ALL INCLUSIVE

Contact us

admission@nmt.edu