

Courses starting at: *Sat 1:00 PM*

M374s1: Computer and Web Security

Shravan Venkatesan

Everything these days runs on computers, so it is important that these systems are secure and resistant to attacks. Learn about some common security vulnerabilities in today's computers, cyber attacks which exploit those weaknesses, and ways to protect against these attacks.

Open to students grades 9 through 12

Maximum Size: 20

Sat 1:00pm–1:45pm

S394s1: Food Science! - An Exploration

Andy Chia

Food! It's delicious and something that we all enjoy, but why is that? Throughout this class, we will be exploring that fundamental question by looking at a series of case studies about our own bodies, plants, and even the molecular components of what makes food, food!

I would suggest leaving some room in your stomach because some of these experiments will involve eating!

Open to students grades 9 through 12

Maximum Size: 15

Sat 1:00pm–2:45pm

S379s1: How Rare Are We?

Tony Yao

The Universe is incredibly vast, yet we are the only intelligent civilization we know of. Just how rare are we?? In this class, we will walk through the rare events in Earth's history, from evolutionary quirks to mass extinctions, that have created intelligent life. Then, as a class, we'll estimate just how unlikely we are!

Open to students grades 9 through 12

Maximum Size: 50

Sat 1:00pm–1:45pm

S382s1: How to Blow Up a Black Hole

Aniket Pratapneni

A step-by-step, scientific guide on how to engineer a supernova-scale explosion. A fun experiment to try out on your enemies! Or their entire solar system, for that matter.

Open to students grades 10 through 12

Maximum Size: 30

Sat 1:00pm–1:45pm

X378s1: Pre-Dental 101

Nathaniel Semanek

Are you interested in the field of STEM? Are you also interested in a career in medicine? From the perspective of a pre-dental student, this course will cover the importance of oral health and the field of dentistry. We will cover the pros and cons of the job, while also comparing the pre-dental academic path to the pre-medical path. I will discuss the application requirements and how technology is changing how dentists work with patients. With this information, students will learn how to read basic dental X-Rays. This will also be a great class (full of advice) for any student considering a pre-health path in college!

Open to students grades 9 through 12

Maximum Size: 50

Sat 1:00pm–1:45pm

S395s1: The Carboniferous Period: The Land Before the Land Before Time

Michael Wolf

In this course, we will explore the wonders of the Carboniferous Period, lasting from about 360-300 mya– long before the rise of dinosaurs.

Open to students grades 9 through 12

Maximum Size: 10

Sat 1:00pm–2:45pm

X384s1: Understanding Procrastination

Kaitlyn Storm

What is procrastination? Where does it come from and why is it so hard to stop it? These are all questions explored throughout this course. We'll discuss how procrastination manifests, where it evolved from, and some tips and tricks to overcome it.

Open to students grades 9 through 12

Maximum Size: 25

Sat 1:00pm–1:45pm

Courses starting at: *Sat 2:00 PM*

S381s1: Introduction to Bioanalytical Techniques

Wilson Huang

Interested in the sort of molecular biology experiments conducted in research and industry settings? This course will begin by giving a quick overview on DNA, RNA, and proteins and proceed to examine the basic theory and method regarding foundational bioanalytical techniques such as PCR, ELISA, gel electrophoresis and the cloning cycle. The course will then explore more technical experiments involving next generation DNA sequencing and common staining procedures performed on clinical samples.

Open to students grades 9 through 12

Maximum Size: 50

Sat 2:00pm–2:45pm

H396s1: Modern Latin American History

Roberto Jarrin

This class will give a brief history of this culturally diverse area of the world since their independence from European powers in the early 19th century. We will dive deeper into a few of the many political and social trends during this time, including Peronism in Argentina and Velasquista in Ecuador.

Open to students grades 9 through 12

Maximum Size: 20

Sat 2:00pm–2:45pm

M387s1: Neural Networks: What Are They?

Dixsheta Muralikrishnan

An introduction to neural networks and what they are. We often hear the term “neural network”, but we don’t really

know what they are. This course attempts to very basically show what they are. We will be building a simple, non-convolutional network from scratch.

Open to students grades 9 through 12

Maximum Size: 10

Sat 2:00pm–3:45pm

S388s1: So Fly! An Introduction to Drosophila Genetics

Elaine Yang

The humble fruit fly is a ubiquitous model organism found in research laboratories the world over. Learn about principles of genetics with a deep dive into what makes *Drosophila melanogaster* so popular amongst scientists, and gain insight into the unique culture of caring for and working with flies.

Open to students grades 9 through 12

Maximum Size: 50

Sat 2:00pm–2:45pm

X385s1: Understanding Procrastination

Kaitlyn Storm

What is procrastination? Where does it come from and why is it so hard to stop it? These are all questions explored throughout this course. We’ll discuss how procrastination manifests, where it evolved from, and some tips and tricks to overcome it.

Open to students grades 9 through 12

Maximum Size: 25

Sat 2:00pm–2:45pm

Courses starting at: *Sat 3:00 PM*

S391s1: Jurassic Park: Fact or Fiction?

Sruthi Katakam

Jurassic Park is the quintessential dinosaur movie, and spawned an entire franchise based on the idea of reverse-engineering dinos from fossils. But how much of the science behind the park is true? What did they get wrong? More importantly, is a real Jurassic Park in our future? We will analyze the science in the movie and make predictions about the future of biotech.

Open to students grades 9 through 12

Maximum Size: 20

Sat 3:00pm–3:45pm

H380s1: Lead your own Civilization! Learning History by Playing a Role-Playing Game

Tony Yao

All too often, History in school is about memorizing facts. In this experimental class, we'll try to learn history through playing a "table-top-style" game instead! Students will be tasked with leading fictional civilizations across Afro-Eurasia. Your choices will affect the course of your civilization based on general historical principles.

Open to students grades 9 through 12

Maximum Size: 30

Sat 3:00pm–4:45pm

S390s1: Liquid Biopsy: the next-generation of cancer diagnostics

Sean Lee

Liquid biopsies are a promising class of diagnostics for early detection of cancer, especially given their non-invasive and relatively accurate nature. Through this course, students will learn about the biological basis behind liquid biopsies (with a particular focus on circulating tumor DNA, or ctDNA), earlier techniques for the detection of ctDNA such as digital PCR, as well as current advances in liquid biopsy techniques involving next-generation sequencing.

Open to students grades 9 through 12

Maximum Size: 50

Sat 3:00pm–3:45pm

S389s1: Stem Cell and Regenerative Medicine

Austin Chen

With their ability to develop into various types of cells in the body, stem cells have emerged as a potential therapeutic tool in medicine. In this course, we will introduce the history of stem cell research, stem cell basics, types of stem cells, and their molecular, cellular, and therapeutic properties. We will also discuss recent breakthroughs in stem cell research and their applications in regenerative medicine.

Open to students grades 9 through 12

Maximum Size: 50

Sat 3:00pm–3:45pm

S392s1: The Beauty of Water: A Physical, Chemical, and Biological Perspective

Andy Chia

What is water, and how does the liquid support everything we know? This class will look at the fundamental aspects of what makes water extraordinary through a look at its unique physical and chemical properties, how life adapted around it, and how it may hold the key to understanding the conditions necessary for life out in space.

Open to students grades 9 through 12

Maximum Size: 14

Sat 3:00pm–3:45pm

S376s1: Why We Sleep & How To Make It Your Superpower

Sam Bronckers

Why do some animals sleep for only 1 hour a day while others sleep for more than 20 hours a day? Why do we dream in our sleep? What helps us fall asleep and get good quality sleep? What happens if we don't? Come find out the answers to these questions and more!

Open to students grades 9 through 12

Maximum Size: 50

Sat 3:00pm–3:45pm

Courses starting at: *Sat 4:00 PM*

S376s2: Why We Sleep & How To Make It Your Superpower

Sam Bronckers

Why do some animals sleep for only 1 hour a day while others sleep for more than 20 hours a day? Why do we dream in our sleep? What helps us fall asleep and get good quality sleep? What happens if we don't? Come find out the answers to these questions and more!

Open to students grades 9 through 12

Maximum Size: 50

Sat 4:00pm–4:45pm

S393s1: An Introduction to Aging

Andy Chia

This course will introduce some fundamental aspects of what aging is, both from philosophical and biological aspects of where life began all the way to death. It will also look more deeply into why and how humans have been trying to comprehend death from a biological perspective.

Open to students grades 9 through 12

Maximum Size: 10

Sat 4:00pm–4:45pm (FULL)

X375s1: How to Play Chess

Shravan Venkatesan

Chess can be a very challenging game to get into, but it can also be very rewarding and teach you a lot of practical skills. We will learn the fundamentals of chess by going through some example games and positions.

Open to students grades 9 through 12

Maximum Size: 20

Sat 4:00pm–4:45pm

S383s1: How to Power a House on Mars

Aniket Pratapneni

In this class, we'll use engineering and the laws of physics to explore one of the most effective (and yet, one of the most absurd) ways to power a house on Mars.

Open to students grades 10 through 12

Maximum Size: 30

Sat 4:00pm–4:45pm

E397s1: Introduction to 3-D Printing

Evan Edelman, Rohin Gurumurthy

Introductory course taking you through the basics of 3-D modeling using Solidworks. Will focus on the practical uses of various tools within the program.

Open to students grades 9 through 12

Maximum Size: 20

Sat 4:00pm–4:45pm

H386s1: The Nature of Explanation

Lawrence Cao

We can cover some basic theories of explanations. Whether explanation is a worldly relation (meaning its independent from us and our minds) or it is a human-centered relation which we actively plays a role. I hope you find this interesting as explanation is considered essential in our scientific inquiry. No prereqs.

Open to students grades 9 through 12

Maximum Size: 10

Sat 4:00pm–4:45pm