



## 2022 Course Selections

Click Anywhere to Open PDF of All Classes  
Updated June 1st

### Cool Math Games

Instructor: Aurora Geliney  
Available All Weeks

No, not Cool Math Games the website! In this class we are going to play cool math games. Math bingo, jeopardy, and many other games. Get ready to have fun and solve some equations! Each day we will play a new math game.

### Programming

Instructor: Alex Hastings  
Available All Weeks

An introduction to computer programming using a language called Processing. Campers will be guided through the design and creation of an interactive application using links, geometry, and simple graphics. What will we make? That's up to you!

### Parts and Pieces

Instructor: Alex Hastings  
Available Every Week 1 & 3

Campers will research, disassemble, and reverse engineer electronic parts. After the dust settles, they will have produced an informative presentation describing everything there is to know about their gadgets. Topics covered for destruction may range from cell phones to online computers.

### 20,000 Leagues Under the Sea

Instructor: Andy Whitman  
Available All Weeks

11 percent of the Earth is water. We haven't even discovered everything on our job, but there are animals on rocks and vehicles exploring the surface of the Earth that has been the ocean. When Don Ross and Frank Rowley took to space in the first rocket, our world's oceans offer immense resources right at our fingertips. If we can find back to the land and use the deep into the heat of underwater vehicles, submarines, ROVs and more. We will look back at the physics of the ocean and the constraints it places on underwater exploration, from engine mechanics and mechanics that allow engineers to overcome those restrictions, from heavy design, building and deploying our own underwater remotely operated vehicles (ROV).

### The Business of Innovation

Instructor: Andy Whitman  
Available All Weeks

We are in a golden age of innovation brought on by rapidly growing capabilities of technology. Although new companies, new products and new apps seem to just appear out of nowhere, nothing happens by accident. Problem solving is one of the most critical skills anyone can have, and it is usually taught through a scientific lens, while we are left to figure out the business and social side of problem solving by ourselves. We are going to explore some of the most impactful and innovative companies around today while focusing on the technology that enabled them; the problems they are solving and for whom they are solving problems, the greater impact and implications of their work! Finally, we will take time to analyze a problem each class finds interesting, and build a business around solving it.

### Modeling Career: 3D Printing

Instructor: Christopher Beckwith  
Available All Weeks

From toys to replacement parts, 3D printing is everywhere. Students will learn the best strategies for designing models for 3D printing, it gives you insight if you can create it. Campers looking for an additional challenge may choose to incorporate battery-powered (20%) into their designs!

### Altitude Adjustment: Coding Drone Flight

Instructor: Christopher Beckwith  
Available All Weeks

Recreational and rescue, education and innovation, drones are performing many airborne jobs. This class will have students assume the role of drone pilot and programmer as they learn to connect the aircraft using code. No coding experience necessary. Campers will learn the basic and advanced drone challenges to test their own skills.

### VEX Robotics

Instructor: Chandler Pike  
Available BW1, BW2, GW1

Students will be split up into two teams and run a mock challenge at the end of the week. Students will learn the basics of VEX Robotics throughout the week and have a way to play it by the end.

In May of 2022, the MSSM VEX Robotics team will go to the World Championships in Texas to compete after winning the Maine State Championships.

### You can do the Cube

Instructor: Chandler Pike  
Available BW1, BW2, GW1

We will look at the math behind the cube, the algorithms, and you will learn how to solve the cube! Then students will choose a mosaic for the class to work on and by the end of the course we will have made a large mosaic made entirely from rubik's cubes!

### Lego Robotics

Instructor: Laurie Spooner / Alex Hastings  
Available All Weeks

Legos and robots! What can be a better combination? You will use Lego Robotics kits to build and program your own competition machines. You will start building the first day and have the opportunity to participate in classes to the gym, music room, and tractor pull challenges. Along the way, we will talk about sensors, computer programming, and physics.

### How Healthy is Your Forest?

Instructor: Laurie Spooner  
Available Every Week 1 & 3

Do you want to learn how to identify tree species? Do you wonder how healthy the forest is around you? We will look at several characteristics that can be used to identify trees and learn some common tree species. We will also inspect the forest for indicators of health such as canopy transparency and decay. Indicators of decay on the trees, and ticks as an indicator of air quality.

### Lift-Off! (a.k.a. Propulsion)

Instructor: Ryan McConard  
Available All Weeks

We will learn about propulsion in two different forms. First, we will race CO2 powered cars down the hall, then we will look to the stars and build model rockets and launch them as high as we can. Campers will take home their race cars and rockets (assuming they come down from the atmosphere...)

### Whatever Floats Your Boat

Instructor: Mia Callahan  
Available All Weeks

What makes a boat float? You'll learn the basic physics of what keeps a boat from sinking and use your findings to design, build, and test your own watercraft! Round out five weeks by taking your first cardboard boat for a spin in the pool--it'll (and you) stay afloat!

### Calculus in Motion

Instructor: Mia Callahan  
Available All Weeks

How can we use math to describe motion? You'll explore position, velocity, and acceleration through motion graphs, and the your findings to the idea of derivatives. Not sure what some of those terms mean? You'll know by the end of the week, and will apply them to make a marble roller coaster!

### Chess

Instructor: Marc Jaquelet  
Available All Weeks

Campers will play against each other after learning one or two concepts per class, then at the end give them the option of having one of their games reviewed with a chess engine that calculates all the best moves to see where it thinks they could have played differently. Chess is an abstract strategy game that can improve perspective, memory, focus, and creativity.

### How does an earthquake get punished? It gets grounded.

Instructor: Ryan McConard  
Available All 4 Weeks

After having lived in Japan for many years and experiencing many earthquakes, including the major Tohoku Earthquake, tsunami, and nuclear disaster on March 11, 2011, camp director, Ryan McConard, will show the power of earthquakes and help the junior engineers build towers out of different materials to find the best way to hold weight and not fall during a quake. We will place the towers on a shaking table and see which ones will stand the test of time (and shaka).

A challenge will be to have the tallest tower that withstands a quake and then a tower that holds weight and doesn't fall.

### The Science behind Art

Instructor: Taylor Denck  
Available One Week Only

We will be looking at different art forms and how science leads to the final product.

Working on projects with epoxy, color theory, and paint pouring.

### Pseudosciences

Instructor: Taylor Denck  
Available One Week Only

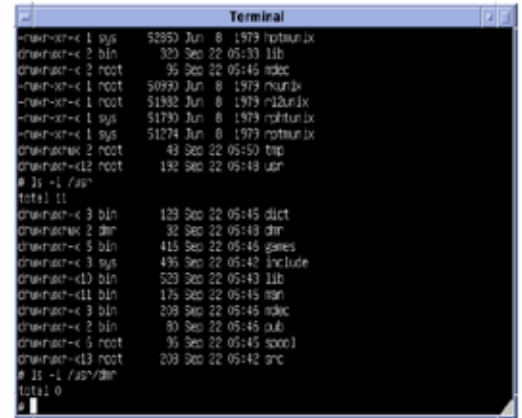
This class will look into the different areas of pseudosciences that are commonly seen today, like astrology, crop circles, metaphysical properties of things, etc. We will also look at the reasoning why the scientific process works and how that influences the background of science.

# Programming

*Instructor: Alex Hennings*

**Available All Weeks**

An introduction to computer programming using a language called Processing. Campers will be guided through the design and creation of an interactive application using tricky geometry and simple graphics. What will we make? That's up to you!



```
Terminal
gnem@nec:~$ ls -l /var
total 11
drwxr-xr-x 3 bin  129 Sep 22 09:15 dict
drwxr-xr-x 2 bin   32 Sep 22 09:18 dir
drwxr-xr-x 5 bin  415 Sep 22 09:18 games
drwxr-xr-x 3 sys  495 Sep 22 09:12 include
drwxr-xr-x 3 bin  523 Sep 22 09:13 lib
drwxr-xr-x 41 bin 175 Sep 22 09:15 man
drwxr-xr-x 3 bin 208 Sep 22 09:15 misc
drwxr-xr-x 2 bin  80 Sep 22 09:15 out
drwxr-xr-x 5 root  35 Sep 22 09:15 scons
drwxr-xr-x 43 root 208 Sep 22 09:12 src
gnem@nec:~$
gnem@nec:~$ ls -l /usr
total 0
drwxr-xr-x 1 sys  52850 Jun  8 1979 rpm/rpmlib
drwxr-xr-x 2 bin   320 Sep 22 09:53 lib
drwxr-xr-x 3 root   95 Sep 22 09:15 misc
drwxr-xr-x 1 root 50930 Jun  8 1979 rpm/rpmlib
drwxr-xr-x 1 root 51932 Jun  8 1979 rpm/rpmlib
drwxr-xr-x 1 sys 51780 Jun  8 1979 rpm/rpmlib
drwxr-xr-x 1 sys 51274 Jun  0 1973 rpm/rpmlib
drwxr-xr-x 2 root  48 Sep 22 09:50 tmp
drwxr-xr-x 42 root 192 Sep 22 09:18 usr
```



# Parts and Pieces

*Instructor: Alex Hennings*

**Available Boys' Week 1 & Girls Week 2**

Campers will research, disassemble and reverse engineer electronic junk. After the dust settles, they will have produced an informative presentation describing everything there is to know about their gadgets. Gizmos slated for destruction may range from cell phones to entire computers.

# Modeling Career: 3D Printing

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*Instructor: Christopher Beckwith*

*Available All Weeks*



Reconnaissance and rescue, deliveries and destruction, drones are performing many airborne jobs. This class will have students assume the roles of drone pilot and programmers as they learn to command the aircraft using code. No coding experience necessary. Campers will learn the basics and attempt various challenges to test their new skills.

# Lego Robotics

*Instructor: Laurie Spooner / Alex Hennings*

*Available All Weeks*

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*Available Boys' Week 2 & Girls Week 1*

Do you want to learn how to identify tree species? Do you wonder how healthy the forest is around you? We will look at several characteristics that can be used to identify trees and learn some common tree species. We will also inspect the forest for indicators of health such as canopy transparency and dieback, indicators of decay on the trees, and lichen as an indicator of air quality



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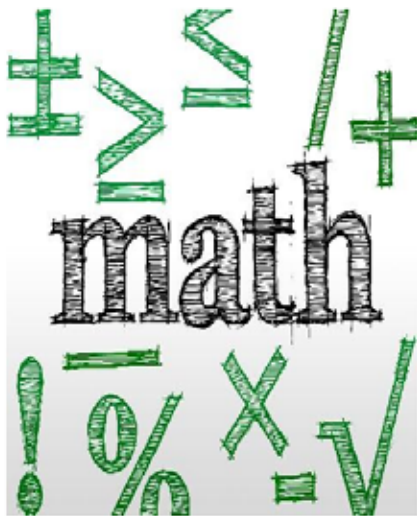
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*Instructor: Andy Whitman*

**Available All Weeks**

71 percent of the Earth is water. We haven't even discovered everything on land yet, but there are armies of robots and vehicles exploring the surface of the Earth that lies below the waves. While Elon Musk and Patrick Stewart turn to space as the final frontier, our world's oceans offer immense resources right at our fingertips if we can find them. In this class we will dive deep into the field of underwater vehicles: submarines, ROVs and more. We will first look at the physics of the ocean and the constraints it places on underwater exploration; then explore mechanics and mechanisms that allow engineers to overcome these restrictions; before finally designing, building and deploying our own underwater remotely operated vehicles (ROVs).



# The Business of Innovation

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*Available Girls' Weeks Only*



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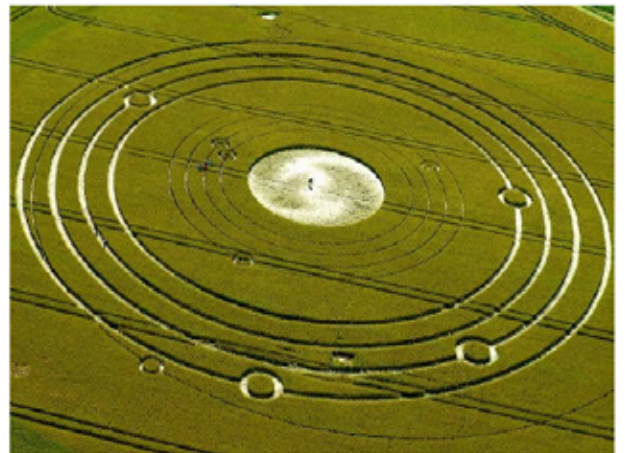
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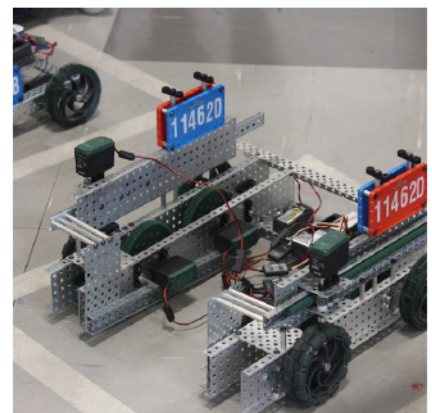
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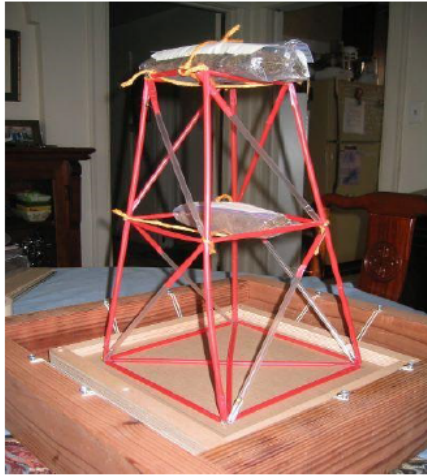


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