
NEW MEXICO TECH
New Mexico Tech Summer STE²M Experience
Virtual
June 14-18, 2021
July 12-16, 2021
www.nmt.edu

THE SUMMER STE²M EXPERIENCE @ NEW MEXICO TECH

A STE²M-Course Is...

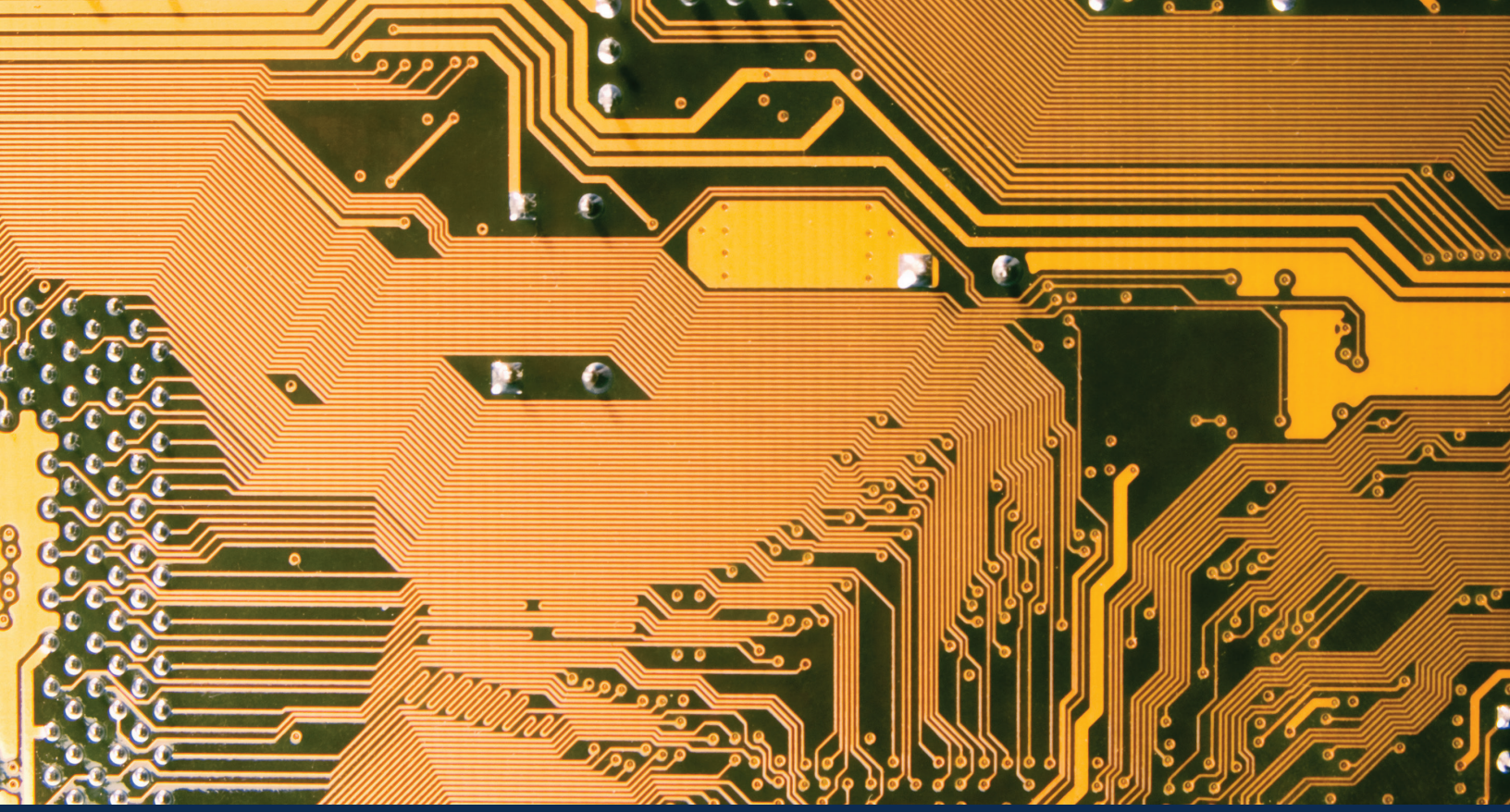
... a 5-day opportunity for you to be a college student and earn 1 credit hour. Learn more about a specific science or engineering discipline. You will be challenged by college professors with exciting lecture and interesting field trips designed to give you a greater understanding of what it takes to 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.

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.



Courses Offered
June 14-18, 2021

Mechanical Engineering
Mineral Engineering
Petroleum Engineering

Mechanical Engineering*

All about Drones

Mostafa Hassanalian

Learn different aspects of unmanned air systems, including novel classification of flying drones from unmanned air vehicles until smart dusts, with their new defined applications.

Students will also become familiar with the design challenges of space and marine drones, existing methods for increasing the drones' endurance, and various control, guidance, navigation, and manufacturing techniques. Students will participate in the design, CAD modeling, aerodynamic analysis, and simulation of a small fixed-wing micro air vehicle in XFLR5 software. Students will be able to get connected remotely to the NMT drone cage and fly a drone. The cage is equipped with different types of vive-trackers, tracking and visual cameras, wind generators, obstacles, drones, remote controllers, work-stations, etc. Moreover, for flight training purposes, a virtual reality setup and flight simulators will be used.

*Class size: 40

www.nmt.edu/academics/mecheng/index.

Mechanical Engineering*

Artificial Intelligence for Robotics (AI4R)

Arvin Ebrahimkhanlou

A survey of Artificial Intelligence (AI) methods for robotics applications. In particular, the state-of-the-art AI methods will be presented in the context of self-driving robotic cars.

The presentations will be in a very simple, interactive, and easy-to-follow language for high school students with an interest in science, technology, engineering, and math (STEM) majors. Throughout this course, students will learn basic information about various AI/robotic topics, including such navigation planning, computer vision, robotics, and natural language processing. Although the course places less emphasis on programming, it will give students an opportunity to get introduced to sample computer codes in Python. Such exposure will prepare students for various STEM fields.

*Class size: 20

www.nmt.edu/academics/mecheng/index.

Mineral Engineering

Introduction to Mining Engineering

Navid Mojtabai

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.

Students will be introduce to technological, economic, social, and environmental challenges in mining industry. Lecture will be 5 to 6 hours per day, from Monday through Thursday. The followings are preliminary schedule for lectures.

Day 1: Importance of minerals in our lives. Why we continue searching for new sources of minerals. Prospecting and exploration.

Day 2 and 3: Stages on life of a mine. Development, mining methods, materials handling, waste management, ground control, and health and safety.

Day 4: Closure plans, environmental issues, economics.

Target Students – Juniors and seniors in high school are the man targets. The maximum number of students will be limited to 12.

Scholarships will be available.

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

Petroleum Engineering

Introduction to the Oil & Gas Industry

PRRC: William Ampomah
PE Department: Tan Nguyen and Hamid Rahnema

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.

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

Courses Offered
July 12-16, 2021

Biology
Chemistry
Electrical Engineering
Computer Science & Engineering
Psychology & Technical Communication

Biology

Discovering Biology in the field and the lab

Kaarin Goncz

Students will explore a variety of New Mexico field environments

The field of biology involves the observation and experimentation on living systems. Biologist study nature both in the lab, or outside, in the field. Often, biologists will collect samples from the field and then conduct experiments in the lab. In this course, students will be provided guidance on how to observe and explore their environment to collect plants, animals, and microbes that populate them. Students will then learn about experimental design for testing scientific hypotheses, and use hands-on laboratory techniques for testing those hypotheses on their samples. Materials will be provided for remote learning.

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

Chemistry

Developing a Chemical Biosensor

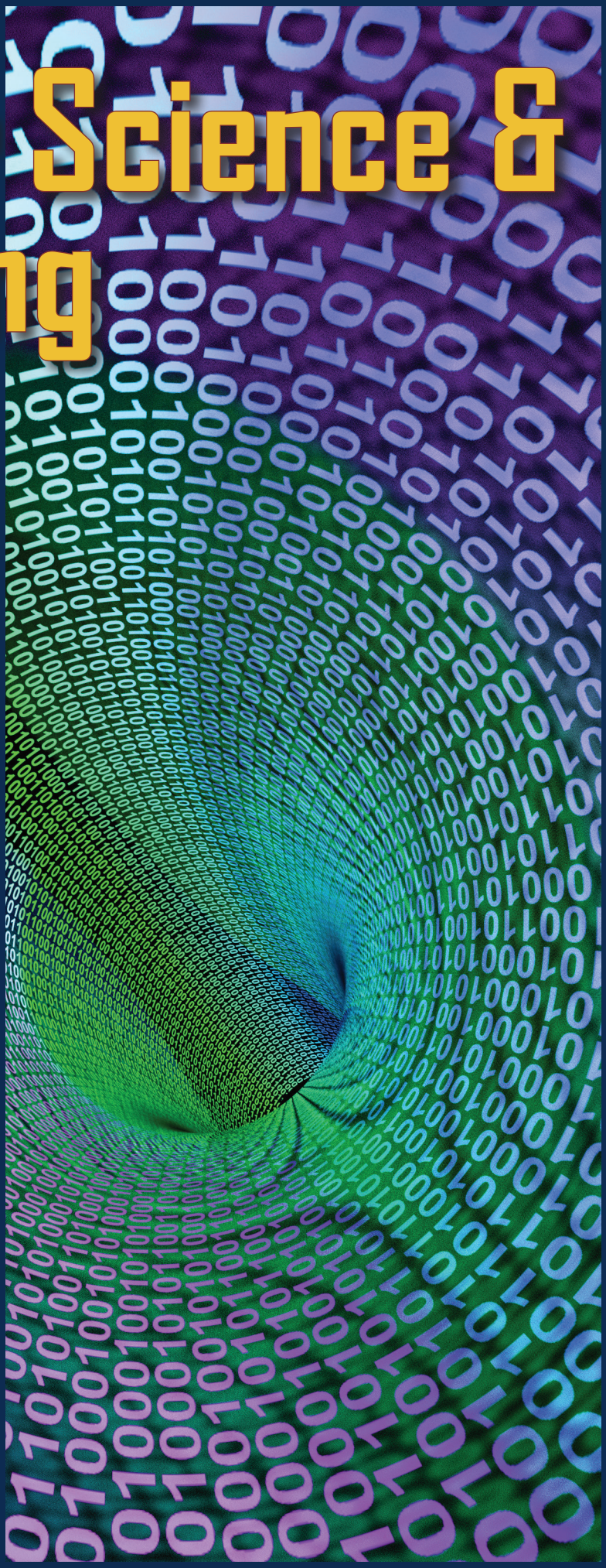
Sally Pias or TBA

SOx, Drugs, and Jelly Rolls: Chemistry and Biochemistry at New Mexico Tech

Despite being one of the oldest sciences, chemistry is incredibly current. At New Mexico Tech, research in chemistry spans a wide range and touches on many exciting areas of discovery. Through this course, students will meet faculty and student researchers doing cutting-edge work in areas ranging from hidden reaction pathways and mechanisms in the atmosphere (SOx, or sulfur oxide species), to new pharmaceutical compound design and synthesis (drugs), to protein structural modeling (jelly rolls – a type of protein folding pattern). Other topics may include DNA damage repair pathways, nanomaterials synthesis, ultrafast laser spectroscopy, and biosensor device engineering. Students will also engage in virtual "hands on" explorations of biomolecular structures.

www.nmt.edu/academics/chemistry/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

Electrical Engineering

Transforming Solar Power to Usable Electricity

Electrical Engineering Staff

Learn about electrical engineering and how it contributes to the world around us.

There is more to using the power of the sun to make electricity than just setting up solar panels. This mini course explores some ways of combining solar panels into a standalone energy system on a small scale to explore larger scale applications. We are moving into a more battery centric world for all levels of energy use including transportation, buildings and of course electronic devices.

www.nmt.edu/academics/eleceng/index.

Psychology and Technical Communication

Digital Media: Research, Design, & Society

Taffeta Elliott & Taylor Dotson

This mini-course is a survey of how human beings apply their senses and language to navigate their environment, collaborate, and use technology.

Mini-course projects will include a combination of hands-on creative production and fun activities involving experimental psychology tools, taught by social science and communication experts. Activities may include eye tracking experiments, user-centered design exercises, prototyping and testing websites and smartphone app interfaces, investigations into human memory and visual perception, and tasks illustrating how we treat media, computers, and other technologies as if they were alive.

www.nmt.edu/academics/class/undergrad.php

NEW MEXICO TECH
SCIENCE • ENGINEERING • RESEARCH UNIVERSITY

2021 New Mexico Tech Summer STE²M Experience

APPLICATION FOR ADMISSION

Completed application and official high school transcripts must be received by May 1, 2021.
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 14–18, 2021

☐ **Mechanical Engineering** *(limited to 40, **Drones**)*
☐ **Mechanical Engineering** *(limited to 20, **AI**)*
☐ **Mineral Engineering** *(limited to 12)*
☐ **Petroleum Engineering** *(limited to 20)*

July 12-16, 2021

☐ **Biology** *(limited to 20)*
☐ **Chemistry** *(limited to 20)*
☐ **Computer Science/Engineering** *(limited to 20)*
☐ **Electrical Engineering** *(limited to 20)*
☐ **Psychology/Technical Communication** *(limited to 20)*

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

1st Choice: _____ 2nd Choice: _____

NO REFUNDS AFTER THE FIRST DAY OF CLASS

I certify all information given in this application is complete and accurate to the best of my knowledge. If 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

$250 covers either one of the five day experiences.
Includes 1 college credit hour!
June 14–18 or July 12–16

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