
NEW MEXICO TECH
New Mexico Tech Summer STE²M Experience
June 14–19, 2020
or
July 12-17, 2020

THE SUMMER STE²M EXPERIENCE @ NEW MEXICO TECH

A STE²M-Course Is...

... a 5-day opportunity for you to be a college student and earn 1 credit hour. Learn more about a specific science or engineering discipline while you experience university life on New Mexico Tech's campus. You will be challenged by college professors with exciting lectures, relevant labs, and interesting field trips designed to give you a greater understanding of what it takes to succeed in that particular field.

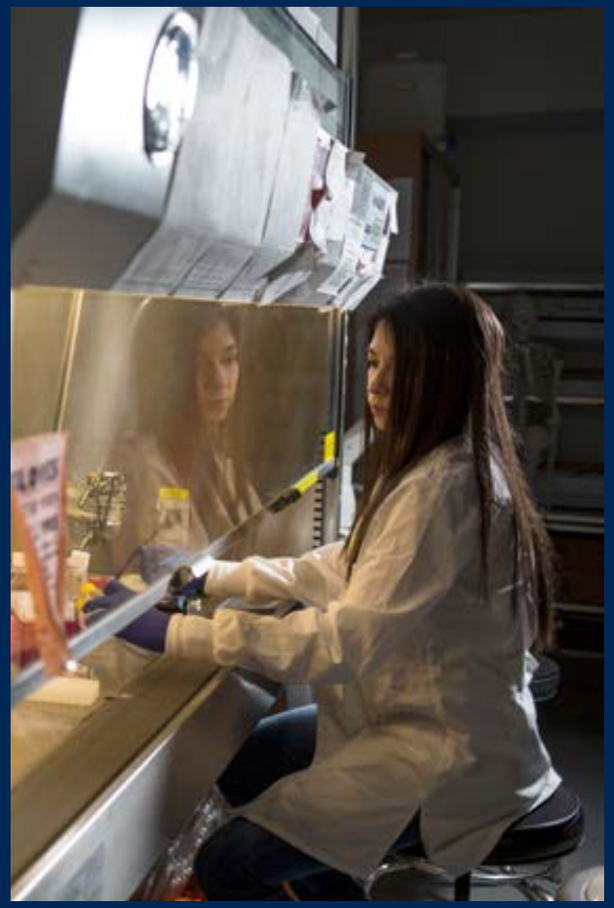
New Mexico Tech's Summer Science Experience will give you an idea of what to shop for when you're ready to apply to college. You'll learn what it takes to reach your career goals, and it looks GREAT on your college application!

New Mexico Tech has a reputation for quality: Quality academics, faculty, and students. It is a university dedicated to excellence in education and research, within a collegial, yet challenging, atmosphere.

Tech offers degrees in physical and biological sciences, chemistry, computer science, engineering, Earth sciences, mathematics, management, physics, technical communication, and pre-professional programs. Tech also offers numerous master's and Ph.D. programs. Students at Tech share a tradition of cooperation, helpfulness, and a motivated determination to succeed.

Summer is a great time to be on New Mexico Tech's green, shady, flower-filled campus! Enjoy our swimming pool and gym and meet fellow students from all over the United States while improving your mind, earning college credit, and experiencing college life — all in one week!

Minimum requirements: Rising juniors and seniors with at least a 2.75 cumulative grade point average (on a 4.0 scale) and Algebra I or higher.



Student Residence Hall
South Hall

Courses Offered
June 14–19, 2020

Biology & Psychology
Chemical Engineering
Electrical Engineering
Materials Engineering
Mechanical Engineering

Biology & Psychology

Biology and Psychology: "Field to Lab"

Kaarin Goncz/Taffeta Elliott

Students will explore a variety of New Mexico field environments

Research in biology and psychology depends on observation, hypothesis formation, and experimentation with systems that occur in nature. For some types of life science research, it is observations in the field that lead to experiments in the lab. In this course, students will explore a variety of New Mexico field environments (e.g. desert, pond, and cave), and will observe and collect the plants, animals and microbes that populate them. Students will learn about experimental designs for testing scientific hypotheses, and then use hands-on laboratory techniques to run tests. Students will work in groups to design and carry out research projects.

www.nmt.edu/academics/biology/index.php

Chemical Engineering

Biodiesel and Constructing a Potato Cannon

Seth Price

Focusing on a potato cannon and biodiesel

Chemical Engineering is the understanding of how chemical reactions occur and how to scale them up from small, batch, bench-top quantities to full-scale, continuous industrial production. Chemical engineers at Tech are also involved in many different research topics, including nanomaterials, traumatic brain injury, biofuels, and methane capture. Students in the Chemical Engineering Summer Course will learn how nylon and biodiesel are produced, as well as operate pilot-scale equipment, such as a heat exchanger and an absorption column. They will also explore the various research, engineering and testing methods used in chemical engineering.

nmt.edu/academics/chemeng/index.php

Electrical Engineering

Exploring Electrical Circuits

Chris Pauli

This mini-course will provide a hands-on introduction to Electrical Circuits.

Learn about electrical engineering and how it contributes to the world around us. This course will introduce you to some key aspects of electrical engineering including measurements, instrumentation, and circuit building. Gain hands-on experience both software and hardware using modern tools. Sample project include computer controlled LED lighting and implementation of its circuit board.

www.nmt.edu/academics/eleceng/

Materials Engineering

Intro to Materials Science and Engineering

Deep Choudhuri

Examine the internal structure of materials

In this course, the students will learn how the internal structure of materials, invisible to our eyes, have an impact on how they behave under different external conditions, such as heat or cold, mechanical loading, electricity and light. This one-week course will provide a cursory and impactful survey of a wide variety of metals, polymers and ceramics. The students will gain first-hand experience, in the presence of experienced instructors, on how materials scientists examine material behavior via thoughtful testing protocols and post-mortem microscopy. The laboratory sessions will alternate with lectures, to help the students understand the experimental observations within the context of structure-property-processing paradigm.

www.nmt.edu/academics/mtls/index.php

Mechanical Engineering

Bioinspiration, Biomimetics, Drones and Bioinspired Engineering

Mostafa Hassanalian/ Sayavur Bakhtiyarov

All about Drones

Students will learn different ypes of drones and their applications. They will also become familiar with design challenges of space and marine drones, existing methods for increasing the drones' endurance, and various control, guidance, navigation, and manufacturing techniques. In the development of next generation materials with self-healing ability, biological systems in nature provide many examples that have exceptional structural designs and unmatched performance in their self-recovery functions. Bioinspired engineering offers a great opportunity in the design and fabrication of self-healing materials that are difficult to engineer through conventional approaches. Students will learn the recent progress in the emerging areas of bioinspired advanced materials for science and technology.

nmt.edu/academics/mecheng/index.php

Student Residence Hall
Torres Hall

Courses Offered
July 12-17, 2020

Petroleum Engineering/PRRC
Physics
Computer Science & Engineering
Mineral Engineering
Mathematics

Petroleum Engineering

Introduction to the Oil & Gas Industry

Tom Engler/Tan Nguyen

Hands-on course with experience on a full-sized Drilling Simulator

The 5-day summer petroleum mini-course is designed to give students an introduction to oil and gas industry as well as show how the industry impacts the world. In this course, students will learn basic concepts and have hands on experience on the following topics: properties of petroleum fluids, formation rocks, flow in reservoirs, reservoir energy, drilling an oil and gas wells, production system, hydraulic fracturing, etc. Students will have a chance to play with the full-size drilling simulator, build a monitoring system (temperature and pressure), design drilling fluids, conduct simple tests on petroleum fluids and formation rocks, visit flow loops and research facilities, etc.

nmt.edu/academics/petreng/index.php

Physics

The physics of weather, climate, and climate change

Ken Minschwaner

Working with Surface Instruments, Balloon Soundings and Sattelite Measurements

The 5-day summer physics mini-course is designed to give students an introduction to weather, climate and Climate Change. Students will learn the fundamental concepts behind weather forecasts and long-term climate prediction. They will work with real data and real instruments, including surface instruments, balloon soundings, and satellite measurements.

nmt.edu/academics/petreng/index.php

Computer Science & Engineering

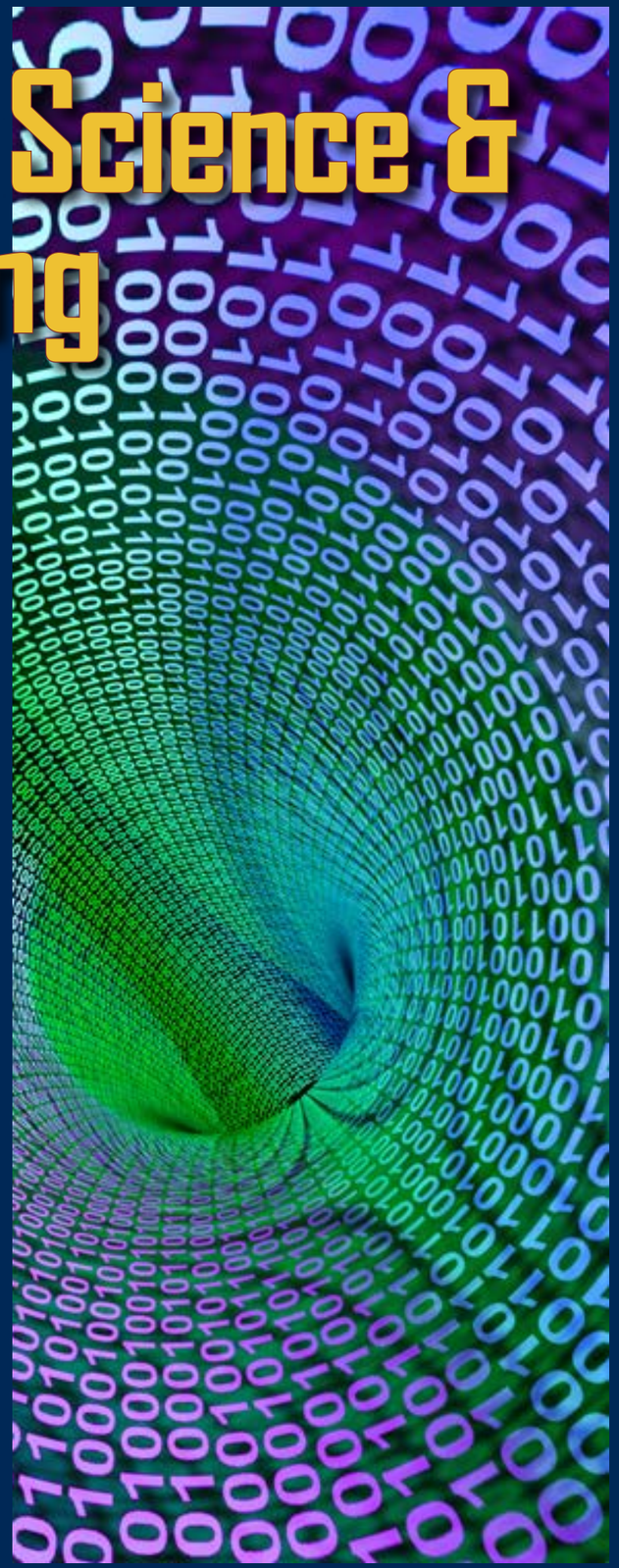
Exploring Computer Science

Jun Zheng

Hands-on labs applying computational approaches to real-life problems

This mini-course will provide an introduction to the field of computer science, including discussions of computational thinking, programming, algorithms, computer systems, applications, and computer security. Students will have hands-on labs on applying computational approaches to real-life problems in various contexts. In addition, students will be given an opportunity to learn skills in creating web applications and mobile applications.

www.nmt.edu/academics/compsci/index.php



Mineral Engineering

Introduction to Mining Engineering

Navid Mojtabai

Modern Mining and Engineering

The course consists of a series of lectures and several field trips to operating mines in New Mexico. Students will be introduced to concepts of modern mining engineering, the importance of the impact and role of minerals and raw materials meeting the needs of the society including technological, economic, social, and environmental challenges in the mining industry.

Field trips include:

- ***Mosaic Potash mine in Carlsbad, NM – An underground operation. The trip will be an overnight event.***
- ***El Segundo mine near Grants, NM – A surface coal mine. It will be a day trip.***
- ***Chino mine near Silver City, NM – An open-pit copper mine. It will be a day trip as well.***

Dates of the visits to be determined, depending on weather, and when the mine can provide the tour. The maximum number of students is limited to 12 due to the field trip costs and constraints.

A $250 scholarship will be offered to each student who chooses the Mineral Engineering Experience.

www.nmt.edu/academics/mining/index.php

Mathematics

Introduction to Mathematics

Bill Stone

Creating Fractals

What are fractals, besides pretty pictures? What is the mathematics behind them? How can math be used to study chaos and find order underlying the randomness? In this class we'll explore what fractals are and learn how to create them. We'll find examples in nature, and study them. We'll do computer experiments on chaos, and learn how the structure is related to fractals. What background do you need? As long as you understand what a function means, and can use a computer spreadsheet, you will have fun with this course!

www.nmt.edu/academics/math/index.php

NEW MEXICO TECH
SCIENCE • ENGINEERING • RESEARCH UNIVERSITY

2020 New Mexico Tech Summer STE²M Experience

APPLICATION FOR ADMISSION

Completed application and official high school transcripts must be received by May 1, 2020.
Submit application to the Admission Office, 801 Leroy Place, Socorro, NM 87801

DO NOT SEND PAYMENT! (Payment due upon receipt of invoice.)

CONTACT INFORMATION

Full Legal Name: _____
Last First Middle

Mailing address: _____
City State ZIP

Telephone:( ) _____ Email: _____

PERSONAL INFORMATION

Date of Birth: _____ Male/Female_____ T-Shirt Size _____
Month/Day/Year

Predominant Ethnic Background (Required for Federal Reporting)

☐ Caucasian/White ☐ African American/Black ☐ Hispanic ☐ Asian/Pacific Islander
☐ American Indian/Alaskan Native – Tribe: _____ ☐ Other _____

HIGH SCHOOL INFORMATION

High School Attending: _____ City / State: _____

Date of Graduation: _____ HS Code: _____

NEW MEXICO TECH SUMMER *STE²M* EXPERIENCE INFORMATION

June 14–19, 2020

☐ **Biology/Psychology** *(limited to 20)*
☐ **Chemical Engineering** *(limited to 20)*
☐ **Electrical Engineering** *(limited to 20)*
☐ **Materials Engineering** *(limited to 20)*
☐ **Mechanical Engineering** *(limited to 20)*

July 12-17, 2020

☐ **Petroleum Engineering** *(limited to 20)*
☐ **Mathematics** *(limited to 20)*
☐ **Physics** *(limited to 20)*
☐ **Mineral Engineering** *(limited to 12)*
☐ **Computer Science/Engineering** *(limited to 20)*

Please indicate 1st and 2nd choice.
(2nd choice must be indicated in case 1st is full/unavailable.)

1st Choice: _____ 2nd Choice: _____

ALL students are REQUIRED to stay in NMT's Residence Halls for the duration of the course.
NO REFUNDS AFTER THE FIRST DAY OF CLASS

I certify that all information given in this application is complete and accurate to the best of my knowledge. If I am accepted as a student at New Mexico Institute of Mining and Technology, I agree to conform and abide by all rules, regulations, and procedures of the Institute. Misrepresentation in any statement by me will be considered adequate grounds for denying admission, for cancellation of registration, or for suspension from the Institute.

Student's Signature: _____ Date: _____

THE SUMMER STE²M EXPERIENCE @ NEW MEXICO TECH

$500 covers either one of the five day experiences
Includes 1 college credit hour, room, & meals for five days!
June 14–19 or July 12–17

As a teenager my plan was to graduate high school and go to art school. The summer between my junior and senior year my parents encouraged me to attend the summer mini-courses at NMT. I was resistant, as I had no desire to go into engineering or science. I took 2 courses that summer: Petroleum Engineering and Geophysics. Both courses were fun and engaging and I had a great time, but it was the Petroleum Engineering mini-course that changed my life course. After the mini-course I decided I wanted to be a Petroleum Engineer. I had learned how exciting and fun engineering and science could be, the spark I needed to truly appreciate my math and science courses in high school. After high school I enrolled at NMT and graduated in 2002 with a BS in Petroleum and Natural Gas Engineering. I currently work at the Petroleum Recovery Research Center (PRRC) *on the NMT campus as a Research Associate II. At the* PRRC *I conduct research for improved methods of water shutoff in oil field wells.*

~Kate Wavrik

Kate Wavrik in the Petroleum Recovery Research Center (PRRC) lab.

We are looking for students intrigued by ***math, science, engineering*** and ***entrepreneurship***. You will thrive in a small school environment that provides intense, focused education. Tech students have been challenged in high school and look forward to continued challenges and opportunities alongside our brilliant faculty and fellow students who share their passion for knowledge.

Hands-on learners do especially well at Tech due to the abundance of research opportunities that take theoretical classroom learning and apply it to research, lab work and field experience.

New Mexico Tech students are:

- Discovering methods to extract valuable resources from the Earth more efficiently and economically
- Studying earthquakes and volcanoes to better understand the mechanisms at work within our planet
- Developing alternative fuels
- Keeping our nation's computer systems secure and safe from malicious cyber attacks
- Monitoring asteroids to protect us from "the big one"
- Blowing things up