

A3854: 3D Bead Sculpture*Stephanie Lin, Faye Wu*

Come and join us in making cute little bird figurines out of stringed beads. Once you master the basic technique of this popular sculpture medium, you will be able to create your own fun keychains, cell phone ornaments, and other neat little trinkets.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–10:55am Sun 1:05pm–2:55pm****M3992: A Gentle Introduction to the P versus NP Problem***Michael Forbes*

The P versus NP question is one of the most fundamental open questions in theoretical computer science (and mathematics). We will use two concepts from graph theory: Eulerian and Hamiltonian cycles, to give some intuition about this problem. Specifically, define the problem, explain its importance, and give some idea why it may be hard to solve.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–9:55am****C3988: Amazing Algorithms - Network Flow Part 1***Michael Cohen*

There are tons of different optimization problems out there in computer science. One feature that many of them have in common is that they can't be efficiently solved. But there is an important type of problem, called a network flow problem, that can in fact be solved quite efficiently. Network flow asks how to most efficiently move "stuff" through a network, where "stuff" could be anything from packets on the Internet to materials on a road grid to an abstract notion of association.

The class will begin by defining network flow and discussing its applications. Then, we will talk about how to solve it! Algorithms covered for the basic maximum-flow problem may include the Ford-Fulkerson algorithm, the Edmonds-Karp algorithm, Dinic's algorithm, push-relabel methods, and further improvements to these approaches. The class may also cover related topics such as the max-flow min-cut theorem and minimum cost flows.

This is an awful lot to digest at once, so the class has been split into two parts, with a break between them. I will structure the class so that you can attend only Part 1 and still understand what network flow is and some ways (though not the most efficient) to solve it.

Also, note the use of "may" in the above. The exact topics covered are likely to change depending on your interests.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am****C4116: An Inappropriately Fast Introduction to (a****certain type of) Quantum Computers***George Hansel*

...exactly what it sounds like. We will, with your gracious assistance, attempt to cover:

- two-state systems
- a bit of linear algebra
- Kronecker products and entangled states
- classical logic and information theory
- quantum logic and information
- hardness of problems and decidability
- funny results of change of basis (quantum communication)
- Some notorious quantum algorithm

*Open to students grades 11 through 12**Maximum Size: 0***Sat 9:05am–11:55am****H3873: Arab!! Oil!! Tents!! Camels!!!!***Renad Aljefri, Mayyada Hawsawi and Eyad Saifaddin*

Do people in the Middle East live in tents and ride camels? Come see if this is true or not.

What do you know about Arabian culture, food, and clothes? Do you want to see different kinds of crazy sports and old ruins and pyramids? Do you know Arabic words, or how to write your name in Arabic?

Come join us in our class to learn about Arabian culture! Food will be served!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–11:55am Sat 7:05pm–9:55pm Sun 4:05pm–6:55pm****W3927: Chess Seminar***Daniel Grazian*

I will be running a simultaneous chess exhibition (where I walk from board to board playing a dozen or more games simultaneously.) Players are allowed and encouraged to talk and collaborate.

All skill levels, from beginner to master, are encouraged to attend. Players of expert strength and above may join me in running an alternating simul.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–10:55am Sun 3:05pm–4:55pm****X3737: Chess Strategy and Tactics***Steven Winer*

Do you want to get better at chess? Learn the secrets from a decorated (FIDE Master, Senior Master, 1999 Denker Tournament of High School Champions Winner) chess master. Course will include discussion of important strategic and tactical concepts. Will also include analysis of the play of one or more world champions.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–10:55am Sat 11:05am–12:55pm Sat**

3:05pm–4:55pm**H4207: Christian Prayer 101***Chinua Shaw*

Have you ever wondered what it is that Christians believe about prayer? Or maybe you are already a Christian and are interested on what it is that Jesus teaches us about prayer.

Either way, this is a no pressure, no risk environment for you to find out what prayer is all about. I will have the conversation open to all of the questions that anyone has and will attempt to show what the Christian Bible has to say on each.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 8:05pm–9:55pm Sun 3:05pm–4:55pm Sat 9:05am–10:55am****X4130: Design and Write a RPG (Video Game)***Tiffany Tang*

Love playing video games? Have plans to create the greatest Role-Playing Game ever? Learn how to avoid cliches (or at least rewrite them in a way that players will be unsuspecting...).

This class will focus on story-writing designed for the video game medium, which includes: the creation of intricate plot-lines, use of static and dynamic characters, and the methods to writing a story-outline.

In addition, this class will concentrate on game mechanics, level balancing, world design, player motivation, map design, (and why RPG games are the best *cough*).

If there is enough time, the class may briefly go through the positions in a game development team and how a one-man team might create a game.

Note: Not a class that teaches you HOW to write, but the tools that can enhance your writing.

*Open to students grades 7 through 11**Maximum Size: 0***Sun 2:05pm–3:55pm Sat 9:05am–10:55am****E4304: Duct Tape and Zipties Engineering***Vincent Lee*

You only need two things to build any structure:

Duct Tape

Zipties

GO!

*Open to students grades 8 through 12**Maximum Size: 0***Sat 9:05am–11:55am****M3820: Economic Growth Theory and Empirics***Janelle Schlossberger*

Why are there substantial differences in income levels across

countries? What role does technology play in sustaining long-run growth? Should we expect poor countries to grow more quickly than rich countries?

To address these questions, we will develop the Solow Growth Model and examine some of the related empirical work in this field. Afterwards, we will critically assess the extent to which geography, institutions, and culture can explain income differences across countries.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am****C4262: Exploring Cellular Automata***Jayson Lynch*

Have you heard of Conways Game of Life? What about Brians Brain, Rule 30, or van Neumann Universal Constructor? Come explore these fascinating models which exhibit complex behavior from relatively simple rules. Well spend time examining different types of Cellular Automata, altering the underlying rules to see what happens, and discussing some of the theory or application behind these models.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–10:55am****M3972: Fermi Problems: Estimation 101.***Christina Jaworsky, Tanya Kortz*

How powerful is an atomic bomb? How many piano tuners are in New York City? How much energy is in a D-cell battery? How many cells are in the human body? Learn to answer these questions with just a pencil, paper, your brain and a little knowledge of the world around you.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am****M4013: Fractional calculus***Will Doenlen*

I know you've taken first derivatives, second derivatives, hell, even n th derivatives. And I know you've all been wondering: is there life beyond the integers? Are we all forever trapped in the integral hegemony?

The time is nigh to break free from your integronormative upbringings! In this class, we will discuss non-integer order derivatives, and make sense of statements like $\frac{1}{2}$ -order derivative, π -order derivative, or even i -order derivatives! We will discuss the many ways to define derivatives and integrals to arbitrary order, including using the Riemann-Liouville operator and pseudodifferential operators. We will not be discussing applications because applications are for ninny physicists and engineers.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–9:55am Sun 11:05am–11:55am****S4065: Fun closer to absolute zero**

Natasha Naidoo, Earl St Sauver

Have you ever wondered what people mean by 'molecules act differently near absolute zero'? If yes, (or no) this is the class for you. We will be examining the effect of liquid nitrogen on various substances, and talking about the chemistry and physics behind these 'cool' experiments.

Open to students grades 7 through 9

Maximum Size: 0

Sun 4:05pm–4:55pm Sat 12:05pm–12:55pm Sat 9:05am–9:55am

H4071: Game Design 101: Part 1 (Creative Concept Development)

Alex Chisholm

In this hands-on, activities-based workshop, the Learning Games Network, a non-profit spin-off of the MIT Education Arcade, will support students interested in competing in the National STEM Video Game Challenge (<http://www.joanganzcooneycenter.org/Initiatives-31.html>).

Game Design 101: Part 1 will cover the following:

- How we think about games generally, and learning games specifically
- Strategies for developing your concept, including analyzing games you love to play and applying what you know to new designs
- Designing for students (and teachers)
- Play testing your concept and incorporating feedback into your design
- Documenting your design

Open to students grades 7 through 8

Maximum Size: 0

Sat 2:05pm–4:55pm Sat 9:05am–11:55am

W4254: Gigantic Rubber Band Web

Zachary Abel

Learn how to make huge, sprawling, stretchy, geometric webs out of household rubber bands. In this collaborative project, we will build a mathematically-inspired geometric sculpture that stretches, quite literally, from wall to wall, floor to ceiling. No artistic or mathematical abilities are required. (To learn more about the underlying mathematics of the construction, consider coming to the related Math lecture titled "Rubber Band Sculptures: a Knot Theory Perspective.")

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–12:55pm

H3969: Glorious Music

Lance Ozier

Sure, you've heard of Beethoven and Bach. We'll start there, but move quickly to some of the most glorious classical music of the early 20th century, including pieces by Orff, Stravinsky, Ravel, Respighi, Gershwin, and Puccini.

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–10:55am

M3844: How to Cut a Cake

Sachi Hashimoto

So here's the issue. You and your friends are trying to share a cake. Perhaps it has sprinkles and frosting flowers, and the cake part is made up of different chocolate and vanilla sections, like any delicious cake should be. Your friends all have different preferences. Laura loves the pink frosting flowers, and Paul is on a diet and wants cake with as little frosting as possible. You just want a piece with chocolate cake. How do you divide the cake up so that everyone gets a fair share (what they think is an nth of the cake)? Are there algorithms, and how well do they work? Are there ways in which we can divide it such that no one envies anyone else's piece? Come to this class, and we'll talk about various aspects of fair division, how it works and how it fails.

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–9:55am Sat 10:05am–10:55am

X4121: How to Make Sushi Rice

Benjamin Sena

The rice is the critical component of sushi. The word "sushi" itself refers to the seasoned rice, not the raw fish that often accompanies it, (that's "sashimi"). The combination of the two is wonderful, but in this class we will be focusing on making seasoned rice. It tastes great on its own and can be used to make rice balls.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05am–10:55am

M4020: How to Use a Slide Rule

Shaymus Hudson, Allison Schneider

Back in the day, when men were real men, women were real women, and things were more hardcore, you couldn't find a scientist or engineer without his or her trusty slide rule. Unlike the TI-whatever-they're-up-to-now, slide rules are a purely analog method of calculation. Operating, not on batteries, but on the magic of logarithms, they can be used for multiplication, division, roots, powers, trigonometry, and more. We'll talk about the history of the slide rule, and teach you basic and advanced calculations. Bring your own if you'd like!

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–9:55am Sat 10:05am–10:55am

H4197: How to Win Friends and Influence People

Christopher Luna

Learn simple, pragmatic techniques to apply in everyday life to gain more friends, to become an inspiring leader, a persuasive salesman, and all around more pleasant person to be around.

Open to students grades 9 through 12

Maximum Size: None

Sat 9:05am–9:55am Sat 10:05am–10:55am Sat 11:05am–11:55am

W4192: Inflatables!*Caroline Malouse*

Want to build an inflatable structure out of nothing but clear plastic sheeting and duct tape? YEAH YOU DO! Come create a 3-D clubhouse, fort, or secret lair by simply taping together pieces of Visqueen, then inflate your structure with a box fan and nap, plot, pretend to be a hamster, or just hang out inside. After class, you can roll up your creation and take it home for later use!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–2:55pm****H3906: Interracial Relationships in America***Xuetao (David) Zhang*

This class is a discussion about interracial relationships (both dating and marriage) in the United States. We will explore questions such as: Why are there so many single black women? Why are Asians far more likely to marry interracially than any other minority? Why are there far more white male/Asian female couples than the other way around? What are the challenges that interracial couples face?

*Open to students grades 11 through 12**Maximum Size: 0***Sat 11:05am–11:55am Sat 9:05am–9:55am****X4359: Intro to Pen Spinning***Rahat Bathija, Alexander Sirota*

Do you ever see that person in your class doing cool tricks with his/her pen? Do you wish you could do those tricks? Come take intro to pen spinning and learn basic pen tricks like the Drummer, thumb around, and more!!!!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–9:55am Sat 1:05pm–1:55pm Sat 12:05pm–12:55pm****C3813: Intro to Ruby***Jennifer Melot*

Come learn how to program in Ruby!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–9:55am****X4220: Intro to live audio engineering***Peter Olszowska*

Learn the basics of operating audio equipment for use with live music or public address. Will include the basic principals of operating microphones, mixers, amplifiers, speakers, and special effects. Students will get a few minutes each of hands on experience operating the equipment using a multi-track recording to simulate live performers.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–12:55pm****C3727: Introduction to Arch Linux***David Lawrence*

Arch Linux is a minimalist Linux distribution that provides a very different experience from “mainstream” distributions like Ubuntu. Arch is configured by hand using text files and the command line. It can take a lot of work to set up, but the user is given complete control over their system.

In the first part of the course, I’ll talk about exactly what makes Arch Linux so powerful and demonstrate the most interesting parts of Arch. The remainder of the class will be a hands-on exploration directed by you.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am****H4184: Introduction to Cantonese***Yan Yan Chin*

Have you ever wondered how the dialect which almost becomes the national language of China (lost by ONE vote) is really like? Still being practiced by many people in Guangzhou, Shenzhen and Hong Kong (!), Cantonese is a must if you plan to get local in the metropolitans in the Oriental Pearl!

*Open to students grades 7 through 12**Maximum Size: 12***Sat 9:05am–10:55am Sun 5:05pm–6:55pm Sun 11:05am–12:55pm****E3724: Introduction to Circuits***Ky-Anh Tran*

Have you ever wondered how a radio works? How AM modulation works? What happens when you tune a radio? Then this is the class you should take.

Starting with the basics of circuit analysis (Ohm’s law, Kirchoff voltage and current), we will try to derive or heuristically understand the basic theorems of circuit analysis: Thevenin, Norton Equivalent circuit, Superposition principle, and impedance analysis.

We will then delve into an analysis of practical and useful circuits, low pass/high pass/bandpass filters, and circuits inside our radio.

*Open to students grades 10 through 12**Maximum Size: 0***Sat 9:05am–10:55am****A3881: Introduction to SLR Photography***Ian Martin*

Ever wondered how to use one of those big, professional-looking cameras? Come learn the basics of aperture, shutter speed, ISO, and maybe even some tips on composition. I’m far from the most professional photographer around, but I’ll be glad to show you the basics. Hopefully we’ll have time for you all to take some pictures yourselves.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–9:55am Sun 1:05pm–1:55pm**

H4241: Introduction to Telugu*Pranava Boyidapu*

Introduce the telugu alphabet and teach some basic sentences. The course is intended to excite you to learn the language completely later in life.

*Open to students grades 7 through 8**Maximum Size: None***Sun 9:05am–11:55am Sat 9:05am–11:55am****H4177: Introductory Russian***Pamela Alvarez*

A basic introduction to the Russian language and the Cyrillic alphabet

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am****A4108: It Doesn't Just Taste Good!***Casey Dugan*

In this class, we'll make sculptures out of chocolate! But, they'll look so good you won't want to eat them when you're through. In previous years students have come up with all kinds of creative designs: dragons, islands, scenes from books, space ships, turtles, houses, horses, abstract pieces, sunflowers, lily pads, chess boards, painters palettes, breakfast, a clock, a wedding dress, three turkeys, pyramids, trees, playing cards, robots, pumpkins, the Apple Logo, a Snitch and the Sorting Hat, and more. Candy bars don't count :) Come with ideas or come up with something on the spot! Those with food allergies: Chocolate may contain peanuts or peanut products. Sorry. :(

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–10:55am Sat 2:05pm–3:55pm Sat 4:05pm–5:55pm****M3723: Markov Models: NOW YOU TOO CAN PREDICT* THE FUTURE!***Matthew Redmond*

So you may have heard about this thing called a Markov Process. You may have heard it's pretty sweet. Maybe you've even heard that you can represent the state-space of your Markov Process in this thing called a Markov Chain. All of your friends are talking about them. In fact, Joey from down the block said that HIS dad bought him a Markov Chain bike for his birthday. Let's see if we can get a hold on exactly what a Markov Process is, and why it might be useful.

Please note: this class will be taught with a dash of humor. If you prefer your mathematics cold and humorless, signing up for this course may not be an optimal choice.

The level of rigor will scale proportionally to the background knowledge of the participants, so if you're afraid of a bunch of nasty linear algebra, that's fine! Most people are.

*Open to students grades 10 through 12**Maximum Size: 0***Sat 9:05pm–9:55pm Sun 1:05pm–1:55pm Sat 9:05am–9:55am Sat 8:05pm–8:55pm Sun 3:05pm–3:55pm****M3841: Mathematics Reloaded***Patrick Hulin, Pavel Panchekha*

Hello students. Look at your mathematics. Now at your paradoxes. Now back at your mathematics. Now back at your paradoxes. Sadly, your mathematics is non-axiomatic and rigorless, but if you rephrased it all in terms of set theory, it could be structured like mine. Look down, back up, where are you? You're in a universe composed entirely of sets, in the mathematics you wished you had. Who's that constructing the real numbers? It's me, using only the Zermelo-Fraenkel set theory. Look down. Back up. YOUR MATHEMATICS IS NOW SET THEORY. Anything is possible if you rephrase everything in terms of sets.

We'll also cover modern set theory with possible diversions to lambda calculus and model theory.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–11:55am Sat 7:05pm–9:55pm****S4056: Maxwell's Equations for Dummies***Joshua Alman, Damien Jiang*

Have you ever wondered how bullet trains levitate? What about how light bulbs work? Or why standing in a metal cage will protect you from lightning? Well, we're not going to tell you, but, we'll give you the theoretical background to figure it out. Maxwell's Equations explain how EVERYTHING to do with electromagnetism works. You might even learn some multivariable calculus on the side. Don't worry, it won't be too painful.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am****H3722: Parliamentary Procedure and Debate***Simone Agha*

Decorum! Learn how to write your own bills and debate them using the much-loved Roberts Rules of Order.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am Sat 11:05am–12:55pm Sun 9:05am–10:55am****S3725: Psychology of the Human Mind***Julie Moyer*

Ever wonder how your mind actually works, why you think the way you do, or how things in everyday life you may not even be consciously aware of shape your attitudes and decisions? Curious about what Freud was always talking about? In this course we will begin with a brief overview of brain anatomy and then dive into the fascinating inner workings of the psychological basis of the human mind.

*Open to students grades 9 through 12**Maximum Size: 0*

Sat 9:05am–10:55am Sun 4:05pm–5:55pm**C4373: Put yourself into the internet!***Jordan Moldow*

Hello, internet users, look at your webpage, now back to mine, now back at your webpage, now back to mine. Sadly, yours isn't mine, but if you stop using Dreamweaver and learn HTML, yours could look like mine. Swan dive.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–10:55am****S3890: Quantum Biology: The Uncertainty of Life***Adam Strandberg*

What if photosynthesis was actually a form of quantum computation? What if the flight paths of migratory birds depended on carefully maintained quantum decoherence? What if you could learn about all this and more at Splash?

In this class, we'll explore many experiments that show how the weird world of quantum mechanics has interesting biological effects, then wrap up with some speculation on how consciousness may be the result of quantum effects.

*Open to students grades 9 through 12**Maximum Size: 0***Sun 11:05am–11:55am Sat 9:05am–9:55am****H4268: Reverse-Discovering the Arthurian Legend***Anne Cai*

Through a brief literature survey of the numerous works, we will investigate the various portrayals of King Arthur, Guinevere, Lancelot, and the many other characters that compose the complex web of Camelot. From select poems, short stories, excerpts from novels, and parts of papers by Arthurian experts, we will reconstruct Camelot, a legend that has captured the imagination of so many writers and artists over the centuries.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am****M4265: S_OPIN G _ETTERS***Noor Doukma*

Ever wanted to encode a secret message? Wished you had a language of your own? Learn how to use your math skills to communicate just about anything!

*Open to students grades 7 through 9**Maximum Size: 0***Sat 9:05am–9:55am Sat 10:05am–10:55am Sat 12:05pm–12:55pm Sat 5:05pm–5:55pm****W4347: Sailor Moon***Robert A. R. Arlt Jr*

All you could ever want to know about Sailor Moon including anime, manga, and games.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–11:55am****H4405: Social Psychology***Josh Shaine*

Why do people behave differently in groups than they do when alone? Why would a perfectly reasonable person agree to administer shocks to somebody just because that person got questions wrong? Does power corrupt and if so, how? Would you stop to help somebody in need?

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05am–10:55am****X4342: Spreading Happiness***Sheina Godovich*

We'll talk about how we can make the world a little bit better, one smile at a time. We'll cover a little bit of the science of happiness, a little bit of the ideas of happiness, and a lot of the applications of making people smile.

*Open to students grades 9 through 12**Maximum Size: 0***Sun 5:05pm–6:55pm Sat 9:05am–10:55am Sat 8:05pm–9:55pm****A4368: Subversive Humor***Paul Hlebowitsh*

I'm going to define "subversive humor" as jokes that don't fit into the established formulas for joke telling. This is probably a horrible definition.

We'll go over a few examples of the best "subversive humor", and then I'm going to tell my favorite subversive joke. It may take a half hour to tell.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–9:55am****W4030: Telephone Pictionary***Aaron Segal*

Come join the wacky and fun game of Telephone Pictionary! Pass on a message by drawing a picture or captioning a drawing ...then see how other people interpreted your work! Can't draw too well? Good! Are you the next Rembrandt! Come show off! Telephone pictionary wants you!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05am–12:55pm Sun 3:05pm–6:55pm****C4194: Terrain Generation***Alan Huang*

Suppose you're developing a game, like Civilization or Minecraft, that needs to generate large, realistic worlds. A flat plain is pretty boring, so you want lakes and rivers, shorelines that look natural, tall mountain ranges... and these all have to be created on the fly. We'll look at some algorithms for doing this efficiently, and how they match up with reality.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05am–9:55am

X4232: The Art of Vehicle Identification... Or How to Name any Car in a Flash

Weizhong Ji

Imagine you're walking down the street, and a red hot roadster roars past you. It's a totally awesome car... but you don't know anything about it. Was it an Audi TT? An Infiniti G37? Your grandmother's Cadillac?

If you want to learn how to identify any car on the street in a flash, come to this class! Impress your friends with your ability to differentiate between a BMW 3 and a BMW 5 (hint: look at the headlights). Or annoy them endlessly. We're cool with either.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05am–9:55am

S4260: The Biology of Cancer

Katherine Luo

What is cancer? Why is that some people get it and others don't? How does it develop in the body, and why do some cancers have a lower survival rate than others? Learn all about the molecular mechanisms (and new research) of tumor initiation and growth. We will also go into treatments for cancer and discuss their efficacies. No prior biology knowledge is required.

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–10:55am

C4293: The Internet and Computer Networks

J.D. Zamfirescu

Do you consider yourself 1337-in-training and want to know more about how the Internet works?

Come learn about TCP/IP and many of the protocols that make up the Internet, including HTTP (for the web), SMTP (sending email), and POP (receiving email). You'll also learn how the Internet is laid out, why the speed of light matters, how your data packets get to Japan or Australia, and why sending email or IMs is like sending a message on a postcard!

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–10:55am

C4390: The Singularity

David Dalrymple

The concept of a technological singularity, originally proposed by legendary genius John von Neumann in 1958, reached the mainstream this year when it formed a major plot point in an episode of a prime-time CBS sitcom. Many popular news stories have been published about the Singularity concept, and its most prominent proponent, Ray Kurzweil, but most fail to capture the subtleties of the idea. If you're wondering what the Singularity is, or why "otherwise smart people"

believe it's going to happen, come to this class and I will attempt to explain. (I will be showing Ray Kurzweil's personal slideshow on the topic as per usual, but in past iterations, the most interesting portion of the class is the question-and-answer session.)

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05am–10:55am

M4198: The powers of summing up: the zeta function

Dmitry Vaintrob

We'll learn how to take sums of certain series, including the famous identity $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$.

We'll talk about Zeta functions (defined by series like the one above) and their relation to primes, and learn about a couple of open problems, including one of the most important and elusive conjectures in mathematics, the Riemann Hypothesis.

Open to students grades 10 through 12

Maximum Size: 0

Sat 9:05am–10:55am

M4117: Understanding Uncertainty: Statistics Storytime

Finale Doshi

Is jaywalking safer than using crosswalks? Should I get a flu shot? Is climate change for real? For small questions as well as big ones, many of our decisions require making sense of uncertainty. In this short course, we'll go through a series of practical, realworld examples of how statistical concepts are used—and misused—in common situations. In the process, we'll learn about some basic probability, statistics, and logic that everyone should know to interpret numbers in the news.

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–10:55am

W4233: Walk-in in a Lego Wonderland

Race Wright

Legos! 'Nuff said.

Well, maybe not. In this walk-in seminar we will be building legos. Stop by and you will have the opportunity to relax between classes, build your own lego creation, and also contribute to a massive SPLASH Lego sculpture. It'll be great.

But, we'll also talk about legos, swap strategies and stories, and just generally hang out and chill while playing legos. So, stop by, it'll be great.

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–5:55pm Sun 9:05am–5:55pm

H3946: What does it mean to be a teen?

Amy Estersohn

This course will cover multiple perspectives on the experience of individuals between the ages of 10 and 20, in other words, teenagers. We'll look at perspectives from pop culture, history, psychology, and biology and consider how these lenses influence teenagehood today.

Open to students grades 7 through 8

Maximum Size: 0

Sat 5:05pm–5:55pm Sat 9:05am–9:55am

H4402: Where the Musical Scale Comes From

Rob Speer

Why does the musical scale we know consist of 12 notes, and why are they those notes in particular? It turns out that there's some simple math that describes what sounds good to the human ear, and you can use that math to build up the familiar Western scale. Like curious engineers, we're going to take apart the scale and see how it works and then we're going to put it back together differently.

By making different choices, you can end up building other musical scales used through history and around the world, or exotic scales that few people have ever heard. Instead of 12 notes, you could have 5, 19, 22, or even 53 notes in each octave.

You'll hear some examples of music that doesn't sound like anything you've heard before, learn why every piano is out of tune in one way or another, and you'll even have the opportunity to play a keyboard with a 19-note scale.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05am–10:55am

X4070: ZDI.001 Introduction to Zombie Defense

Andrew Farrell

News reports swirl about an outbreak of a strange variant of the rabies virus accidentally released from a Harvard Biology lab

Cameras capture the infected lurching through Cambridge, spreading southward.

What do you do?

The key to survival is preparation.

Learn how to:

identify zombie weaknesses,

choose the right weapons,

save supplies needed for a siege or escape

and most importantly: kill zombies and survive

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05am–10:55am Sat 1:05pm–2:55pm

H4024: Advocacy and Lobbying 101

Brock Adler

Is there a cause you are passionate about? Would changing laws or regulations, or having new government funding for your area of interest be useful? By joining together and advocating and/or lobbying with others, you can work towards accomplishing your personal, community, and societal goals.

This session will give you (and your collaborators) a great start at being able to plan and carry out campaigns to create or change laws that you feel will improve things. You will learn about strategies and tactics applicable to a variety of different kinds of causes. I will use as an example an effort I have been working on for a few years to pass the Federal No Child Left Inside Act H.R. 2054 (see www.NCLCcoalition.org), but the lessons presented will be applicable to a wide variety of other issues and levels of government.

Open to students grades 9 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm Sat 10:05am–11:55am

A3897: Architecture of the Home

Luke Joyner

Chances are you live somewhere. Most of us do. And so have most people for years and years. Somebody's gotta design the places we live, and there have been tons of interesting ideas about how to do so, over the years. This class will go over some ideas and debates about how homes ought to look, feel and work. We'll look at tons of examples—normal and strange, beautiful and ugly, big and small—and discuss some interesting questions that have arisen when people think a little differently about houses and housing than you might expect.

Open to students grades 10 through 12

Maximum Size: 0

Sat 10:05am–11:55am

S3880: Atomic Structure and the Periodic Table

Ian Martin

Have you ever been taught about the periodic table and wondered what is really behind its arrangement? Come learn about the reasoning behind the ordering and grouping of the elements, how atoms really work and the history behind our present view of the building blocks of the universe. This is mostly an introductory class for people who haven't taken in-depth chemistry before, so if you've taken high school chemistry (especially AP), this class will probably bore you to death.

Open to students grades 7 through 12

Maximum Size: 0

Sat 10:05am–11:55am Sun 10:05am–11:55am

X3917: Diplomacy - The ultimate game of forging alliances, stabbing your allies in the back, and grand strategy

Neil Forrester

It is 1900, and the great powers of Europe - England, France, Germany, Italy, Austria, Russia, and Turkey - are about to go to war. You control one of them, and now must conquer or be conquered. You need allies, for their assistance now, and to have someone who won't expect a whack over the back of the head later. You need territory, since the size of your military is controlled by the size of your empire. And did I mention that you need allies?

As the name suggests, Diplomacy is not a war game. Diplo-

macy is a people game that happens to be set in a war. Like Chess, there is no element of chance. Unlike Chess, you do not take turns: everyone writes their orders in secret, and all orders are resolved simultaneously. You will have 15 minutes to discuss each move, in public or private, during which time you can say anything you want to. What you say and what orders you write can be exact opposites if you like.

In this class, I will go over the rules quickly (they're not too terribly complicated), and then we will start playing as soon as possible. Diplomacy is long. We will probably complete one game in a hectic 5 hour period. It is possible that you will be eliminated before the end. If this happens, I will have some form of alternative entertainment for you, such as a deck of cards, or you can watch the rest of the game, or drop in on some other class.

Players of all skill levels are welcome. Ideally we will have one or two people besides myself who have played before. Unfortunately, I can't run more than one game at the same time, so there is a strict limit of 7 students.

Open to students grades 9 through 12

Maximum Size: 0

Sat 10:05am–2:55pm

S4320: Dreaming of the Stars: Humanity's Journey to Understanding

Laura McKnight

Have you ever looked up at the sky and wondered what all the sparkly dots up there are? Are they fireflies stuck in the blue-ish black thing, or giant balls of burning gas? Come learn about exactly what goes on in the life of a star, about the different types of stars, and how we know what we know

Open to students grades 9 through 12

Maximum Size: 0

Sat 10:05am–10:55am

H4181: Homosexuality in Japan: Un-Repressing a Cultural Phenomenon

Seong-Ah Cho

Japan: a repressed society, right?

Did you know that male-male sexuality was conspicuously visible in Japanese society, starting way back in the 800s all the way up till it mysteriously 'vanished' in the 1800s?

In this class, we will examine the historical phenomenon of Japanese homoeroticism through the critical evidence of a number of fascinating personal journals and historical accounts, as well as (PG-13) art and fiction from the times. This study will ultimately take us to a better understanding of the powerful and far-reaching undercurrents of Japanese society as a whole, and give us a perspective on how Japan's historical societal character affects its many social phenomena ("deviant" and not) today.

Let's take a look under the hood at what all they've been repressing for a thousand years, shall we?

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm Sat 10:05am–10:55am

S4006: Hunting for Extra-Solar Planets

Rebekah Dawson

Who will discover the next planet around another star? It may be you! Unlike projects like Folding@Home or SETI@Home designed by scientists who want to use your computer to crunch their data, the world's premier planet hunting team at Lick Observatory wants to use your brain. Come learn how astronomers combine the celestial mechanics developed by Kepler and Newton with data from the latest telescopes and NASA missions to discover planets around other stars. You will receive all the training you need to use the Systemic Console – a free piece software developed by astronomers at Lick – to search for new extra-solar planets by analyzing radial velocity measurements.

Open to students grades 10 through 12

Maximum Size: 0

Sat 10:05am–11:55am

S3738: Intro to Criminal Justice

Shar Gunn

Intro to Criminal Justice is an interactive class, where students will learn the basic terms, definitions and procedures to help them understand the criminal justice system.

Students will learn about violent crimes, job and educational requirements, arrest procedures, the cycle of crime and fingerprint analysis. Students will be able to analyze their own fingerprints and patterns and participate in classroom role plays.

Topics of discussion:

Team building

Booking

Arrests and Pat Searches

Crime and Trend

Open to students grades 7 through 12

Maximum Size: 0

Sun 10:05am–11:55am Sat 2:05pm–3:55pm Sat 10:05am–11:55am

S3721: Introduction to Special Relativity

Ryan Normandin

This is the class that will throw everything you know out the window. Time travel is not only possible, scientists actually know how to do it! The Law of Conservation of Mass is a lie. Energy Conservation is another lie. From a four-dimensional point of view, you are a strand of spaghetti. Come and learn how to not only time travel, but turn into a black hole while you're at it!

Open to students grades 9 through 12

Maximum Size: 0

Sat 10:05am–10:55am Sat 11:05am–11:55am Sat 12:05pm–12:55pm Sat 2:05pm–2:55pm Sat 3:05pm–3:55pm Sat 4:05pm–4:55pm Sun 10:05am–10:55am Sun 11:05am–11:55am

H3996: Latin: The Direct Method*Zachary Haney*

“Arma virumque cano!” - I sing of war and a man! The Aeneid

By employing the Direct Method (also called the Natural Method) of Hans Oerberg’s *Lingua Latina*, we will embark on the study of Latin. By using this method, we will see that one does not have to use English to understand Latin (nor any other foreign language!). By the end, we will have the opportunity to discuss later Latin and how to go about studying this language that lasted for almost 2,000 years (and developed into our modern Spanish, French, Italian, etc.)

Open to students grades 7 through 12

Maximum Size: 0

Sat 10:05am–11:55am

A4133: Music Theory 1: Music Fundamentals*Russell Cohen*

What is that whole music thing? This course will go through the absolute basics – the staff, clefs, sharps, flats and basic rhythm.

Open to students grades 7 through 12

Maximum Size: 0

Sat 10:05am–11:55am

S4256: Optical Illusions and You!*Debbie Yee*

Have you ever looked at an optical illusion and wondered how they worked? Over the past few decades, we’ve acquired much knowledge of the visual system, and attempt to dive into the complexities of the brain and visual system to explain some of the phenomenon we see in our every day lives! We will attempt to dive into the neural basis of optical illusions, and talk about the cool and unknown aspects of our visual system.

Open to students grades 9 through 12

Maximum Size: 0

Sat 10:05am–10:55am Sun 10:05am–10:55am

H3828: Paradoxes of Democracy: Fair Elections and Voting*Stephen Hou*

What if, in hypothetical two-way races during the 2008 primaries, Clinton beats Obama, Obama beats Edwards, and Edwards beats Clinton? Is this even possible? (Yes.) What would then be a fair way to decide the “best” preferences of Democrats? Whether it’s a T-shirt design contest or a presidential election, voting converts preferences of individuals into a single preference for the community. We’ll discuss Arrow’s Impossibility Theorem, which states that there is no “perfect” way of doing so. We’ll demonstrate a few of the mind-boggling flaws that every voting method must have.

Open to students grades 9 through 12

Maximum Size: 0

Sat 11:05am–11:55am Sat 10:05am–10:55am

X3868: Safe & Simple Self Defense*Jeff Chen, David Young*

Self defense classes typically teach you how to escape from life threatening situations. Sometimes you just want escape from an uncomfortable situation without severely injuring the other person.

This class will address both. Based mostly on fundamental teachings of jiu-jitsu and judo, we’ll teach you how to defuse bad situations, shield against attack, escape from grabs and holds, proper falling, and simple strikes and other ways to escape and deter an attacker.

Our eventual goal is to teach you that the safest way to win a fight is to prevent it from happening in the first place.

Due to safety concerns this class will be STRICTLY NON CONTACT!

Open to students grades 7 through 12

Maximum Size: 0

Sat 10:05am–11:55am Sun 1:05pm–2:55pm

H3995: Suomen Kieli: Introduction to Finnish!*Nora Rsnen*

Finnish is one of the few languages in the unique Finno-Ugric language family, and only spoken by about 5 million people in the world. Come learn the basics of Finnish! By the end of the class, you’ll be able to correctly pronounce Finnish words, introduce yourself, ask questions and count. If we have time, we will learn one children’s song.

Open to students grades 7 through 12

Maximum Size: 0

Sat 10:05am–11:55am

H3982: The Gold Standard*Kathleen Fitzpatrick*

The gold standard is a monetary system in which gold can be used as currency, or currency may be exchanged for gold at fixed rates. However, during the 20th century, every nation in the world abandoned the gold standard (and any standard based on metal) in favor of fiat currency, which is a system where money has value simply because the government says it does. Why did this shift occur? What are the advantages and disadvantages of the gold standard? Will we ever return to it?

Open to students grades 10 through 12

Maximum Size: 0

Sat 10:05am–10:55am Sat 11:05am–11:55am Sun 10:05am–10:55am

H4007: Writing a New U.S. Constitution*Ethan Lewin*

Suppose you are a delegate at a 2010 convention to write a new U.S. Constitution. Which institutions would you keep? What changes would you propose? Would you change the Bill of Rights? We will simulate such a convention, and hopefully by the end of class, create the outline of a new American government.

Open to students grades 10 through 12

Maximum Size: 0

Sat 4:05pm–4:55pm Sat 10:05am–10:55am Sat 11:05am–11:55am

S3925: Advanced Topics in Astronomical Destruction

Tejas Navaratna

Violence on an enormous scale!

Starting with the big bang, go on a whirlwind tour of the cosmos and explore what makes your sun BURN, a supernova super, a black hole whole (how do you make one?!), and eventually, the final result: universal destruction.

Open to students grades 8 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm Sat 2:05pm–2:55pm Sat 11:05am–11:55am

C4152: Amazing Algorithms - Network Flow Part 2

Michael Cohen

There are tons of different optimization problems out there in computer science. One feature that many of them have in common is that they can't be efficiently solved. But there is an important type of problem, called a network flow problem, that can in fact be solved quite efficiently. Network flow asks how to most efficiently move "stuff" through a network, where "stuff" could be anything from packets on the Internet to materials on a road grid to an abstract notion of association.

The class will begin by defining network flow and discussing its applications. Then, we will talk about how to solve it! Algorithms covered for the basic maximum-flow problem may include the Ford-Fulkerson algorithm, the Edmonds-Karp algorithm, Dinic's algorithm, push-relabel methods, and further improvements to these approaches. The class may also cover related topics such as the max-flow min-cut theorem and minimum cost flows.

This is an awful lot to digest at once, so the class has been split into two parts, with a break between them. I will structure the class so that you can attend only Part 1 and still understand what network flow is and some ways (though not the most efficient) to solve it.

Also, note the use of "may" in the above. The exact topics covered are likely to change depending on your interests.

Open to students grades 9 through 12

Maximum Size: 0

Sat 11:05am–11:55am

C3907: Artificial Intelligence: When will THEY be smarter than us?

Bob Weinberg

From its early beginnings a half century ago, giant leaps have been made in the field of artificial intelligence (AI).

Early programs often mimicked the thought processes of their programmer. Whether it was a computer playing chess against a person, a computer holding a conversation with a person via the CRT screen, or a program attempting to diagnose psychological problems, it was usually fairly easy to figure out that a computer was at work.

Now Expert Systems can solve complex engineering and scientific problems much faster than the average engineer or scientist.

Robotics has made great advances in the manufacturing field. Virtual Reality has allowed the players to enter exotic and faraway places.

And whether talking about surrogate robots or robotic androids, we all are familiar with the idea of machine becoming friend and ally to man, as well as companion and advisor.

This course will make a survey of AI over the past century, and take a glimpse at where it is going.

The inventor Ray Kurzweil and the computer whiz Mitch Kapoor made a \$20 million dollar bet whether robotic intelligence will surpass human intelligence in the next 20 years. Who will win?

Open to students grades 7 through 12

Maximum Size: 0

Sun 11:05am–12:55pm Sat 11:05am–12:55pm Sat 7:05pm–8:55pm Sun 9:05am–10:55am

C3980: Bit Hacks

Sherry Wu

Interested in computer science? Think you can't do much with 1s and 0s? Come to Bit Hacks to learn about the power of binary numbers.

Open to students grades 8 through 12

Maximum Size: 0

Sat 11:05am–12:55pm

X4079: Chinese Games

Danyi Wu

Do you want to learn how to play Chinese games? Learn how to play dice games as well as card games like Big 2!

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am Sat 1:05pm–1:55pm

X4329: Chocolate tasting seminar

Joshua Slocum

Come taste fancy chocolate! We'll teach you about various different kinds of chocolate, how where it comes from and how it's made can affect the taste, and a little bit about how chocolate is made. Most importantly, though, we'll provide tons of different kinds of chocolate for you to taste!

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am Sat 1:05pm–1:55pm

M3947: Come on Down! Game Theory in The Price is Right*Tana Wattanawaroon*

Imagine that you are in the Bob Barker studio. You don't know whether a box of microwave mac-n-cheese or a 20oz bottle of lemonade is more pricey. You have no idea that a pair of designer shoes might be more expensive than a pair of iPads. Suddenly, Rich Fields calls your name, and you're nervous. Come to this class and see if "one dollar" is a good strategy, or if spinning again on 65 is a good idea.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 11:05am–11:55am****C4217: Computer Architecture in One Sitting.***Ariel Wezler*

I'm pretty sure everyone here uses computers on a daily basis. A computer could be in the form of a phone, or a laptop, or a remote control, or just about anything electronic nowadays... But you may be wondering what the heck is going on inside these microscopic devices? Well, that's why I'm here. I'm going to explain to you WHAT computation is, and HOW you can design a computer (from step one just about). Also, if I do my job right, you will walk out of the classroom thinking about everything you see in an amazingly new fashion!

*Open to students grades 9 through 12**Maximum Size: 0***Sat 11:05am–12:55pm Sat 7:05pm–8:55pm****M4360: Construction of the Real Numbers***Nils Molina*

What really is a real number? How are they different from rational numbers? Why are they so useful, and what can we do with them?

Although there will be appeals to intuition and some discussion, the class will be packed with mathematical rigor: Cauchy sequences, equivalence classes, suprema, and so on.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 11:05am–12:55pm****C4172: Easy Video Game Design and Programming!***Daniel Gonzalez*

This class will teach students VERY basic video game programming and design, with little to no coding, using a program called Game Maker. We will work on and complete a very basic game. Then we will expand on different concepts such as user control, simple artificial intelligence, physics, etc.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 4:05pm–5:55pm Sat 11:05am–12:55pm Sun 1:05pm–2:55pm****S3825: Essentials of Dating (Part 1): How we know the Earth is around 4,567,000,000 years old***Aaron Scheinberg*

Ever wonder how we know the age of very old things?

The age of the Earth, when life began, when the dinosaurs died out, when Hawaii was formed, when homo sapiens evolved - these are important dates that provide a framework for understanding our world and how we fit into it.

In part 1, you will learn the basics of radiometric dating, including the techniques, assumptions and verifications that go into the process and how it ties in with relative dating methods.

In part 2, we'll also take a look at the most common arguments used by young Earth creationists against radiometric dating techniques and geoscience in general.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 11:05am–11:55am Sat 1:05pm–1:55pm****A4142: History of Musical Theater***Christopher Brathwaite*

Gershwin, Porter, Rogers & Hammerstein, Sondheim and Larson. Come learn about the growth of musical comedy, the great American theater form. Where did it come from? Where is it going? and why is the entire score of RENT so freaking catchy? Come find out!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 11:05am–11:55am****E4205: How to Build A Satellite: Exploring Space Systems Design***Mary Knapp, Ryan McLinko*

Have you ever wondered what goes into building a satellite? Learn about satellite design and practice by designing and building your own satellite!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 11:05am–12:55pm Sun 1:05pm–2:55pm****A4044: How to Listen to Classical Music***Andrew Wang*

Bach, Beethoven, Brahms, Booorrrring.... Nah, by that logic, you'd have to include the Beatles ;-). We invite you to explore classical music with your emotions and your mind. This is a very interactive session where we try to identify the essence of what the music is speaking to us. The class will be structured as a tour of the various eras of classical music starting from the 1600s onwards. You will leave longing download more classical music onto your iPods.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 11:05am–12:55pm****X4122: How to Roll Sushi (And Eat It)***Benjamin Sena*

As a follow-up for How to Make Sushi Rice, this class will

teach you all you need to know about how to roll sushi and make other delicious creations. Ingredients will include sashimi-grade fish suitable for raw consumption.

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am

W3959: Human Knots

Sachi Hashimoto

Human knot is a game in which people connects hands in random complicated ways and then try to untangle themselves into a circle. In the course of playing this game, participants sometimes realize that the knot they are making is impossible to untangle. In fact, there are a ton of knots that are impossible to untangle, and in this seminar we will be trying to construct as many as we can. As an extra challenge, we will also see if we can make knots with as few people as possible: did you know the simplest knot, the trefoil, can be made by just one (flexible) person? Come learn about what a knot is, help make some huge knots, break the current bounds on the number of people it takes to make them. (Note: You should be comfortable with being up close with other people, as this involves holding hands and tangling yourselves into knots.)

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am

X4333: Intro to J-Rock ¡3

Ramya Swamy

j-rock = Japanese rock. Don't know what it is? Come to this class and be enlightened. We'll listen to (lots of) samples, laugh at the ridiculousness of English album titles, discuss the musicality of j-rock (of course), and take a peek at the craziness that is visual-kei. Trust me. It'll be fun. (:

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am

C3835: Intro to the Command Prompt for Girls (and Boys)

Ruth Byers

Not very many girls know how to fix their computers when things go wrong- but they can, and learning to use the command prompt is the first step! The command prompt is the knife you use to open up a computer and spill its digital innards onto your screen. Come learn to wield that knife and use it to enter and explore parts of your computer you've never even knew were there. Boys also welcome.

Open to students grades 9 through 12

Maximum Size: 0

Sat 11:05am–12:55pm

A4048: Introduction to Chinese Art History

Lily Chan

Learn about Chinese Art History

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm Sat 11:05am–11:55am

X3819: Introduction to Interstellar Warfare

Daniel Kane, Bram Sterling

Defense of a gravity well against a first strike countervalue attack by an interstellar known-physics adversary with a sub-stellar mass economy

Or, dodging rocks

We analyze methods that might be used in a real interstellar war, without unexplainable technologies such as faster than light travel and energy shields. Topics include relativistic bombardment, singularities, Von Neumann devices, innocuous antimatter weapons

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am

M3954: Introduction to Regression Analysis

Zoe Thorikildsen

Regression analysis is a statistical method that allows researchers to explore relationships between dependent and independent variables. These could range from the relationship between SAT scores and college admissions, or between natural resource abundance and likelihood of civil war. Far more than a simple correlation coefficient, regression analysis allows much more detailed and informative analysis. In this course, we'll touch on research methods, basic statistics, conceptual mathematics, econometrics, and the study of social issues. You'll get to participate in a mini-research project using statistical software to analyze some real world data using regression techniques.

We will move fast, be prepared.

Open to students grades 9 through 12

Maximum Size: 0

Sat 11:05am–12:55pm

X4211: Nolan's Life Lessons

Nolan Hull Essigmann

Basically just show up and we'll talk about MIT, the application process and life in general. I'm also well versed in many other topics in Math, Science, Literature, History, et cetera... so we can also talk about that.

Good food will also be provided.

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am

C4307: Parallel Programming from the Hardware Up

Dan Noe

We now live in a world of multithreaded programs, dual and quad core CPUs, and increasingly parallel programming. Moore's law no longer scales up it scales out. Understanding concurrency and parallel programming will be crucial to the next generation of software engineers.

In this course I will discuss the reasons why parallelism is

the direction of computing performance, how computer software and operation systems handle simultaneously shared resources, and how computer hardware is designed to facilitate synchronization (including memory barriers and cache synchronization) and resource sharing.

Open to students grades 9 through 12

Maximum Size: 0

Sat 11:05am–12:55pm

X4316: Piper Cleaner Hypercubes

Victoria Vega

Interested in physical representations of multidimensional objects? Come craft your very own with pipe cleaners!

Open to students grades 7 through 10

Maximum Size: 0

Sat 11:05am–11:55am Sat 12:05pm–12:55pm Sat 1:05pm–1:55pm

C3900: Programming Skills for the Future

Thomas Murphy

Most computer programmers like to say how different and special their favorite language is. Underneath, though, almost all modern languages require similar ways of thinking about problems. Modern hardware (especially multicore and distributed computing) is starting to demand a new set of tools, and programmers will have to bend their brains further.

We'll start from the ground up with Haskell and Erlang, and learn about functional purity, typeclasses, transactional memory, the dreaded Monad, and much more.

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am Sat 12:05pm–12:55pm Sat 9:05pm–9:55pm Sun 4:05pm–4:55pm

M4037: Proof vs. Truth: Gdel's Incompleteness Theorem

Jesse Dunietz

Kurt Gdel rocked the world of mathematics in 1931 when he proved that there are some mathematical statements that are true but can't be proven. We'll go through an intuitive overview of the proof, covering bits of formal logic, number theory, and mathematical history along the way. We'll also discuss some of the earth-shattering implications of the theory.

Open to students grades 9 through 12

Maximum Size: 0

Sat 11:05am–12:55pm

H4331: Prototyping Plots

Finale Doshi, Matthew Fay

Interested in crafting stories but don't know where to start? Ever wondered what a monomyth is? Want to know what it's good for? And how many coincidences can you really get away with in a story, anyway? (It's two, by the way; come and hear why.) "Prototyping Plots" is a crash course in creating stories - looking at where ideas come from, making memorable characters, and crafting coherent plots. Come in

with some ideas and leave with more!

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–12:55pm

S4357: Relativity and Four-Vectors

David Field, Anand Oza

An introduction to special relativity from a mathematical perspective. We will cover the Lorentz transformation and four-vectors.

Open to students grades 9 through 12

Maximum Size: 0

Sat 11:05am–12:55pm

E3865: Sensational Failures in Engineering

Liza Plotnikov

Exploding space shuttles, collapsing bridges, exploding naval guns sometimes designs fail, and sometimes they fail catastrophically. These failures can be dramatic, deadly, or sometimes just plain silly, but they have one thing in common: they are all preventable. In this class we'll cover the technical missteps behind some famous engineering disasters (and some you may never have heard of). We'll talk about how smart people can make bad designs, the importance of communication, and especially the value of common sense.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm Sat 11:05am–12:55pm

X3979: Textbook Stupidity

Alyssa Zisk

The answer doesn't make sense because the problem doesn't make sense. It happens. Sometimes his favorite orange weighs nine pounds, and the problem is even wronger than that. We're mostly going to laugh at examples of this and explain why it's bad for having people get good at math, with the amount of each depending on what most of you want.

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–11:55am Sat 1:05pm–1:55pm

S3919: Topics in Abnormal Psychology

Veronica Gross

Depression. Schizophrenia. ADHD. These common mental illnesses are a source of great controversy. Are they biological? How responsible should people be for their actions if they're mentally ill? What about neurological malfunctions, such as Alzheimer's Disease or amnesia?

This course will explore the phenomenon, diagnosis, and treatment of mental illnesses, as well as a debate about the role of mental health in the workplace, at school, and in the legal system.

Open to students grades 7 through 12

Maximum Size: 0

Sat 11:05am–12:55pm Sun 1:05pm–2:55pm

A4252: Ukulele*luke plumber*

Ukuleles are awesome and easy to play! Learn the basics of uking from Lukulele himself, and then play ukulele favorites from Jake Shimabakuro to Train!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 11:05am–12:55pm Sun 9:05am–10:55am****X3924: Urban Adventures: Eateries and Playgrounds***Justin Monestime, Elena Serio*

Need a reason to not do your homework, essay, project, reading, clarinet practice, newspaper article, yearbook design, science project, or other fun parts of being in high school? Don't keep hitting refresh on Facebook ... go to Boston! This class is designed to teach you how to take advantage of living in the great city of Boston. Together we will discover those unknown places that all your indie friends keep talking about. (Class also features an Urban Adventure to get pancakes)

*Open to students grades 9 through 12**Maximum Size: 0***Sat 11:05am–12:55pm****H4314: Warfare in the Age of the Samurai***Alexandre Todorov*

Thanks to manga and anime, the samurai have really entered into American pop culture, yet the real things are even cooler than their fictionalized counterparts. In this class you will learn about the men who fought over Japan for 500 years, from the great leaders to the individual soldiers fighting in the battle lines.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 11:05am–12:55pm Sat 1:05pm–2:55pm Sat 7:05pm–8:55pm Sat 4:05pm–5:55pm****X4109: What Don Draper does: Advertising 101.***Shinya Watanabe*

Ever watched an episode of Mad Men?

Ever dazzled by the beauty of advertisement?

Ever thought "I could make that commercial more engaging"?

Do you think you can write a better course description?

Surprise me.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 11:05am–12:55pm Sun 9:05am–10:55am****S4127: You Canna Change the Laws of Physics: Science Mistakes in Star Trek***Elizabeth Attaway*

Despite Scotty's protests, the Enterprise crew seems to do a lot of messing around with the laws of physics, not to mention biology. Heck, they don't even get their math right half the time!

Check out the errors I noticed in Star Trek: The Original Series, point out any I may have missed, and try to come up with a good explanation of the stardate system, if such a thing is possible. :)

*Open to students grades 7 through 12**Maximum Size: 0***Sat 11:05am–11:55am****M3955: Mathematical Research by High School Students at MIT***Pavel Etingof, Tanya Khovanova*

We will tell about mathematical research that is conducted by high school students at MIT. We will talk about RSI and a new program PRIMES which is being set up now. We will describe past successful projects and research ideas for the future.

We will answer your questions and tell you how to apply to PRIMES.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 12:05pm–12:55pm****S4196: Atomic Adventures***Philip Engelke*

Since the discovery of nuclear fission, a great source of power is in our hands. Rather than releasing energy stored from the sun, such as burning dead plants, nuclear fission unleashes vast amounts of energy stored within the atomic nucleus. This class will present the story of our discovery of this great power and the dramatic rush to create the unprecedentedly destructive atomic bomb; the peaceful uses of nuclear energy as an effective power source that does not emit carbon dioxide, and discuss innovative reactor designs to make nuclear energy safer and more efficient. So come for a journey through fascinating science, history, and possible visions for our energy future.

*Open to students grades 7 through 12**Maximum Size: None***Sat 12:05pm–12:55pm****S3977: COW wow!***Sherman Janet*

This is not the cow that says moo. This is the COW in your brain. Let's talk about radiology and circulation.

*Open to students grades 7 through 8**Maximum Size: 0***Sat 4:05pm–4:55pm Sat 12:05pm–12:55pm****S4365: Chicken Soup for the Science Geek's Soul, Gr. 7-8***Reena Joubert*

This course will happen in the format of stand-up comedy, with breaks for tea, comfort food, and introspection.

It requires no further explanation.

*Open to students grades 7 through 8**Maximum Size: 0***Sat 12:05pm–12:55pm**

X4227: Dance!*Danyi Wu*

Come learn hip hop or jazz dance choreography from MIT's DanceTroupe! Have fun and DANCE!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 12:05pm–12:55pm Sat 4:05pm–4:55pm****W4243: Exquisite Corpse***Luke Joyner*

The surrealists played a game called Exquisite Corpse, where individuals collaborated on drawings or poems with only a hint of what their collaborators were doing. We'll play the game, in both drawing and poetry. Creative variations and additional media are encouraged.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 12:05pm–1:55pm****S3935: From Ultracold Atoms To Superstring Theory***Nabil Iqbal, Hiro Miyake*

What would happen if you could cool objects to really, really cold temperatures? What would the world look like if you could look at objects at smaller and smaller distances? We'll talk about the amazing discoveries that people have made trying to answer these questions, including Bose-Einstein condensation, where millions of atoms act as one huge atom, and the Standard Model of particle physics, which describes the objects that make up our universe. Be ready to have your mind blown away!

*Open to students grades 9 through 12**Maximum Size: 0***Sat 12:05pm–12:55pm****H3894: Gender: Or, what's up with all of these ties and skirts anyways?***Judith Vasquez*

Have you ever been curious as to what exactly gender is? How does gender as a social construct form—is it a result of sexuality, or personality? Are sex and gender distinct, and is this distinction useful? How does gender interrelate with sex, class and ethnicity, and is it even separable from these ideas? How does the distinction between gender and sex factor into politics? What does it mean to be gender fluid? This class will be a discussion based, participant-focused seminar around the topic of gender. We will explain some basic topics centered around the ideas of Michel Foucault, Judith Butler, Catharine MacKinnon, and some others, and then open it up for discussion centered around the key points.

*Open to students grades 11 through 12**Maximum Size: 0***Sat 12:05pm–12:55pm Sat 5:05pm–5:55pm****C3884: Genetic Algorithms: Making Data Reproduce***Dustin Katzin*

You know how you inherited traits from your mom and dad. Learn how data can reproduce and pass down traits through generations. We'll learn how "survival of the fittest" can be applied to ensure that we get the best data after running the algorithm. Finally, we will apply this to Tetris!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 12:05pm–12:55pm****S3851: Great Moments in Molecular Biology***Anubhav Sinha*

Do acronyms like DNA, PCR, and ATP confuse you? Would you like to learn about the foundation of modern biology? Then this is the class for you!

Learn about the revolutionary experiments of molecular biology. Learn about the scientists behind the discoveries.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 12:05pm–12:55pm Sat 9:05pm–9:55pm****X4008: How to Ace Your College Admissions Interviews***Ethan Lewin*

So you have the grades and the SAT scores. You've poured countless hours into perfecting your college application essays. But what about the interview? I will share my tips on what the interviewers look for in an applicant, how they rate applicants, and how you should prepare.

*Open to students grades 11 through 12**Maximum Size: 0***Sat 3:05pm–3:55pm Sat 12:05pm–12:55pm Sat 1:05pm–1:55pm****X4231: How to Overcome Stage Fright and Present to People***Weizhong Ji*

Ever get in front of a crowd of people, only to be completely gripped by the sheer terror of the moment? Not sure of what to do when the audience stares at you? Does the very thought of talking in front of a group break you out into cold sweat?

Learn how to talk about almost anything in front of anyone—and survive! Develop confidence and practice overcoming stage fright. And let's face it: the audience doesn't bite!

*Open to students grades 9 through 12**Maximum Size: 0***Sat 12:05pm–12:55pm****S4032: Illuminating Dark Matter***Eric Gentry*

Scientists used to think the universe was pretty large. And then they found out there was something mysterious, something unknown and practically undetectable. That something was 9 times more massive than the entire known universe. Come learn about that last 90% of the universe: dark matter!

We will discuss where it came from, what it is, how we know it exists, and how it is different from antimatter, negative matter, etc.

No previous experience with subject matter necessary; whether you just barely know about electrons and protons, or you are an AP Physics ace, this class is for you!

Open to students grades 7 through 12

Maximum Size: 0

Sun 6:05pm–6:55pm Sun 11:05am–11:55am Sat 12:05pm–12:55pm Sun 3:05pm–3:55pm Sun 4:05pm–4:55pm Sat 9:05pm–9:55pm

H4287: Introduction To Hinduism

Aditya Kalluri, Naren Tallapragada

With nearly a billion adherents and dating back millennia, Hinduism is one of the world's largest and oldest religions. Western thinkers from Carl Jung to the Beatles have been profoundly influenced by its ancient philosophies. All are welcome to come explore and discuss the spiritual traditions of India.

Open to students grades 9 through 12

Maximum Size: None

Sat 12:05pm–1:55pm

C4275: Introduction to Algorithms: Searching and Sorting

Shaunak Kishore, Jacob Steinhardt

Algorithms drive most of the technology we see today: Google search and Google maps, Facebook, and Amazon.com all have algorithms tightly woven into their software.

This class will be a quick introduction to algorithms. An algorithm is a procedure for accomplishing some task, usually with efficiency as a goal, and oftentimes implemented on a computer. We will lay the foundations for constructing and analyzing algorithms, using the examples of sorting a list of numbers and finding a number in a list.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm

W4155: Laptop DJing for Novices

Colin McSwiggen

I'll bring my laptop, MP3 turntables and speakers, and set up a live DJing demo to walk novices through basic party DJ techniques. I'll cover simple manual beat-matching and mixing, and maybe touch on some slightly more advanced techniques as time allows.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm

X4154: Lateral Thinking Puzzles

Jennifer Hsu

Lets try to think outside the box. Well provide the problems, and you guys will work together to solve them. Like 20 questions, the questions you ask will be answered with a

“yes” or a “no”. The puzzle is solved when you guys solve the puzzling aspect of the scenario.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm Sat 1:05pm–1:55pm Sun 3:05pm–3:55pm

X4378: Life in the Great Down Under

Sarah Mountjoy

Always secretly wanted to be Australian? Learn how from two true blue Aussies! We'll teach you how to throw a prawn on the barbie, enjoy Australian football, eat Vegemite, spell things the RIGHT way, and pronounce all the different cities on the map so you'll be ready for your next trip to Aus.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm

H4190: Lost in Translation

Amy Woodruff

in this class we will examine a poem from poet Pablo Neruda's book, *Veinte Poemas de Amor y una Cancin Desesperada*, starting with the original spanish and then looking at several english translations. By comparing the translations and the original, we will attempt to answer the question, what really is lost in translation?

Open to students grades 9 through 12

Maximum Size: None

Sat 12:05pm–12:55pm Sat 1:05pm–1:55pm Sun 10:05am–10:55am

X4267: Make Your Own Stuffed Animals, Pillows, and Whatever-You-Wants

Anne Cai, Sonika Reddy, Iris Xu

Ever wanted to make your own, blatantly handmade stuffed animals? With just cloth, stuffing, needle and thread, you can sew and stuff your own dolls and stuffed animals and pillows, or stretch your creativity and make anything else—cacti, UFOs, microwaves, whatever pops into your mind.

Open to students grades 7 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm Sat 4:05pm–4:55pm Sat 12:05pm–12:55pm Sat 1:05pm–1:55pm

A4180: Make your own Hummus

Erika Bildsten

We'll be experimenting with tasty hummus, and concluding with a hummus taste-off between our inventions

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm

M4221: Making it in Vegas: The Math behind the Money

kavya joshi

Learn about the math behind roulette, blackjack, poker and other millionaire-making casino games and put it to practice

by playing a few rounds of each. We'll supply the betting money & prizes, you just show up and play to win =)

Open to students grades 11 through 12

Maximum Size: 0

Sun 3:05pm–3:55pm Sat 12:05pm–12:55pm

A3905: Overtone Singing: How to Sing Two Notes Simultaneously

Xuetao (David) Zhang

Overtone singing, also known as throat singing, or harmonic singing, is a type of singing in which the singer manipulates the resonances in order to sing more than one note simultaneously. Imagine singing both the melody and harmony by yourself! I'll show you these techniques.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm Sat 4:05pm–4:55pm Sat 5:05pm–5:55pm

H3984: Paper or Plastic? The Economics of Environmentalism

Kathleen Fitzpatrick

This class gets right into the debate over the costs and benefits of environmentalism. Should I use paper or plastic? Is vegetarianism really better for the earth? Isn't real fur, which comes from a renewable resource (animals), better than fake fur, which comes from a non-renewable one (petroleum)?

Open to students grades 10 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm Sun 2:05pm–2:55pm Sun 5:05pm–5:55pm

C4077: Pointers on pointers!

Cam Tenny

These aren't your daddy's pointers! Well, actually, they are. First, learn about good memory management practices in C and C++ so that you don't poke any eyes out. Then learn how to do cool things in C with pointers, like state machines and stack traces. Bringing a computer is recommended but by no means required.

Open to students grades 9 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm Sun 12:05pm–12:55pm

X4246: Silent Football

Ami Greene

A game that is neither silent nor football, but does involve the formation of universes, autocratic, grammatically-correct dictators and zooming non-corporeal entities, all whilst sitting in an ellipsoidal figure on the floor.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm

A4027: Singing Loudly

Mindy Or

but keeping it smooth!

Project your voice without damaging your vocal chords (and get a smidge closer to sounding like an opera singer).

(What do you mean, breathe with your diaphragm? Doesn't all breathing involve your diaphragm?)

We will do vocal exercises, practice projection, and test techniques to reach those difficult notes.

Feel free to contact me at [mindol@umbc.edu](mailto:mindo1@umbc.edu) if you have anything in particular you would like to me to address.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm

X4422: Stress, Anxiety, and Depression Management

Hana Bochicchio, Meri Jade Piltser

A discussion based class where participants share coping strategies for increasing emotional stability and reducing depression, anxiety and stress in everyday life.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm Sat 1:05pm–1:55pm

W3948: Sudoku and Its Evil Siblings

Tana Wattanawaroon

Having a hard time solving Sudoku in the newspaper? Acing Sudoku and looking for more challenges? Stop by this Walk-in Seminar and play Sudoku! We offer everything from gentle introduction to fiendish variants. All experience level welcome!

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–2:55pm

H4415: The History of Middle-Earth: the Valian Years

Raisa Lardie

JRR Tolkien's The Lord of the Rings takes place fairly late in the overall timeline of Middle-Earth; what happened before that? Come learn about the rich history of Arda as we follow the events that ultimately led to Biblo Baggin's discovery of the One Ring.

Part one in a three-class series, we will be learning about the Valar and the Shaping of Middle-Earth, Melkor's betrayal and the subsequent First War amongst the Valar, and other important events that form the foundation of Middle-Earth and pave the way for The Hobbit and The Lord of the Rings.

Open to students grades 7 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm Sat 1:05pm–1:55pm

C4362: Tricks with the Memory Management Unit

Greg Brockman, Alex Dehnert

The Memory Management Unit of a CPU has the seemingly

boring role of converting linear addresses, used in software, to the physical addresses used by the actual memory chips. The MMU is key to much of the functionality of the operating system, though. The MMU makes possible swap and direct memory access to files; helps enforce the user-mode/kernel-mode distinction; and keeps processes separated from each other.

We'll go over what exactly the MMU does, and how it is used to implement this sort of functionality.

Open to students grades 9 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm

E4123: Trusses

Benjamin Sena

We will look at trusses, those geometric connections of rods and joints on things like bridges, why they are important, and how to understand and analyze them.

Open to students grades 9 through 12

Maximum Size: 0

Sat 12:05pm–12:55pm Sun 1:05pm–1:55pm

X3964: Vicious Card Games (and how to win): Spit, Spoons and Egyptian War

Christina Jaworsky

Spit, Egyptian War, Canfield, Spoons: Each of these games goes by many names, and the way to win each one is speed. In this class, we will learn the rules and variations of uncivilized card games and strategies to increase your speed and beat your friends.

In this section, we will be covering the rules to three games: Spit, Spoons and Egyptian War.

Open to students grades 7 through 9

Maximum Size: 0

Sat 12:05pm–12:55pm Sun 11:05am–11:55am

A3989: What's on your iPod?

Sean Boyd, Christian Hauze

Ever wonder why that song sounds sad? Ever wonder why every pop song sounds the same? Ever heard of Pachelbel and his canon? Sure, most of us enjoy music. But do we know why it makes us feel the way it does? What makes some music different than other music and why do some songs remind us of other songs?

In an introduction to music theory, we'll engage in a class discussion and analysis of both classic and modern music. You'll have the opportunity to talk about what you like or dislike about certain songs and how they make you feel. We'll show you why.

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm Sat 12:05pm–12:55pm

E4016: Aircraft Jet Engines

Mayank Agarwal

Come find out how large and fast military jets and commer-

cial airline are powered. There will be no equations or theory. Just conversations and class discussions.

This class was taught last year also 3 hrs, but this year it has been shortened to 2 hours.

Open to students grades 8 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm Sat 1:05pm–2:55pm Sun 5:05pm–6:55pm

X4248: Anything you want to know about Star Wars!

Katherine Karwoski

Come ask questions about Star Wars- the movies, tv series, or expanded universe. I'll try to answer what I can and look up what I can't. I'll also be wearing my clone trooper armor, so you can see that and ask questions about Star Wars costuming. Just come talk anything about Star Wars!

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm Sun 3:05pm–3:55pm Sun 1:05pm–1:55pm

S3916: Basic Astronomy: Fun Knowledge for When You Go Camping

Jessica Yen

Why did Pluto get demoted to a dwarf planet? What is the difference between the Milky Way and the Milky Way Galaxy? What's all the big fuss about eclipses? How did sailors find their way home back in the day? These are some of the topics that will be covered in this class, in addition to the effects due to the Earth's axis tilt and various tidbits about the Moon, its phases, and other planets. The class is meant to be an introductory course: no theories about controversial theories will be discussed, and numbers and equations will hardly be introduced. If you are familiar with the topics mentioned above, you will be bored in this class and it probably isn't for you.

Open to students grades 7 through 8

Maximum Size: 0

Sat 4:05pm–4:55pm Sat 5:05pm–5:55pm Sat 1:05pm–1:55pm

M3728: Bayesian Inference

Casey McNamara

I have one bag containing 800 Skittles and 200 M&Ms, and another bag containing 800 M&Ms and 200 Skittles. I'm offering you your choice of bag, but you can only have one, and I might change my mind if you try to examine them too closely. Certainly you can't just look inside. Ridiculous. Unheard of.

You like Skittles, and hate M&Ms.

You pick a bag and start taking out pieces of candy from it (you put each piece back in the bag after noticing what kind of candy it is, because you like round numbers). In the first 5 pieces of candy you get, there are 4 Skittles and 1 M&M. Have you chosen the right bag?

How sure are you of that? (70%? 80%? 98.5%?)

Would you be more or less sure if you took out 4 more pieces of candy and got 2 of each type, for a total of 6 Skittles and 3 M&Ms?

With applications ranging across robotics, medical diagnosis, the theoretical basis of science, and intelligent choice of bags of candy, Bayes' Theorem is a very simple and very useful piece of math that tells you how to make the most of the information you have.

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm

W4401: Beat me at Kirby's Avalanche!

Cam Tenny

Ever heard of Kirby's Avalanche? No?

Kirby's Avalanche is a puyo-puyo game for the SNES, kind of like tetris. It's competitive and fun. Think it's not fun? Get your own class, then. Come play and try to beat me! Snacks provided; relax and play video games and chat for an hour. Only two players at a time, but the games are short. Pseudo-elimination/tournament-style. Winner gets a mystery prize of mystery value! (TBD) Who wouldn't be intrigued?

Participants should have finger dexterity, good sportsmanship, and an appreciation for things of the 20th century. Also, a good time.

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm

X4223: Behind the Scenes at a Wildlife Rehab Center

Alyssa Stockdale

How do you handle a full-grown red-tailed hawk or make a 20-lb snapping turtle purr? Discover the answers in this class that takes you through a typical day at a wildlife hospital. We'll talk about the people involved, medical facilities, and of course, animals!

Open to students grades 7 through 12

Maximum Size: None

Sat 7:05pm–7:55pm Sun 9:05am–9:55am Sat 1:05pm–1:55pm

H4061: Canada, and why you shouldn't live there

Joshua Alman, Niki Castle, Alan Huang, Damien Jiang, Jonathan Schneider, Wolfe Styke

Canada, eh?

Open to students grades 7 through 11

Maximum Size: 0

Sat 1:05pm–1:55pm

A4276: Chinese Calligraphy and Brush Painting

Tian Ong, Apiradee Sanglimsuwan

Ever wonder how those beautiful Chinese paintings were made? Want to learn how to transform Chinese characters into elegant scrolls of Chinese calligraphy?

If so, this is the class for you! Come join us in this fun introductory course to Chinese Calligraphy and Brush Painting.

Open to students grades 8 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm Sat 2:05pm–2:55pm

H4026: Chinese Internet Slang

Huilian Qiu

You don't need to know any Chinese. You can come to this class without knowing how to say "HELLO" in Chinese. I'll translate every slang into English and make sure you guys can understand what it means. Just come to learn something really fun and get to know about current China. I'll write down the Chinese but you can choose not to remember it if you don't want to.

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm Sun 12:05pm–12:55pm

X3909: Complex Organizations: What makes effective leadership?

Aliza Hanif

Want to learn what it takes to lead in your community? We will brainstorm the qualities that constitute a good leader and how to properly lead projects within your community. Finally, we will learn the fine art of golf so that you will be able to network like Bill Gates.

Open to students grades 11 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm

E4111: Composite Structures and Design

George Hansel

A brief introduction to various types of composite (think carbon fiber) structures, design, and fabrication, from a member of MIT's Solar Electric Vehicle Team.

We'll talk about how composites, from airplanes to cellos to skis, are built and when they fail - with demonstrations and tests to destruction.

Open to students grades 10 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm Sun 5:05pm–6:55pm

A3810: Crocheting is not for Grandma.

Lizi George

Come learn to a crochet flowers, stars, hearts and other cool stuff :D

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm

A3824: Culimprov: Cooking Without Recipes

Emily Hupf, Robert McQueen, Hiroyuki Yamada

Ever wonder how the Iron Chefs like Mario Batali devise such elegant "recipes" off the top of their heads? Or how some

chefs can just put together a complete dinner with a very limited number ingredients?

They all share a secret which all great chefs know: “don’t use a recipe!” Cooking is an Art, not a Science. It requires a great deal of creativity, not precise measurement. It also requires an in-depth knowledge of the basic building blocks of the culinary arts.

In this class, you will learn how to cook without a recipe by exercising your creative minds and learning about the foundations of cooking. By the end of the class, you will be able to put the two together and open a new door of culinary freedom.

Check this out: <http://mcqueen.mit.edu/splash>

Open to students grades 7 through 8

Maximum Size: 0

Sat 1:05pm–3:55pm

E3901: Electronics with Theory

Eric Van Albert

Learn electrical theory. Start out with Ohm’s law, but finish with enough knowledge to build a computer from scratch. This intense lecture covers analog circuitry in the first hour, and digital circuitry in the second hour. No matter how much you think you know about electronics, you will learn something new.

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm

H4157: Feminist Theory for Dudes (or Women!)

Colin McSwiggen

Feminist theory is a fascinating subject even if you’re a dude, and your life will be better if you learn about it. Unfortunately, a lot of guys never study it, either because they don’t feel comfortable in the spaces where feminism is taught, or because they think it has nothing to do with them. This course aims to fix both of those problems by teaching the basics of feminist thought in an explicitly male-friendly environment. Women are of course equally welcome. I’ll talk about:

- What feminism is, how it works, and why it matters.
- A survey of key ideas in gender theory over the years.
- The social construction of gender and how masculinity makes life suck for men.
- Race, class, and intersectionality issues.
- Whatever you want to know more about!

I’d especially encourage you to take this class if you don’t know much about feminism or are not totally comfortable with the idea. Be forewarned, however, that the class will not be an open debate (though questions are welcome), and trolling in particular will not be tolerated.

Open to students grades 9 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm

C4189: File systems for Linux

Mohan Chinnappan

Topics covered in the course:

1. Linux operating system fundamentals
2. File systems in general
3. Linux file systems
4. Ext2 file system
5. Ext3 file system
6. Ext4 file system
7. Status of Linux’s new file system: Btrfs
8. ZFS and the future of file systems

Open to students grades 8 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm Sat 1:05pm–2:55pm

S4303: From light to eyes to brain: How vision works, with optical illusions.

Abby Noyce

For most of us, sight is very very easy. We look at something, we know what color, shape, and size it is, and where it’s located in space. How does our brain extract all this information?

In this class, we’ll look at a number of cases where vision fails (also known as optical illusions). What do these illusions tell us about how vision is handled in the brain?

Open to students grades 7 through 8

Maximum Size: 0

Sat 1:05pm–2:55pm

C3991: Haskell, Hands-On

Thomas Murphy

Whether or not you’ve ever programmed before, if you want to learn Haskell, and you like to learn things by trying them, instead of hearing about them, come join us! We’ll play with as much code as we can in 50 minutes.

Haskell is an incredible, fast, elegant, full-featured language. It’s been used by academics for over 20 years, and has only recently started being used by major companies and “regular people.”

Haskell is a pure functional language. These languages make you think differently about almost every programming skill you have. People who’ve never programmed before might even have an easier time getting used to it.

For the challenges you face, pure functional languages reward you with clearer code, fewer bugs, and almost unbeatable performance (especially on modern, multicore computers).

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm Sat 5:05pm–5:55pm

M4114: How To Avoid Being Eaten By Bears... In Space!

Leon Zhou

In this class, you will learn how to avoid being eaten by bears in space. Also elsewhere.

Open to students grades 8 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm Sat 7:05pm–8:55pm

H4240: Incredible India

Pranava Boyidapu

A brief overview of the variety and diversity of Indian culture.

Open to students grades 7 through 8

Maximum Size: None

Sat 1:05pm–3:55pm Sun 1:05pm–3:55pm

X4050: Intermediate No-Limit Hold'em

Dennis Liu

Know the basics of how to play poker but want to improve?

A poker pro will explain the tools you'll need to take the next step. Probable topics include: the continuation bet and how to defend against it, semibluffs, and jam-or-fold situations.

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm Sat 3:05pm–4:55pm

H4201: Introduction to Bokononism

Ashley Villar

All the true things I am about to tell you are shameless lies. Bokononism is the invented religion of Kurt Vonnegut from his world famous novel *Cats Cradle*. Together we will explore the scattered psalms and writings from the Books of Bokonon.

Believe in vin-dit; find your karass; come listen to the foma!

Open to students grades 8 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm

H3951: Introduction to Game Theory

Zoe Thorkildsen

Come and meet Rose and Colin in a brief introduction to the field of game theory. You will learn how to read a payoff matrix for a non-zero sum game, how to find the Nash Equilibrium, and how game theory has been applied to real life. We will also simulate and discuss some of the more famous games: Prisoners Dilemma, Chicken, Battles of the Sexes, Stag Hunt, and more. If time permits, we will also discuss how game theory is used to model real life situations, and create our own models for a few recent international or domestic scenarios.

Open to students grades 7 through 10

Maximum Size: 0

Sat 1:05pm–1:55pm

S4251: Introduction to Quantum Mechanics

Gabriel Blanchet

Mike Gibson and Gabe Blanchet, both sophomores at MIT will take you on a whirlwind tour through the basics of quantum mechanics.

Open to students grades 7 through 12

Maximum Size: 0

Sun 6:05pm–6:55pm Sat 1:05pm–1:55pm Sun 9:05am–9:55am

E4097: Introduction to Synthetic Biology

Grant Robinson

Have you ever wondered if life really has meaning? Is there something missing from your world that you just can't put your finger on? Well, worry no more- synthetic biology is the answer to all your problems. In this two hour course, we will explain not only what synthetic biology is, but how you could one day use its principles to change the world (or at least make genetic circuits that do remarkable things).

Open to students grades 10 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm Sun 9:05am–10:55am

H3985: Is Free Trade Fair?

Kathleen Fitzpatrick

We frequently hear protesters at trade meetings complaining that free trade ships jobs overseas, forces children overseas to work as slaves, and makes the rich even richer. Are these criticisms accurate? I will discuss what free trade is, and discuss all of its important effects, both good and bad.

Open to students grades 10 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm Sun 12:05pm–12:55pm Sun 4:05pm–4:55pm

E4374: Lightning Crystals! Building Piezoelectric Sensors

Benjamin Sena

What are piezo electric transducers? Most simply they are parallel plate capacitors with dielectric, but they are made of awesome and can directly convert mechanical stresses to electrical signals, which means you can make great contact microphones for amplifying all sorts of things. Come see just how great they are!

Open to students grades 9 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm Sat 1:05pm–1:55pm

H4387: Lord of the Rings and Christianity

Kristin Kuhn

J.R.R. Tolkien was a devout Catholic, and his writings are thoroughly drenched in his Christian worldview.

Come explore with me how Tolkien's faith comes through in his writings, and learn a new way to look at this incredible fantasy trilogy!

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm

X4332: Magic: the Gathering

Eugenio Fortanelly

Ever wanted to learn to play Magic? Think you're hot stuff?

Come and enjoy the game that has been awesome since 1993!
Open to students grades 7 through 12
Maximum Size: 0
Sat 1:05pm–1:55pm Sun 1:05pm–1:55pm

H4261: Major Social Injustices Around Us and How to Make a Difference

Giana Castorani

Do you have a desire to change the world? Do you know how many terrible violations of basic human rights are going on in this world? What about in this country? This city? Learn about true stories of people like you in peril and how we can help them and make their lives a little brighter. We are all human, and when some of us are not treated as such, we must step in however we can.

Open to students grades 9 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm

C3876: Make Your Own Website! (Introduction to web design using HTML)

Abhishek Nagaraj

Have you always wanted your own webpage? Where you can put cool stuff about yourself? Where you can share pictures, paintings, stories? Then this is the place! We will make webpages with HTML and upload them so that the whole world can see them!

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–3:55pm Sat 7:05pm–9:55pm

A4136: Music Theory 2: Intervals, Triads, and Modes

Russell Cohen

Building on the material in Music Theory 1, Music Theory 2 covers: Modal Scales, Intervals, Triads, Inversions and basic Roman Numeral analysis. We will apply our knowledge and perform theoretical analysis of both classical and Pop Music.

Open to students grades 9 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm

H4406: Non-Linear Thinking in a Linear World

Josh Shaine

Does doing one thing at a time drive you batty? Do people frequently tell you to pay attention or to stay on topic? Do you think in pictures instead of words? Does the whole you have to do it in the right order concept bother you? Join us for an exploration of hows and whys of non-linear thinking. We'll talk about how to recognize and develop strengths, not just how to fit in.

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm Sat 1:05pm–2:55pm

S3950: Physics of Unicycling

Jonathan Abbott

Ever wondered how one balances on a unicycle? Learn the physics behind balance, turning, accelerating, and idling on a unicycle. All are welcome, regardless of previous unicycling and/or physics ability.

Open to students grades 7 through 8

Maximum Size: 0

Sat 1:05pm–1:55pm Sat 3:05pm–3:55pm

S3918: Sensation and Perception

Veronica Gross

Seeing (and hearing) is most definitely not believing. The human sensory apparatus does not exactly transfer the world around us into our brains and awareness. Instead, only a select portion of the environment is perceived, let alone processed.

This class will cover the basics of sensation and perception, including vision and attention, with an emphasis on neural and cognitive components.

Open to students grades 8 through 12

Maximum Size: 0

Sun 9:05am–10:55am Sat 1:05pm–2:55pm

H4125: Star Trek and the 1960s

Elizabeth Attaway

Remember that episode with the space hippies? Yes? How about the one where Kirk starts the Vietnam War on the planet Neural? I didn't think so. We'll talk about how Star Trek: The Original Series reflected issues of the 60s, and maybe even discuss the movies a little. Not to mention you'll get to hear William Shatner recite the Preamble to the Constitution (We.....the PEEEEOPLE!)

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm

X3945: Starting a New Business

Amy Estersohn

This class will encourage you to think about some ways to find ideas for new businesses and how to get that business started. You'll also have time to develop a business plan with your classmates and present it.

Business is one of the few fields that brings together artists, writers, dreamers, scientists, social butterflies, readers, and mathematicians, so please come, even if you don't think business sounds like it's for you!

Open to students grades 7 through 8

Maximum Size: 0

Sat 1:05pm–2:55pm

S4238: Sudden Ionospheric Disturbances!

Rishi Patel

Come and learn how to detect solar flares at home with a radio receiver.

This class will offer a brief overview of the theory of radio wave propagation in the ionosphere (an upper layer of our atmosphere). We'll then discuss how various cosmic distur-

bances (that is, sources of high energy radiation from space, like solar flares) affect this radio propagation.

The next half of the class will focus on how we can detect these disturbances (with a general emphasis on how radios work— we won't go into detailed circuit design)— We'll also discuss what you'll need to do if you want to build your own antenna and receiver system.

Open to students grades 9 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm Sat 7:05pm–8:55pm

E4129: The History of Space Flight

Samantha Marquart

From Sputnik to the Space Shuttle and everything in between.... what we did and when ...and why... and where we're going!

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm Sat 2:05pm–2:55pm

H4222: The Tortoise and Achilles

Farrah Yhee

If Achilles lets the Tortoise get a head start in a race, can Achilles pass the Tortoise? Can you prove it? Can you make me believe it?

That and other fun paradoxes.

Open to students grades 9 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm

A4069: Weaving Chainmail

Jesse Ashcraft-Johnson

Weave metal rings into awesome fabrics! Learn the basic weaves, the same ones used by the Roman Army. Make anything from delicate jewelry to armor that will stop a sword.

Open to students grades 7 through 12

Maximum Size: 0

Sat 1:05pm–2:55pm Sat 4:05pm–5:55pm Sun 4:05pm–5:55pm Sun 11:05am–12:55pm

H3908: What if economists ran the world?

Xuetao (David) Zhang

What if, instead of politicians, lawyers, and businessmen, we had economists ran the world? This topic is frequently discussed in among professional economists. I'll cover some of the perhaps surprising conclusions that most have made. On the liberal side, prostitution and marijuana would be legalized. On the conservative side, the minimum wage and anti-discrimination laws would be abolished.

Open to students grades 7 through 12

Maximum Size: 0

Sat 2:05pm–2:55pm Sat 3:05pm–3:55pm Sat 1:05pm–1:55pm

X4112: Yakuza: the Japanese mafia.

Shinya Watanabe

Number of mafia in Japan: 84,200.

Number of mafia in the U.S.: 21,000.

How can Japan have such a large organized crime syndicate? How are they influential to the society? What do the Japanese think about them?

What is Japanese mafia in the first place?

I'll answer your questions.

Open to students grades 9 through 12

Maximum Size: 0

Sat 1:05pm–1:55pm Sun 12:05pm–12:55pm

X3978: A Menagerie of Bridge Bidding Systems

Brian Hamrick, Sherry Wu

Many players of bridge know only a single way to bid: Standard American Yellow Card (SAYC). In fact, there are countless different systems each with different flavors. We'll talk about systems that are legal, systems that aren't, systems that are sometimes legal, and systems that are made to be legal but probably shouldn't be.

Open to students grades 7 through 12

Maximum Size: 0

Sat 2:05pm–2:55pm

M3735: A Quick and Dirty Introduction to Linear Algebra

Stephanie Ger, Benjamin Horowitz

Ever wonder why your Algebra II teacher taught you how to add, subtract and multiply those pesky little matrices? Matrices are just the first step into, what we consider, the most beautiful field of mathematics. From the basic properties of matrices are built up determinants, Kramer's rule, linear transformations, vector spaces, linear independence, eigenvalues and eigenvectors, and so much more.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm Sat 2:05pm–3:55pm

X4183: An Introduction to Lucid Dreaming

Seong-Ah Cho

Inception: It was pretty cool, right?

Well, even in our reality, you can, in fact, become the conscious architect of your dreams.

In this class, though we won't be able to go into the minds of *other* people, we'll take a look at the fascinating phenomenon of lucid dreaming and go over some of the important techniques you need to practice in order to learn to control your own subconscious. We'll also do a test run for one of these techniques right in class (so don't be scared by the class length—you'll be unconscious for a fair chunk of it).

Note: Taking this class will not automatically let you be-

gin having lucid dreams. It takes a good deal of disciplined practice to get to the point where your sleeping mind is like putty in your god-like dreaming hands; the purpose of this class is to introduce to you those techniques you need to practice, in addition to planting in your mind the seed of the idea that you want to be conscious when you dream.

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm Sun 9:05am–10:55am

A3914: Beginner Poi

Nathan Lachenmyer

Poi is a performance art where a ball on a string is swung around in circular patterns. It originated as a traditional Maori dance form, it is quickly expanded to be a popular performance art around the world. If you've always wanted to learn poi, or just want to come and see what it is, this is the class for you.

For people that have taken previous poi classes at Splash, please see Intermediate Poi.

Open to students grades 7 through 12

Maximum Size: 0

Sat 2:05pm–2:55pm Sat 3:05pm–3:55pm

E4063: Bridge Building

George BAILEY, Brian Carvalho, Michael Duplessis, Cameron French, Otitochi Mbagwu, Jorge Ornelas, Chang Guo Zhan

We will break into small groups, with an undergrad leading each group to build the strongest possible bridge (it'll be a competition to make things more fun!). We will use simple everyday materials to build bridges of certain prescribed dimensions. The one who holds the most weight, will win a prize!

Open to students grades 7 through 9

Maximum Size: 0

Sat 2:05pm–2:55pm

M4257: Calculus for Middle Schoolers

Reena Joubert

Nope, not kidding - this really is an introduction to calculus for students in the 7th and 8th grade who know basic algebra. And it will make sense, and it will be Awesome.

I'm not going to tell you here what calculus is or why you would want to learn it; if you sign up for the class, I'll assume you've heard of calculus (even if you don't know what it is) and have a motivation for learning it, beyond "this is the only math class that fits in my schedule."

IMPORTANT Warning / Reality Check: This is a three hour long class on a subject typically taught in 11th or 12th grade. This means, that although I'm serious when I say "yes, you can understand it!", it will of course be very challenging. Parents, while we discourage you from choosing any class on your student's behalf, it is an especially bad idea to choose this one.

Students - the prerequisites below are important! You DO NOT have to be a math genius, but do make sure you meet the prerequisites, and come prepared to think!

Open to students grades 7 through 8

Maximum Size: 0

Sat 2:05pm–4:55pm

S4085: Climate change

Andrea Dubin

Have you heard about global warming? Ever wonder what the climate has done in the past? Come learn about what our climate has done, and what we might expect it to do in the future.

Open to students grades 8 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm Sun 1:05pm–2:55pm

A3896: Covers: An Open Studio

Luke Joyner

Cover, remix, adaptation, interpretation, inspiration, allusion, precedent, copy, appropriation, theft... whatever you call it, a good cover takes an original work and twists it around till it's something else. A great cover manages to do all that, and makes the original seem even more interesting too.

This process is hardly limited to music. Artists take inspiration and pay homage to other artists, poets to other poets, architects to other architects, etc. And sometimes artists take from musicians, musicians from architects, architects from athletes, and so on. When does it work, and where does meaning come from along the way?

In this class, we'll think about "covering" in all sorts of ways. How do you take an idea from someone else and put it toward art that both honors its source and generates new meaning? Where is the line between homage and theft? Can meaning ever come out of nowhere? Can it ever not?

I'll give plenty of examples to get us going, but everyone in the class should be ready to bring ideas and examples to the table too.... this is a studio-type class, so bring work of your own to talk about if possible. (Poems, drawings, guitars, souffls, etc.... anything goes, but whatever you bring, be prepared to show or perform your work and get ideas from others.) If you're feeling ambitious, bring work that responds in some way to some other art out there, in your medium or another, that really moves you.

Open to students grades 10 through 12

Maximum Size: 0

Sat 2:05pm–5:55pm

S4014: Crash Course in Organic Chemistry

David Huang

Want to know how to make TNT? Want to know some of the worst and best smelling molecules in the world? Want to know how to make pharmaceutical drugs? Come and take Crash Course in Organic Chemistry.

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm

A3928: Data Visualization: Beauty in Numbers

Desiree Koh

Let's present some data! Learn how to create data visuals that are attractive and meaningful. We'll go through data design principles as well as examples of excellent data design. We'll also look into new methods for interactive data visualization.

Open to students grades 7 through 8

Maximum Size: 0

Sat 2:05pm–3:55pm Sat 4:05pm–5:55pm

S3826: Essentials of Dating (Part 2): How we know the Earth is around 4,567,000,000 years old

Aaron Scheinberg

Ever wonder how we know the age of very old things?

The age of the Earth, when life began, when the dinosaurs died out, when Hawaii was formed, when homo sapiens evolved - these are important dates that provide a framework for understanding our world and how we fit into it.

In part 1, you will learn the basics of radiometric dating, including the techniques, assumptions and verifications that go into the process and how it ties in with relative dating methods.

In part 2, we'll also take a look at the most common arguments used by young Earth creationists against radiometric dating techniques and geoscience in general.

Open to students grades 7 through 12

Maximum Size: 0

Sat 2:05pm–2:55pm

M4004: Graph Theory: Dots and Lines!

Zachary Haney

Are you one of those people who can't see the forest for the trees? Well! You will be able to with Graph Theory, an extraordinarily accessible advanced theory in math. The graphs here aren't those horrid $y = x^2$. They will be dots (vertices or nodes) and lines (edges) connecting those vertices.

This field, first used by Euler, has had some of the most successful applications in history. The applications range from pure mathematics and computer science to genetics and public transportation.

We will study these graphs and their properties, using applications as our motivation. This will mainly be examples of different uses and fun properties with graphs, while posing some questions. There will be some proofs, but this is not a proof-heavy approach.

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm

H4119: Happiness Within: A Brief Introduction to Jainism

Finale Doshi

Jainism is a Eastern religion that talks about finding peace with oneself and the world by realizing an inner happiness that is truly one's own. Although relatively little-known, it served as inspiration for the nonviolent nature of Gandhi's protests (which later inspired Martin Luther King); elements of its philosophy have particular relevance given that America has the highest GDP of any nation—but is 26th in happiness. What exactly does Jainism say, and what do you have say in response? After a brief introduction about its history and principles, we'll focus the discussion on the implications of its philosophy in our current society.

Open to students grades 7 through 12

Maximum Size: 0

Sat 2:05pm–2:55pm

H4403: History of Video Game Music

Rob Speer

Atari. Commodore 64. The NES. Sega Genesis. The demoscene. MIDI. SoundBlaster. Koji Kondo. Bobby Prince. Nobuo Uematsu. Yasunori Mitsuda. OverClocked ReMix.

Video game music has evolved over three decades from simple blips and bleeps into a genre of its own. This genre has been influenced by the technological limitations of its roots, and also by numerous crossovers from popular music, electronic music, film soundtracks, and anime. In this class, I'll give a tour of the history of video game music, and we'll take time to appreciate some of the most significant technological and artistic accomplishments along the way.

Open to students grades 8 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm Sat 2:05pm–3:55pm

H3829: Introduction to Chinese Writing

Stephen Hou

Chinese writing is unique among the world's major languages in that it uses thousands of characters as opposed to an alphabet with a few dozen letters. We will learn some basic characters, the organization and structure of characters, the distinction between traditional and simplified scripts, calligraphic styles and typographical fonts, how new characters are created and how Chinese characters are used in the modern Japanese and Korean languages. I will also discuss Chinese dialects and why the Chinese language did not (and will likely never) switch to an alphabetical writing system. Since the focus of this class is intended to introduce you to the concept of Chinese writing, we will not be learning Chinese conversational phrases or grammar. That's taught in another class =)

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–2:55pm Sat 5:05pm–5:55pm

C3975: Introduction to Computer Science and Pro-

gramming*Francis Plaza*

This class is designed to introduce the fundamentals of computer science to students with little or no programming experience. We will start talking about computational techniques to solve problems and understand the way computer scientists think. We will spend the rest of the class creating simple programs. This class will use Python programming language. More information about Python is available at <http://python.org>

*Open to students grades 7 through 12**Maximum Size: 0***Sat 2:05pm–4:55pm****M4153: Introduction to Integer Factorization***Bayley Wang*

Everyone knows how to factor numbers, right? Just divide by everything less than it! WRONG! Brute force is just too slow for large numbers. Fortunately, there are better approaches. This class discusses integer factorization, and covers the motivation for the methods and several fast algorithms, up to and including the quadratic sieve.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 2:05pm–5:55pm****X3858: Introduction to Trading***Theodore Hilk*

Ever wondered how finance and investing worked? Want to learn how to make money by trading stocks and other securities in the real world? Then this course is for you! Learn the basics of trading: where to trade, who trades, what bids and asks are, how to manage risk, and what skills are required for traders.

Finish off the course by participating in a live trading simulation on our state-of-the-art electronic trading software, and see whether you have what it takes to be a trader!

*Open to students grades 9 through 12**Maximum Size: 0***Sat 2:05pm–3:55pm****W4191: Kemps***James Yeung*

A ridiculously fun card game for four players. The rules are simple: get four cards of the same rank (number) in your hand. Work together with a partner to signal that you have four of a kind and have your partner call Kemps! But make sure the other team doesn't see your signal or they'll call Counter-Kemps on you. Confuse your opponents with elaborate signals and have a load of fun doing it.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 2:05pm–5:55pm Sun 9:05am–2:55pm****C4345: Math on the T***Jacob Hurwitz*

You probably walk by subway route maps every day without

even bothering to glance at them. Unbeknownst to you, maps like these form the basis for the rich mathematical field of graph theory. In this class, we will introduce graph theory and a few useful algorithms. It is recommended that you ride the T home from Splash - so, you know, you can do some "math on the T."

*Open to students grades 7 through 12**Maximum Size: 0***Sat 2:05pm–2:55pm****H4399: Metered Poetry: Impress your friends with potent speech***Stephanie Bachar*

You've probably learned about poems in school scanning verse after verse, until you start to drool. But if you take this class

I'll teach you some class

Unlike your school teacher I am no fool

*Open to students grades 7 through 9**Maximum Size: 0***Sat 2:05pm–2:55pm****A3869: Not Your Average Cootie-Catcher***Natalia Guerrero, Josh Hester, Thomas Hu*

Come practice the ancient Japanese art of awesome-gami on a whole new level you never knew existed. Modular origami, kusudama specifically, is an amazing, beautiful branch of this craft, folding many parts to put together into one giant ball of awesome. Come and make something totally ridiculous with us!

*Open to students grades 7 through 12**Maximum Size: 0***Sun 3:05pm–4:55pm Sat 2:05pm–3:55pm****W4361: Old Age vs. Cancer vs. Evolution***Evan Hefner*

As people age, their bodies deteriorate, leading to conditions such as heart failure and diabetes, and many people develop cancer.

Why do we not have stronger defenses against these problems? Why couldn't we evolve longer-lasting bodies?

Come learn why evolution has not made us better able to withstand old age, and how our natural defenses against old age make us susceptible to cancer, and how our natural defenses against cancer make us susceptible to old age.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 2:05pm–3:55pm****S4173: On Black Holes, Singularities, and the Event Horizon: A Journey into the Abyss***Michael Shaw*

Back by popular demand! Were going to dive right into the most massive objects in our universebillions of times the mass of the sun. (Note: we won't actually dive into a black holeit's hard to get out).

When small stars die, they peter out. When massive stars die,

they explode in supernovas, outshining an entire galaxy, and what's left is a black hole, a singularity of mass so dense that even light is trapped behind. We'll tour around a few black holes, study their effect on our daily lives, and of course, the seven ways a black hole can kill you. We'll venture into wormholes, white holes, and other exotics. We'll even bring in a sporting interest and talk about how Stephen Hawking once lost a bet on black holes, and how it was related to the ultimate demise and even death of these most mysterious of objects. (Food for thought: how does a black hole die, anyway?)

Be ready to open your minds, to be bent by the curvature of spacetime, and generally to lose yourself in the fun and beauty of the most amazing objects out there in the sky.

Open to students grades 7 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm

E3903: Principles of Surfboard Design

Sho Sato

Would you like to learn how to design your own surfboard? I'll describe the entire surfboard-making process, from shape design to material selection to manufacturing. I will bring in some of my own boards.

Open to students grades 10 through 12

Maximum Size: 0

Sun 4:05pm–4:55pm Sat 2:05pm–2:55pm

H4166: Social Innovation and Volunteerism - How to Make a Difference?

Michelle Ng

Social innovation and volunteerism is on the rise among young people. We all want to make a difference. The question is how? This course will begin with a 1-hour lecture on various topics related to social issues we face today (e.g., health care, poverty, hunger, education, environment). The lecture will be followed by a 1-hour interactive discussion to engage students on different ways to examine these issues and potential solutions. Plenty of young people want to make a difference to our world. The intent of the course is to broaden their horizon and encourage them to seek ways to make their impact.

Open to students grades 10 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm

H4230: Teacher! Teacher!

Shinya Watanabe, Race Wright

We all know that you know that you know what you know, but did you know that we don't know what you know that you know? Did you know that we want to know what you know?

This class is a hands-on class about teaching—if you've ever wondered what it takes to be a teacher, or what it really takes to teach something—this is the class for you.

We'll go through everything you need to teach a class: we'll discuss basic teaching techniques and theory (pedagogy), we'll brainstorm and plan a class—and then we'll teach!

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–5:55pm

A3733: Testing the Waters of Japanese Culture

Jennifer Yoo, Samantha Yoo

Part lecture, part demonstration, and part workshop, you will get a chance to learn about many aspects of traditional Japanese culture, including Japanese traditional attire, music, dance, and theater as well as cultural arts such as tea ceremony and ikebana (flower arrangement).

Participation in the workshop component is not required, you are more than welcome to just come to watch and learn. Please note also that supplies are limited, so depending on class size not every student may be able to participate in the workshop section.

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm

S4062: The Chemistry of Ice Cream

Natasha Naidoo

Learn how to create ice cream from scratch, and the chemistry behind this delicious dessert.

Open to students grades 7 through 8

Maximum Size: 0

Sat 4:05pm–4:55pm Sat 3:05pm–3:55pm Sat 2:05pm–2:55pm

S3913: The Science Behind XKCD

Ravi Charan, Anubhav Sinha, David Xiao

Has an XKCD comic ever confused you? In this class, we'll go over XKCD comics and discover the science behind!

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–2:55pm Sat 3:05pm–3:55pm

H3967: The Sonnet

Lance Ozier

The sonnet is one of the oldest and most durable forms of poetry. It's been used by great poets from Shakespeare to ee cummings. Because it has certain rules, it poses creative challenges for any poet, but as a result can yield poems that astonish and delight. Come see how poets have met the challenges and reaped the rewards over the past 400 years.

Open to students grades 8 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm

X4145: Tractor (Card Game)

Kyumin Lee, Tiffany Lin, Lindsey Shi

Learn to play the Chinese game called Tractor, also known as 80 points, Finding Friends, Up a Level, and the different

variations of the game.

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–4:55pm Sun 9:05am–11:55am

M4294: Transfinite Numbers - Comparing the Infinite

Jayson Lynch

What is the biggest number you can think of? What is twice infinity? How large is the set of natural numbers?

We will answer such questions with an introduction to Cantors work on transfinite numbers. We will discuss some basic Set Theory, how to can compare infinite sets, and some of the implications of different cardinalities of infinite sets.

Open to students grades 7 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm

X4047: Using Myers-Briggs Type Indicator for Better Relationships

Patricia Craig

This class will teach you the Myers-Briggs Type Indicator. This can be useful for understanding your own personality traits and those of others (friends, family, or others.).

We'll take the Myers-Briggs Type Indicator test in class and review the results.

Open to students grades 11 through 12

Maximum Size: 0

Sat 2:05pm–3:55pm

H4234: What is a “food desert”?

Amy Woodruff

Come and learn about one of the biggest reasons for the health problems in urban areas– food deserts. We'll talk about what these areas are, how they develop, the problems they cause, and what we can do to fix them.

Open to students grades 9 through 12

Maximum Size: 0

Sat 2:05pm–2:55pm Sat 4:05pm–4:55pm

W4229: Acting 101

Tiffany Tang

Curious about how it's like to stand in front of a stage? What are stage directions?

Stage Acting 101 is designed for beginners and will explore the many ways to interpret acting scripts, the style and mannerism of actors, the casting process, how to “sound real”, stage directions, and much more!

The class will also contain ice-breakers, impromptu scripting, improv acting games, and other acting exercises that will (hopefully) improve your acting skills!

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–5:55pm

H4376: Baller People in History

Paul Hlebowitsh

There was a homeless man who declared himself Emperor of America, an astronaut who parachuted to Earth from space, a scientist who created mile long lightning bolts, a swordsman who carved a sword out of a boat oar on the way to his most famous duel, an explorer who traveled across an unexplored mountain range to rescue his men who were stranded in the Arctic, among other totally amazing people. We're going to talk about some of them. Well, at least, the totally baller ones.

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–3:55pm

M4073: Bringing Down the House: The Mathematics of Gambling

James Putnam, James Weis

Learn probability, win prizes!!!

In this course, we will discuss and maybe even prove the mathematical principles behind gambling strategies.

Learn how to play with the odds and put your new skills to test in an in-class gambling competition.

Open to students grades 10 through 12

Maximum Size: 0

Sun 1:05pm–3:55pm Sat 3:05pm–5:55pm

S4120: Capacitors and Capacitance

Benjamin Sena

Capacitors store energy in an electric field when a voltage is supplied across them (such as by a battery). This can be a good way to build up electrical charge and release it quickly. Come find out more about how they work, learn even more about them, and see what a 3000 Farad capacitor looks like.

Open to students grades 8 through 10

Maximum Size: 0

Sat 3:05pm–3:55pm

S4019: Carbon Chauvinism

Will Doenlen

We, as carbon-based lifeforms, have the terrible tendency towards carbon chauvinism, the assumption that all lifeforms in the universe would also be carbon-based and resemble earth lifeforms. This is not only impolite, it's politically incorrect! This class will ask you reconsider your inherently bigoted carbonocentric bias as we explore new heteroelemental paradigms in the form of alternative biochemistries. We will discuss alternative biochemistries in known organisms (e.g., extremophiles) and in theoretical organisms (e.g., the possibility of silicon-based life).

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–3:55pm

S4391: Cell Therapy: Science, not fiction*Stephanie Bachar*

Due to some unfortunate accident, you have a large, third degree burn on your body. It's large enough that the wound won't grow back on its own. How do you make the wound heal?

Cell therapy is a brand new and growing field that answers that question as follows:

Step 1: Extract a sample of your own, unburned (healthy) skin cells.

Step 2: Grow a sheet of skin in a lab

Step 3: Implant your own cells back into your body to cure your own injury.

A number of companies are commercializing products that do just that. But it gets even cooler. Scientists are working on ways to use bone marrow cells to cure stroke paralysis, dissolving scaffolds to grow bone and much, more.

So, how does cell therapy work? What can we use it for? What are some of its limitations? And what does the future of cell therapy look like? We'll discuss answers to all of these questions in this class.

Open to students grades 7 through 9

Maximum Size: 0

Sat 3:05pm–4:55pm

S4159: Chemistry of Stink*Andrew Thompson*

We have been so obsessed with ridding the world of odor that the art of using your nose to investigate science is being lost. By examining the chemistry of some common odorous odors and the chemicals used to eradicate them, I hope to give students a more sophisticated understanding of what's in your household cabinets and the esoteric experience of judging a chemical's composition by smell alone.

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm Sun 10:05am–11:55am

W4105: Chocolatology*Amber Bennoui, Julian Halbertsma-Black*

While the goal of the class is to gorge ourselves on chocolate, we're also going to teach you the fine art behind making it to justify all the materials we'll be purchasing.

You'll leave with a newly acquired tolerance to curiously flavored dark chocolate and knowing way too much about ganache.

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–3:55pm

W3871: Duct Tape Crafts*Ruthie Byers, Liz Simon*

Learn how to make anything out of duct tape!

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm Sun 5:05pm–6:55pm

A4140: Ear Training 1: Intervals and Rhythms*Russell Cohen*

The sister class to Music Theory 1 – Ear Training 1 will get you on track to the lofty goal of being able to transcribe the music you hear by starting with the basics – intervals, triads and rhythms.

Open to students grades 9 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm

M3817: Euler's Formula*Samuel Bader, Alex Cole, Stephen Face*

Ever wondered why $e^{i\pi} = -1$?

Do you want to know why trig functions and exponentials are the same thing?

Interested in learning fast ways to prove trig identities so you don't have to memorize them?

Come to this class and learn all of these things and more!

Also grab a look at the wikipedia article for more info.

Open to students grades 9 through 12

Maximum Size: 0

Sat 3:05pm–3:55pm Sun 6:05pm–6:55pm

H4023: Free-Form Philosophy*Jason Gross, Allison Schneider*

This isn't a class, really. In the tradition of philosophers since Socrates, we don't know anything: so we're not going to try to teach you anything. We will discuss questions, however. We'll talk about some classic philosophical dilemmas, but feel free to ask about your own ideas! No previous philosophy experience is required, but willingness to participate is a must.

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm

M4346: Guess the Last Ball*Jacob Hurwitz*

We'll play a simple game, and all you have to do is guess the last ball! The catch is, you won't be told the answer. You'll have to work with your peers to collectively figure out what the last ball is going to be.

Open to students grades 7 through 9

Maximum Size: 0

Sat 3:05pm–3:55pm

X3861: How to Run a Splash*Chris Kennedy, Paul Kominers, Daniel Zaharopol*

Ever wondered what goes on behind the scenes to make a Splash happen?

Come see a completely accurate portrayal of exactly what we do to make Splash happen every year, presented by the

directors of Splash 2009.

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–2:55pm Sat 3:05pm–3:55pm

X3823: Introduction to Interstellar Empires

Daniel Kane, Bram Sterling

We discuss models for exploitation of extrasolar resources, with consideration for the difficulties of interstellar communication and travel under real physics.

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–3:55pm

S3850: Introduction to Quantum MechAwesome

Mahmud Chowdhury, Dylan Yott

Have you heard about quantum mechanics, but never really knew that much about it? If so, then this class definitely for you! In this class, we will discuss the counterintuitive nature of quantum mechanics and what makes it so awesome!

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–3:55pm Sat 4:05pm–4:55pm

H3942: Introduction to Thai 1

Abhabongse Janthong, Sasilada Sirirungruang, Phumpong Watanaprakornkul, Tana Wattanawaroon

There are more Asian languages that involve exotic characters and outlandish tones than Chinese, Japanese and Korean! Learn about this awesome language where tone markers don't describe the same tone on different characters. We will focus on the Thai alphabet, word formation and tone recognition. You will write your own name in Thai trying to put characters together yourself.

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–5:55pm

X4064: Introduction to the Pokemon Metagame

Vlad Firoiu, Rui Hu

Did you know that your entire team of legendaries has the potential to be swept by a single Magikarp? Have you always wanted to use really cute Pokemon like Jumpluff or Politoed against your friends in battle, but never did because you are afraid that they are too weak or too useless? In this class, you will learn the fundamentals of battle mechanics in the 4th Generation Pokemon games. Topics covered will include EV/IV selection, moveset/item selection, basic team building techniques, common battle tactics (setups, switch-ins), predictions and the metagame. At the end of the class, we will give you a list of resources that you may use to further advance your Pokemon mastery.

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm

X4392: Learn Beatboxing!

Wei-Yang Sun

You may have seen it on TV, on YouTube, or perhaps even some of your cooler friends can do it, but you probably decided that beatboxing, while awesome, is something you will never learn to do. Well, after this class, you will be popping beats like a pro! This class is a jam-packed start to the world to beatboxing: basic sounds and techniques, rhythms, future resources, and insight into beatbox culture will all be explored. The class, however, is designed to be super-accessible to people of all levels (read: those of you with absolutely NO experience with anything musical, let alone vocal percussion, have nothing to worry about!). Hope to see you there!!

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm

X4110: Learn to play Go

Brian Lee

Go, also known as Weiqi in Chinese and Baduk in Korean, is a game that originated in China about five thousand years ago. Two players, black and white, take turns placing a stone on a 19 by 19 board. The objective is to control a larger territory than the opponent. The rules are so simple; yet from simplicity comes endless complexity and strategic depth. Whereas the strongest chess programs can routinely defeat grandmasters, the strongest Go program can be defeated by a strong club player.

Open to students grades 7 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm

X3833: Magic the Gathering Drafting

Graham Rogers, Arielle Rosenthal, Ben Yee

MtG Limited is one of the most challenging formats. In this class, students will learn how to draft more effectively.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–11:55am Sat 3:05pm–5:55pm

A4236: Modern Architecture

Joanna Zhang

Ogle over contemporary architecture and learn about major movements and architects that that defined the past century. Perhaps their beauty will bring you to tears.

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–1:55pm Sat 3:05pm–3:55pm

S4170: Optics

Amy Fritz

What is light? Is it a particle? A wave? This class unravels the properties of light and how it interacts with the world. We will discuss reflection and diffraction and real world application of this phenomenon.

Open to students grades 9 through 12

Maximum Size: 0

Sat 3:05pm–3:55pm

S3834: Predator Prey Game*Michelle Bentivegna, Abby Noyce, Abby Noyce*

In this class, we will play a giant game of tag called “Predator - Prey.” Some students will be predators like eagles, some will be prey, like rabbits. All students will try to find enough food and water, avoid disease and pollution, find a mate. Some students will hunt. Others will be hunted.

This game will help you learn about food webs, and give you a chance to run around during Splash!

We will play outside, so make sure you wear warm clothes!

*Open to students grades 7 through 7**Maximum Size: 0***Sat 3:05pm–4:55pm****S4053: Proteins!***Melissa Ko*

Proteins are awesome, REALLY awesome! Learn about what proteins are, what they are made of, how they are made, and what they can do!

*Open to students grades 7 through 9**Maximum Size: 0***Sat 3:05pm–4:55pm****A3866: Psychedelic Knitting***Katherine Rudolph*

Learn to knit... in bright, ever-changing colors! Start from the basics of casting on, knitting, garter stitch, and binding off. Take your needles and leftover yarn with you to get started on your own projects!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 3:05pm–3:55pm Sat 4:05pm–4:55pm****M4118: Samples from an Infinite Buffet: An Introduction to Nonparametric Statistics***Finale Doshi*

What does a Chinese restaurant have to do with models of gene classification? An Indian buffet with models of what movies people will enjoy? Welcome to the quirky, exciting, and ultimately useful world of Bayesian nonparametric statistics, an area of mathematical modeling that says: “If designing big models is hard, maybe making them infinite will make things easier!” In this class you’ll be introduced to two classic nonparametric models: the Chinese Restaurant Process and the Indian Buffet Process. We’ll talk about what they are, how they’re useful, and how to “solve” them using inference.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 3:05pm–4:55pm****S3932: Slime!***Catherine Braine, Alexa Kottmeyer*

Tidbits on polymer chemistry and preparation of PVA slime.

All in good fun.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 3:05pm–3:55pm Sat 4:05pm–4:55pm****X3904: The “Grass-Eating” Phenomenon in Japan***Sho Sato*

In recent years, a trend has hit Japanese society where growing numbers of young men consider themselves to be “oushoku danshi” literally translated, “grass-eating boys”, meaning, unlike their fathers and grandfathers, they have no interest in dating, marriage, careers, money, or other conventional signs of success in life. Why is this happening? And what effect will this trend have on Japanese society?

Read this Slate article for more details.

<http://www.slate.com/id/2220535/>

*Open to students grades 9 through 12**Maximum Size: 0***Sat 3:05pm–3:55pm Sat 5:05pm–5:55pm Sun 11:05am–11:55am****X4228: The Developing World Through Maps***Yalu Wu*

Join this class to learn more about the rest of the world! We will cover issues affecting the developing world such as GDP, gender equality, literacy, and sustainability through the examination of world maps and discussion (no world politics discussions). This class will also discuss indices such as the Human Development index and the Millennium Development Goals. No prior knowledge on the topics is assumed. An eagerness to learn and participate in discussion is desirable.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 7:05pm–8:55pm Sat 3:05pm–4:55pm****E4216: Toilets!***Reuben Aronson, Amanda Turk*

Toilets are one of the best examples of purely mechanical systems that are everywhere and easy to open up and figure out. In this class, we’ll do just that: open up a toilet and try to figure out how it works. Not only will you get the experience of figuring something out, but you can take home your new knowledge and fix your own plumbing!

*Open to students grades 7 through 10**Maximum Size: 0***Sat 3:05pm–3:55pm****M3827: Wanna Bet? Interesting Puzzles from Betting and Probability***Stephen Hou*

Are you the type who calculates the odds of getting a particular hand when you play poker? Do you enjoy explaining the Monty Hall problem to your parents and friends? If so, this class is for you! We will examine some classic puzzles that involve betting or probability. If time permits, I’ll discuss the mathematical, economic, and psychological reasons why people buy insurance policies and lottery tickets, even though they know that, on average, they will lose money in the long

run (and the insurance companies and lottery commissions will earn a profit). Note: This class is intended to teach mathematics and to have fun solving challenging puzzles. This is NOT to promote or endorse gambling.

Open to students grades 10 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm Sun 10:05am–11:55am

H4160: What in the world are we supposed to do with Art?: Intro to Philosophical Aesthetics

Colin McSwiggen

What is art, how do we know which art is good, and why do we like it so much? What exactly do we mean when we talk about “beauty,” “good taste,” or “creativity”? No one really knows any of the answers, but this course will help you to think about the questions. I’ll give a brief coverage of theories of art in classical, modern, and postmodern philosophy; I’ll introduce concepts for analyzing the complex relationships between artists, their audiences, and the works of art that they produce; and finally I’ll open the floor for discussion.

I’ll try to bring some kind of pretentious cheese for us to nibble while we talk.

Open to students grades 9 through 12

Maximum Size: 0

Sat 3:05pm–4:55pm

C4443: Become an Animator! Because life is no fun when you’re 2D AND stuck in the same position.

Ramya Swamy

Ever wondered how cartoons are made? Ever wanted to learn how to ANIMATE things? Breathe some life into your drawings! Learn how to use the same software professionals use (Adobe Flash) to create a small animation of your own. We’ll discuss animation techniques (both 2D AND 3D) and look at some examples of the unlimited diversity of things you can make using this new skill. This course will go pretty rapidly (but don’t let that deter you) so come with a crazy awesome DESIRE TO LEARN :D

Open to students grades 7 through 8

Maximum Size: 0

Sat 4:05pm–5:55pm

A3960: Bhangra! Bhangra! Bhangra! (Indian Dance)

Anshul Bhagi, Vibin Kundukulam

If you’re looking to learn a new style of dance or if you want a full-body workout while having lots of fun, this is the class for you. Bhangra is an energetic folk dance from the north Indian state of Punjab, and in this class we’ll be showing you how it’s done. We’ll start from the basics and then teach you a full Bhangra dance that you can take back with you, show off to your friends, and perform in your school’s talent shows.

Check out Bhangra videos from last year’s class at the following url: <http://web.mit.edu/abhagi/www/Splash/>

Open to students grades 9 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm Sun 11:05am–12:55pm Sun 2:05pm–3:55pm

H4054: Conquering the Berkshires: America’s First Push Westward

Ian Martin

From the early years of the American Colonies to the mid-19th century, the Berkshire Mountains of Western Massachusetts formed a serious obstacle to transportation between Boston and Albany. We’ll talk about how three major rail links helped resolve this problem and prevent Boston from losing its position as a port city. Anyone who like trains or early American history will enjoy this class, along with anyone who has wondered about the history of the MBTA’s Commuter Rail Lines.

Open to students grades 9 through 12

Maximum Size: 0

Sat 4:05pm–4:55pm

M3974: Counter-Intuitive Probability and Random Math

Letitia Li

Learn of interesting math problems like Proof by Induction, how to solve the Monty-Hall problem, Matching algorithm, and others.

Open to students grades 9 through 12

Maximum Size: 0

Sun 3:05pm–3:55pm Sat 4:05pm–4:55pm

M4057: Doing Math with Physics

Jonathan Schneider

People usually use math to do physics. They’re silly. Come learn how to prove various mathematical theorems with clever physical arguments. Topics include proving the Pythagorean theorem via exploding aquariums, the AM-HM inequality through resistor networks, and how to solve almost any high-school calculus question with physical arguments.

Open to students grades 8 through 12

Maximum Size: 0

Sat 4:05pm–4:55pm

H4380: History of the Star Wars Galaxy (Part 1)

Evan Ehrenberg

Overview of the history of the Star Wars Galaxy covering material from 30,000 BBY to 25 ABY. This is a four-part course focusing on character profiles, important events (including the Great Hyperspace War, the Sith War, the Mandelorean War, the Second Sith War, the Battle of Ruusan, the Clone Wars, the Galactic Civil War, the Birth of the New Republic, and the Yuuzhan Vong Invasion), weapons and technology (everything from blasters and lightsabers to energy shields and cloaking devices), and vehicles and vessels with a focus on the use and development of the force by the Jedi Order, the Sith, and other lesser known factions throughout. Class will consist mostly of lecture with short breaks for discussion of the material.

Part one of this course will cover history from 30,000 BBY

to 1,000 BBY. This will cover events from the creation of the Star Forge to the Battle of Ruusan.

Part 2 of this course will cover material from the Clone Wars to the Galactic Civil War (22 BBY to 5 ABY).

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

H3857: How Law Works

Chris Peterson

An introduction to mainstream theories of legal consciousness, historical and present.

We'll broadly review how formal legal actors have conceived of the roles (order? dispute resolution? tradition?) and origins (nature? god? man?) of law throughout history, and how these different views of law have helped shape society.

We'll then do a deep dive into the issue of precedent and how it works, with a special focus on the critique of "activist judges" and whether or not it is conceptually coherent.

Open to students grades 10 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

X3888: How To Be a Secret Agent

Amber Bennoui, Myriam Taibi

Government run organizations are always looking for new talent but few have what it takes to join their ranks. While this class does not guarantee a position in a government run organization, it will certainly help you stand out to recruiters. Here, you'll learn how one agent used Lady Gaga's music to facilitate the leak of countless classified documents. We'll even look at techniques used by spies employed during the Cold War and beyond.

You'll walk away knowing how to:

- Speak like an agent
- Defend yourself using improvised weapons
- Lie AND get away with it
- Blend into foreign countries
- Pack a spy toolkit
- Debug a room in under 90 seconds

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

W4215: How To Write 50,000 Words In A Month And Survive

Sahar Hakim

Want to take that big step and write a novel? Ever think of doing the whole thing in just thirty days? Well, not to worry! This seminar will focus on National Novel Writing Month (NaNoWriMo), an annual challenge in November in which people must write a novel of at least 50,000 words. We'll focus on writing tips such as how to form a plot, how to create characters and the world about which you are writing, and, above all, how to stay on track without falling too behind.

We'll do writing prompts and exercises revolving around these tips, and they should help you get a feel for what you've been writing this year or for what you may want to write next year. And of course, November's not the ONLY month you can do this. Find out about other writing challenges, too!

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm Sat 7:05pm–8:55pm

M3859: How to Become a Mathemagician: Mental Calculations and Math Magic

Adam Gleitman

How do you multiply two numbers in your head? How do you add a sequence of numbers faster than someone can punch them into a calculator? How can you use minimal information to identify a special number?

In this course, entertainment meets education as I show you some incredible mathematical tricks, how to do them, and why they work! Amaze your friends, speed up your calculations, and get the phone number of that cute boy/girl who sits in front of you in class! (Seriously, I'm not kidding.)

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm Sun 1:05pm–2:55pm

X3816: How to Skunk your Grampa at Cribbage

Josh Hester, Kate Turner

Learn to play cribbage, a classic card game that involves recognizing patterns in your hand to score points and advance your pegs around the scoreboard. Cribbage is not just for old men, and you'll soon be beating them all with your pegging powers!

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

A4212: How to make plush sushi

Katherine Fang, DD Liu

Nothing edible, just the kind of sushi you normally sleep on.

Open to students grades 9 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm Sat 7:05pm–8:55pm

X4354: How to solve a Rubik's Cube

Eugenio Fortanelly

Have you ever stared at a Rubik's Cube? Thought that solving it was impossible. It's not! I'll show you how.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm Sat 4:05pm–4:55pm

S4165: Information Security - What's the Big Deal?

Michelle Ng

Internet usage is essential to education, entertainment and many aspects of our daily life for all ages. This is a course intended for students who would like to learn more about the

various ways information is shared / used in popular Internet applications including but not limited to Facebook, MySpace, iTunes, Twitter, IM, Google Chat, Wikipedia.

The course is designed to increase awareness of best practices and precautions in using the Internet at a time where social networking and media play an important role for virtually everyone. Users of all experience levels and opinions are welcome for a respectful and lively discussion.

Open to students grades 7 through 9

Maximum Size: 0

Sat 4:05pm–4:55pm

X4188: Introduction to Dungeons & Dragons

Edward Tremel

You may have heard of it as “that nerdy game all the nerds play.” Or you may have played other fantasy games like World of Warcraft and heard them compared to D&D. Or you may have no idea what Dungeons & Dragons even is. Regardless, if you’ve never played Dungeons and Dragons, come to this class to learn to play one of the great classics of tabletop roleplaying games. We’ll learn game mechanics, create some characters, and then play through a quick adventure.

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm Sat 4:05pm–4:55pm Sat 5:05pm–5:55pm

M4046: Introduction to Elliptic Curves

Ethan Cecchetti, John Hawley

The study of elliptic curves stems from the more general study of Diophantine equations. Elliptic curves have many interesting properties that make them useful in several areas including factoring large numbers and public key cryptography.

This course will introduce students to the most basic ideas of elliptic curves. We will define the group of rational points on an elliptic curve and explain several important properties of that group. We will also discuss several special points on elliptic curves and their properties. Finally, we will introduce a way of measuring the complexity of a rational number and explain how that relates to the group of rational points. If time permits, we may discuss some applications.

Open to students grades 9 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

H3872: Introduction to Socionics

Roan LaPlante

Socionics is a field of nonscientific (some argue protoscientific) analytical psychology developed by Austra Augustinaviciute who was working with ideas of Jungian psychology, which is well popularized in Eastern Europe and almost unheard of in Western Europe or America.

Socionics is best described as a language for understand-

ing and interpreting processes of personality. It is by far most often used as a typology, assigning personality types to individuals and using these types to systematically predict relational compatibility. However, some would argue that it is more a philosophical language for modeling people, social interaction, and different cultures than strictly a model of personality. Perhaps most importantly, thinking about socionics provides a substantial conceptual framework for thinking about questions of personality, social behavior, cognition, and philosophy.

Open to students grades 9 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm Sun 4:05pm–5:55pm

H4000: Languages: Histories and Inflections

Zachary Haney

This class will consist of two parts:

- 1) a historical view of languages including language families and how we talk about the development of language. (This branch of linguistics is called Historical Linguistics or Philology). We will focus in on the Romance Languages and English.
- 2) A discussion of what is inflection. A majority of the world’s languages are so-called inflected languages. In this class, we will explore what this means and how learning the basic concept of inflection will have you on your way to learning ridiculously inflected languages such as Finnish and Latin to the standards of French and Spanish. Here I hope to bring in examples from as many different languages as possible.

I will also try to incorporate a few examples of the International Phonetic Alphabet and how it can be used to read a language that you do not know.

Certainly come to this if you are a bilingual or multilingual person. There will be lots of non-English examples, and any outside experience will be very welcome.

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

C3720: Modern Cryptography

Sweet Tea Dorminy

Ever wanted to know how banks, the government, etc. can keep a drives contents from being read, even if someone steals the hard drive? Or how to generate numbers that appear random without actually creating random numbers? Enter cryptography, the study of keeping secrets.

Well be running over basic principles of modern (symmetric) cryptography, discussing:

What does it mean for an encryption algorithm to be secure? (common attack methods, random output)

What do we do with an encryption algorithm? (hash functions, pseudo-random number generators, block cipher modes)

What do modern symmetric encryption algorithms look like? (DES, AES)

Note that this course specifically does not cover RSA or any other asymmetric cryptography.

Open to students grades 8 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm Sun 2:05pm–3:55pm

M4285: More Space than Space Has Space For

Chris Kennedy

What would life be like if you lived on a torus? What about a projective plane? How about a hyperbolic plane? It turns out that some things we take for granted, like area, volume, and whether or not you can go back in time, get warped in different geometries (ha, ha). In this class, we'll explore all the myriad ways you can fold, twist, and glue together space to get mind-bending results.

Open to students grades 9 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

X3831: New York highways

David Lawrence

We'll discuss some roadways of the greater New York City area. I'll talk a bit about the history of the highways and then move on to some tricks – avoiding the biggest bottlenecks and so forth. Bring laptops or paper maps if you have them (not required).

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–4:55pm

A4012: Poetry Workshop

Will Doenlen

Read and talk about poetry YOU'VE written! In this class, each student will bring one poem which everyone will read and discuss. The aim of the class is to give new ideas and critical feedback about the students' poetry. We will also talk about some of the nuts and bolts of poetry: forms, literary terms, techniques, etc.

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

W4168: Puzzle Solving

Robert Habib

Four people are on the end of a bridge and they all walk at different rates. One takes 1 minute to cross, one take 2 minutes, one takes 5 minutes, and the last takes 10. It is super dark out and there is only 1 flashlight. The flashlight is bright enough that 2 people can cross at once with it. The flashlight battery will die in 17 minutes. No one can go anywhere without a flashlight. How can they all get across before the flashlight dies?

Can you solve it? Come to this seminar and have your mind blown by this puzzle and other ones.

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

X4035: Strategy and The Art of War

Aaron Segal

Why do Wall Street traders, high-powered executives, and army generals swear by this 2,500 year old book? Learn the ancient Chinese secrets to military leadership and cunning, and then try your hand as a general in an interactive war game.

Open to students grades 9 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm Sun 11:05am–12:55pm

E4218: Take stuff apart!

Reuben Aronson, Amanda Turk

Ever wonder what the inside of a computer looks like? What about a blender? We'll bring in a bunch of random devices people use and a bunch of screwdrivers – you get to take them apart!

Open to students grades 7 through 10

Maximum Size: 0

Sat 4:05pm–5:55pm

X4049: Techniques to Help You Build Your Inner Strength

Patricia Craig

The full course title is, "The Adversity Quotient: Techniques to Help You Build Your Inner Strength so You can Get What You Want in Life."

This class will give you "The Cliff Notes" version of the book, "The Adversity Quotient." We'll discuss how to get through the hard times in an easier way. Knowing the techniques that great athletes, great statesmen, and great businesspeople have used to triumph over some very difficult circumstances

Open to students grades 7 through 8

Maximum Size: 0

Sat 4:05pm–4:55pm

X4067: The Art of Making Things Palatable

Jenny Hu, Patrick Hulin

Ever wondered what would happen if you dumped a whole bunch of chocolate into your favorite cake recipe? What if you tried to combine chocolate chip cookies and chocolate cake? Would apple-chocolate cake make any sense? Find out! We give you the ingredients and some (very basic) recipes, and you can take it from there.

We'll bake your recipe and give it back to you at the end of the day.

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

S3902: The Origin of Blond Hair and Blue Eyes

Sho Sato

Did you notice that European descendants are the only people with a variety of hair and eye colors? How did this happen?

Recent studies have shown that blond hair and blue eyes arose from genetic mutations in two individuals about 10,000 years ago. Before then, all humans had dark hair and eyes. How did the traits spread so quickly? What evolutionary pressures favored blond hair and blue eyes?

Open to students grades 7 through 12

Maximum Size: 0

Sat 4:05pm–4:55pm Sun 10:05am–10:55am Sun 12:05pm–12:55pm

C4372: Using the command line to program awesome!

Jordan Moldow

```
printf("Ever wanted to learn how to program?");
if (your_answer == "yes")
printf("Awesome! Take my class, and learn how to program
in C");
```

```
if(your_answer == "no")
printf("What?! Why not?!?!?!");
/*
```

This is a class for students with none or little programming experience, or who know other programming languages but want to learn the C language. We'll have lots of fun writing and running cool programs in the command line (a text-only interface to interact directly with your operating system), and you'll learn a lifelong skill in the process.

```
*/
```

Open to students grades 8 through 12

Maximum Size: 0

Sat 4:05pm–5:55pm

S4343: Applied Cryomania

Enrique Cintron

Liquid nitrogen is cold. Really, really cold. Colder than the heart of a freshman physics teacher. And it is concentrated, pourable awesome. In this class our dedicated team of cryomaniacs will take you through 77 Kelvins worth of the science and practice of playing with some very, very cold things. Remember kids, when the ice cream stops steaming, its warm enough to eat.

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–1:55pm Sat 5:05pm–5:55pm

X3814: Beginning Orchid Care

Jennifer Melot

Think orchids are beautiful but difficult to grow? Come to this class to learn how to grow them!

Open to students grades 7 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm

H4028: Chinese Dialects

Huilian Qiu

This course will teach some interesting words in Chinese dialects and how a sentence or a word is said in different Chinese dialects.

Open to students grades 7 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm

H4086: College Essay Funtime

Paul Hemberger, Ho Chit Siu

Is your Common App too common? Is your personal essay too essay and not enough person? Do you want your essay to be as awesome as you are?!

Bring your essay(s) and come workshop with us! We'll work together to make sure your writing is so awesome that admissions officers around the world will go blind from overexposure to pure awesomeness!

Open to students grades 11 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm Sun 2:05pm–2:55pm

S4305: Energy sources of the future - Flowing through the cracks

Peter Kang, Ben Scandella

Society cant run without energy, but demand is quickly outstripping the supply. We'll explore two emerging energy sources shale gas and methane hydrates which are extracted by flow through cracks in rocks. Learn about fluid flow through fractures by injecting air and Kool Aid into JELLO! In the real world, fractures exist miles underground. How can we predict flow gas flow through fractures without knowing where they are? Particle tracking simulations can do exactly this! You will see such a simulation and have a chance to run it.

Open to students grades 7 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm Sun 12:05pm–12:55pm

E4040: Engineering Improv

Derreck Barber, Julia Boortz

Like building things? Like Improv? During this hour you will work with your team to try to build the best solution to a problem that you will be given at the beginning of class.

Open to students grades 7 through 8

Maximum Size: 0

Sat 5:05pm–5:55pm

X3990: First Contact: The Art of Meeting New People

Marin Kress, Ben Lapointe

We will cover themes, skills, and tips pertaining to a variety of potentially challenging social interactions. These can include the art of asking out a romantic interest, behavior on a first date, formal business meetings issues, and other common social situations. The course will start as a lecture and then break into activities to teach themes. You will have to talk to strangers!

Open to students grades 10 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm Sat 5:05pm–5:55pm

A3867: Gnittink*Katherine Rudolph*

Psychedelic Knitting isn't enough for you? Try Knitting Backwards: Gnittink, or more commonly, Purling! Use your basic knitting skills and bring your needles back to learn Stockinette stitch and make nice, smooth patterns. And you're using the same yarn so it's still psychedelic!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 5:05pm–5:55pm****C4277: Graph Algorithms***Shaunak Kishore, Jacob Steinhardt*

Have you ever wondered how Google maps works? In this class we will go over the theory behind it, developing a fast way of finding the shortest path from A to B.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 5:05pm–5:55pm****S4349: Hitchhiker's Guide to the Universe***Laura McKnight*

Welcome to the universe! Meet exploding stars, black holes, planets around stars other than our own, stars around our own, and get acquainted to your universe. Just remember, Don't Panic

*Open to students grades 7 through 8**Maximum Size: 0***Sat 5:05pm–5:55pm****A3891: How to not Fail at Cosplay***Letitia Li*

Cosplay means dressing up as anime or video game characters, for an anime convention or maybe just Halloween. Learn what makes your character recognizable, and what will get you posted on "Top 10 worst cosplays".

*Open to students grades 7 through 12**Maximum Size: 0***Sat 5:05pm–5:55pm Sun 11:05am–11:55am****W4025: How to play Euchre***Kevin White*

This class will teach you how to play the legendary Midwestern card game of Euchre. Get ready for exciting games and thrilling victories. Learn everything from how the game gets its name and why "going alone" is so epic.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 5:05pm–5:55pm****C4039: Intro to Complexity Theory***Louis Wasserman*

What is the mysterious traveling salesman problem, and why does it strike fear into the hearts of programmers? What does number theory have to do with the NSA, and why is it safe to send your credit card number to Paypal? Why is it called "Department of Computer Science & Applied Theology?"

*Open to students grades 9 through 12**Maximum Size: 0***Sun 1:05pm–1:55pm Sat 5:05pm–5:55pm****H3895: Introduction to Early Islamic History, the Quran and Islamic Law***Benjamin Horowitz*

Ever wonder what a Fatwa was? What guides the Sharia (Islamic) law? In this class we will quickly cover (10 minutes) the early history of Islam, the split between Sunni's and Shia (10 minutes), and then go on to discuss Islamic law for the rest. We will discuss how the Quran is arranged, what the Hadith are, the timeline of Qu'ranic interpretation, the role of the Caliphate, the Hidden Imam, and anything else people are interested in and there is time for. Questions are encouraged!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 5:05pm–5:55pm****M4042: No Mr. Bond, I expect you to die: Coordinate Substitution in a Centrifuge***Ravi Charan, David Xiao, david luciano*

The famous line from <http://xkcd.com/123/> discusses "Coordinate Substitution" by "Constructing Newton's laws in a rotation system" with the result that the centrifugal force appears "plain as day".

We will do as Dr. No (the bad guy with the lever) suggests and see that the non-existence of centrifugal force is, in fact, a myth perpetrated by overzealous physics teachers.

*Open to students grades 11 through 12**Maximum Size: 0***Sun 6:05pm–6:55pm Sat 5:05pm–5:55pm****H4398: Poetry Infused with Neologisms***Stephanie Bachar*

Poetry Infused with Neologisms

Do you enjoy a good chortle when reading a clever poem?

Well, that's only possible because of a poem called The Jabberwocky by Lewis Carroll which first coined the word chortle. Such words are called neologisms imaginary words that evoke the intended meanings. Some famous examples include: Frugal, manxome, frumious, vorpal, galumphing, grok, quixotic, cyberspace and frindle.

Even if you find most poetry uffish and tulgey, come to this class and we'll show you a frabjous time!

*Open to students grades 7 through 9**Maximum Size: 0***Sat 5:05pm–5:55pm****C4009: Programming Your TI Graphing Calculator***Ethan Lewin*

Do you want your calculator to do your math homework for you? Do you want to write your own games to play during

math class because your school doesn't allow iPhones? I will go through an overview of writing programs on Texas Instruments (TI) graphing calculators. The class is compatible with the following models: TI-83, -84, -85, -86, and -89. Please bring your calculator to class.

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–11:55am Sat 5:05pm–5:55pm Sun 10:05am–10:55am

S4396: Sailing for Adventure: Oceans, Energy, and Climate

Alorah Harman

“How vain to call this planet Earth, when it is clearly Ocean”
– Arthur C. Clark

The Age of Discovery saw the ocean as a wild frontier and a vehicle for cultural exchange.

How did early voyages influence human perception of the ocean and the evolution of science? What “stories” from modern science influence our ideas of the ocean today?

As early explorers risked their lives in the name of discovery, oceanographers perform science under extreme conditions - in storms at sea, on polar icebreakers, in remote locations - in pursuit of meaningful data. In the climate/energy era, physical oceanography has never been more relevant, yet our data sets are limited by expense and equipment. How do we work around these issues?

From tales of early mariners to cutting edge oceanographic techniques, we'll consider the role of the sea in our history and culture, and ultimately explore the resulting implications in current science, climate and energy problems.

Open to students grades 7 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm Sun 3:05pm–3:55pm

X4005: Spice Advice!

Nora Rsnen

Cumin, bay leaves, coriander and much, much more! There are so many spices available to use - but which ones are which? Is it okay to use cinnamon with coriander? How can you tell cumin from fennel seeds? By the end of this class you'll be able to tell most major spices by sight and smell, and walk away with a couple recipes to test your new-found knowledge on!

Open to students grades 7 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm

X3821: The Art of Money

Chris Su

Ever seen a hundred TRILLION dollars? Last year, Zimbabwe rolled out a 10¹⁴ dollar paper note, making this officially the paper money with the most number of zeros ever printed. Did you know that Chile fired its Mint Manager

because of an error on a coin that boldly declared the coin was produced by the country of CHIIE? Do you want to SEE that coin? Come learn about the fascinating world of money - and walk away with a free souvenir.

Open to students grades 7 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm Sat 9:05pm–9:55pm

X4389: The Everyday Life of Math: a language for understanding the world

David Dalrymple, Aviv Ovadya

Why is it that scientists can build so many awesome things that actually work? It's not just because they're smart - science has developed a language for talking about things that's more precise than the languages we typically use, like English. But that language doesn't just apply to science and engineering! By choosing the right tools and applying a little creativity, we can explain issues in philosophy, psychology, sociology, and even everyday life. Without requiring any prior background knowledge, we'll explain concepts like graphs, maps, spaces, and distributions, and interactively apply them to interesting situations.

Open to students grades 7 through 9

Maximum Size: 0

Sat 5:05pm–5:55pm

H4424: The History of Middle-Earth: the First Age

Raisa Lardie

JRR Tolkien's The Lord of the Rings takes place fairly late in the overall timeline of Middle-Earth; what happened before that? Come learn about the rich history of Arda as we follow the events that ultimately led to Biblo Baggin's discovery of the One Ring.

Part two in a three-class series, the First Age marks the Awakening of the Elves and their the Great Journey westward, the forging of the Silmarils (and what on Arda is a Silmaril anyways?), and the Awakening of Men, among other things, notably battles... We will also learn who Fanor is and why his sons helped ruin everything.

Open to students grades 7 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm Sun 1:05pm–1:55pm

C4348: Think Like a Computer

Jacob Hurwitz

Want to think like a computer? Through several hands-on activities, we'll discover how (basically) a computer thinks. In the process, we'll introduce many concepts used in computer programming. You won't learn how to program, but you will learn the core ideas common to most programming languages. Hopefully, you'll leave with the motivation to pick up programming on your own!

Open to students grades 7 through 9

Maximum Size: 0

Sat 5:05pm–5:55pm

X3877: Trivia Quizzing!

Abhishek Nagaraj

In this class we will answer trivia questions and learn how to think about the world around us in interesting ways!

Open to students grades 7 through 7

Maximum Size: 0

Sat 5:05pm–5:55pm

X4185: Tunnel exploration and edifying conversation

David Lawrence

We will explore the (pedestrian) tunnels of MIT while discussing whatever strikes your fancy. Possible topics include college admissions, high school academics, roller coasters, cold fusion, tiling window managers, spam, complex analysis, spam, spam, spam, baked beans, and spam. Bring your ingenuity.

Open to students grades 9 through 12

Maximum Size: 0

Sat 5:05pm–5:55pm

A3716: A Brief History of Punk

Amber Bennoui

Why are those kids wearing studded jackets and sporting hair of neon hues? What's that noise to which they're enthusiastically listening and why are they flailing? While I can't promise the entire history of the punk subculture, I will explain how the style came to be, how the music developed and how other it influenced other subcultures.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

C4427: Alice - 3D Computer Animation

Michelle Ng

Alice is an innovative 3D programming environment that makes it easy to create an animation for telling a story, playing an interactive game, or a video to share on the web.

For this course, we will be using Alice as a learning tool for introductory computer programming. The 3D graphics and a drag-and-drop interface makes it easy to learn and facilitate a more engaging experience for students with no programming background. We will begin with the navigation of the Alice tool and the basic steps in creating an animation - storyboard, character (objects), actions (methods). We will also learn about fundamental programming concepts such as class, object, parameter, if/else, loop, etc. The final hour of the course will be devoted for an animation-hour to encourage students to apply their new skills to create their own animation programs using Alice.

The Alice software is developed by Carnegie Mellon University and can be downloaded for free (<http://www.alice.org>).

Open to students grades 9 through 11

Maximum Size: 0

Sat 7:05pm–9:55pm Sun 9:05am–11:55am

C4326: Become an Animator! Because life is no fun when you're 2D AND stuck in the same position.

Ramya Swamy

Ever wondered how cartoons are made? Ever wanted to learn how to ANIMATE things?? Breathe some life into your drawings! Learn how to use the same software professionals use (Adobe Flash) to create a small animation of your own. We'll discuss animation techniques (both 2D AND 3D) and look at some examples of the unlimited diversity of things you can make using this new skill. This course will go pretty rapidly (but don't let that deter you) so come with a crazy awesome DESIRE TO LEARN :D

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

H4239: Blog Your Way

Pranava Boyidapu

A basic introduction to the world of blogging. It covers the aspects of how to blog, available facilities on the internet and the social, ethical and legal issues involved.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

H3815: Build a Language

Jennifer Melot

We'll construct the phonology, syntax, and lexicon of our own language... all in 50 minutes.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm

M4340: CRAZY Statistics

Jacob Hurwitz

We'll approach statistics from a mathematical perspective, meaning that the results may be counter-intuitive. We'll start off by speeding through high school statistics, and then we'll finish by discussing some statistical paradoxes and how to resolve them. This class will move quickly, but if you can keep up, you should gain a much deeper understanding of the field of statistics!

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

W4325: Card games: How to have fun without electricity

Laura McKnight

Before there were video games, there was paper. On these pieces of paper people drew symbols and numbers, and card games were born. Come learn many standard card games and never be without fun things to do ever again.

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

M4270: Combinatorial Game Theory

Adam Yedidia

Want to use math to beat your friends at games? This is the class for you! Throughout the class, we'll play games, and I'll talk about their winning strategies and the mathematics behind them. For the first half of the class, I'll go over general strategies in two-player games and games with more players, and I'll talk about what it means for a game to be zero-sum, or for a game to be impartial. In the second half of the class, I'll talk about winning strategies in impartial games such as Nim, the Spague-Grundy theorem, and how to use impartial-game techniques even in games that aren't impartial games. Throughout the class, we'll have ample opportunity to apply the strategies that I describe.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm Sun 1:05pm–3:55pm Sun 4:05pm–6:55pm

M3874: Complex Variables

Andrew Spieker

So, why do we care so much about these stupid numbers that are partially 'imaginary'? Seriously?! Why would we bother with numbers that aren't even real? Well, as a matter of fact, complex numbers creep their way into electrical engineering! Woah! In this class, we will cover the algebra of complex numbers, functions of a complex variable, some basic calculus with complex numbers, and applications to engineering and real life. Be prepared for rapid neuron growth in this class!

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

E4090: Cool Tech for International Development

Jessica Huang

Come learn about the interesting, challenging and important field of international development. We have made so much progress in the past few centuries, yet an estimated 4 billion people are still living under the equivalent of \$3 a day - that's almost 2/3 of the world! What role can technology play in addressing this global challenge? We'll have an opportunity to play with some cool technologies that are out there, as well as build some of our own. Discover and unleash your inner creativity for a positive social impact!

Open to students grades 7 through 12

Maximum Size: 0

Sun 11:05am–12:55pm Sat 7:05pm–8:55pm

X4412: Cracking the ACT

Teresa Nguyen

The ACT consists of four main categories: english, math, reading, and science. Think this is intimidating? It's really not! This course will focus on pin pointing the questions that usually appear on the test, how to recognize and approach them, reading efficiently and effectively, and analyzing only the necessary parts of the science questions. By developing and mastering the methods (tricks actually!) that will be taught in this course, getting a high score is much easier than you think!

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm Sun 11:05am–12:55pm

A4440: Culimprov: Cooking Without Recipes

Emily Hupf, Robert McQueen, Hiroyuki Yamada

Ever wonder how the Iron Chefs like Mario Batali devise such elegant recipes off the top of their heads? Or how some chefs can just put together a complete dinner with a very limited number ingredients?

They all share a secret which all great chefs know: don't use a recipe! Cooking is an Art, not a Science. It requires a great deal of creativity, not precise measurement. It also requires an in-depth knowledge of the basic building blocks of the culinary arts.

In this class, you will learn how to cook without a recipe by exercising your creative minds and learning about the foundations of cooking. By the end of the class, you will be able to put the two together and open a new door of culinary freedom.

Check this out: <http://mcqueen.mit.edu/splash>

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

S4144: Deep-sea biology

Georgina Botka

Ever wondered how animals survive thousands of meters underwater? Why would anything want to live there, anyway? With no light, photosynthesis and a very limited amount of oxygen, is the deep ocean really able to accommodate a whole ecosystem? Come and find out!

Open to students grades 11 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm Sat 8:05pm–8:55pm

X4084: Discussion Group: Gifted Education

Dennis Liu, Tracy Walsh, Andromeda Yelton

In this course, the co-instructors will lead a group discussion about how to improve gifted education, both for students participating in the discussion as well as for gifted kids in general. Topics covered will include different models of gifted education, how to self-advocate, what kind of tools and support groups are available, and how to deal with school administration.

We may also try laying the groundwork to put together a resource to help gifted kids (particularly elementary school kids) make sense of the behavior of teachers, administrators, and grownups.

While this course is listed as a 50-minute course, we will try to arrange it for a 1:50 block so that we can go past 50 minutes if people are interested.

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm Sun 4:05pm–4:55pm

H3860: Fun with English

Samuel Bader, Ben Horkley, Hannah Schiller

Words that sound dirty but aren't. Sockdolagers that will add sophistication to your insults and trash talk. Bizarre etymologies. And a couple games you can play anytime, anywhere.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm

M4263: Generating Functions

Arvind Thiagarajan

Sometimes in Math (or Science) there are these hammers which you can use to trivialize problems. Often, using a hammer takes some of the fun and excitement out of solving a problem, but usually that doesn't keep you from learning how to use the hammer.

Generating function is the hammer with which we demolish combinatorics problems. In this class, we will show how encoding combinatorial problems algebraically gives us a whole new level of insight into the subject, and conclude with a method that will allow you to compute almost any combinatorial sum you might encounter.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm

E3832: Guitar Hero Modding/Workshop

Joseph Lodin

Are you a Guitar Hero? Like, for reals?

Or are you just SO CLOSE to beating Raining Blood on expert, when suddenly, your blue button stops working during that LAST trill? You are not alone. In fact, did you know that one in every three Guitar Hero Les Paul wireless controllers has the same fundamental problem?

In this class, we'll be opening up some Guitar Hero controllers, learning how to fix some common problems, and possibly covering the basics of further modding.

If you have a controller, broken or otherwise, feel free to bring it! It's no fun when everyone's sitting over the same controller! If it's an Xbox360 controller, we can *probably* test it, too!

Open to students grades 11 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

X3822: Hardcore College Admissions

Chris Su

HYPMSC = Harvard, Yale, Princeton, MIT, Stanford, and Caltech. The Big Six. Want to get in? Have questions? MIT Admissions Blogger and College Confidential enthusiast with 1,900+ posts decrypts the college application process for you in a fun seminar, since Splash 2007! Topics include: high

school preparation, GPA, SAT, AP, extracurriculars, teacher recommendations, personal essays, deadlines, compiling a college list, choosing a college, and a Q/A session.

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

H4381: History of the Star Wars Galaxy (Part 2)

Evan Ehrenberg

Overview of the history of the Star Wars Galaxy covering material from 30,000 BBY to 25 ABY. This is a four-part course focusing on character profiles, important events (including the Great Hyperspace War, the Sith War, the Mandelorean War, the Second Sith War, the Battle of Ruusan, the Clone Wars, the Galactic Civil War, the Birth of the New Republic, and the Yuuzhan Vong Invasion), weapons and technology (everything from blasters and lightsabers to energy shields and cloaking devices), and vehicles and vessels with a focus on the use and development of the force by the Jedi Order, the Sith, and other lesser known factions throughout. Class will consist mostly of lecture with short breaks for discussion of the material.

Part 2 of this course will cover material from the Clone Wars to the Galactic Civil War (22 BBY to 5 ABY).

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

M4274: How to Solve Math Problems Without Knowing (very much) Math

Paul Handorff

Knowing math is always a useful thing in life, especially when you are trying to solve math problems. But no matter how many practice problems you do, no matter how many books you read, there will always be some times when you have no idea what to do. In this class, we'll develop some strategies for dealing with these sorts of problems, then see how we could have used these strategies to solve at least ten problems (or maybe even 13!) on last year's AIME.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

A4315: How to Write a Murder Mystery/Soap Opera/Drama

Andi Wang

Tired of playing Truth or Dare all the time and wanting to create a party game that will knock the socks off your guests? Want to capture the hearts of teenage girls all over with the next Twilight? Curious about what murder mysteries games and TV dramas have in common and how they can be taught in the same class? Interested in being a desperate housewife, an uber-playboy, or anything in between for three hours? Or would you just like have a clean, fun, interactive time with your fellow creative high schoolers?

Then come learn the basics of writing murder mysteries and

soap operas. In this class, you will work in small groups to write a murder mystery that you can then play with your friends with, or a script for an episode of a soap opera, or both, depending on your interests and how much time we have, and see the fruits of your labor acted out by you or your peers afterwards.

Get ready for drama, get ready for intrigue, and get ready for the exciting life of characters in popular entertainment.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

X4203: Internet Reeducation, Part 1

Vicki Crosson, Chris Merrill, Duncan Townsend

The Internet Reeducation Project is dedicated to educating the populous about the Internet through a high-intensity lecture and seminar series designed to expose the participant to a maximum number of historically significant memes and videos in minimum time.

For more information, see <http://web.mit.edu/cmerrill/www/reeducation.html>

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm

H4033: Intro to the Japanese Language

Kimberly Baldauf, Daniel Gray

Have any interest in Japan? Come learn a bit about the language! We'll give you a basic introduction to both spoken and written Japanese, with an emphasis on speaking. This class is not for students who have taken Japanese before or for students who have taught themselves Japanese though anime. Expect to learn a lot in this class but still feel absolutely clueless by the end of it; Japanese is an incredibly complex language and we'll barely be able to scratch the surface in three hours.

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–11:55am Sat 7:05pm–9:55pm

A4104: Introduction to Digital Audio Production

Stephen Poletto

In this course we will learn the fundamental basics of digital audio production. With more sophisticated commercial audio production software available, musicians are increasingly doing production work themselves as opposed to paying for professional sound engineers. We will consider how sound is represented in computer architecture, and then move on to various processing techniques, such as compression and equalization. By the end of the class, students will have all the basic skills to do their own mixing and mastering.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

C4134: Karel the Robot teaches Java Programming

Tiffany Tang

Want to learn Java Programming, but in a cute, cuddly way?

Before jumping off to the world of code and black text, consider exploring Karel, a robot, and Karel's world, a 2-d grid. It's fun, and you get to learn!

In this class, students will explore the fundamentals of computer programming through a more visual basis. This class will cover basic concepts like loops, recursion, and methods. Students will be able to control Karel by writing their own code.

Class will include challenges on how to help Karel achieve certain goals (by which YOU will be writing code for). Have fun!

Note: This is NOT Karel Programming, which is an educational programming language.

Open to students grades 8 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

W4410: Learn Chinese Yo-Yo / Diabolo

Wei-Yang Sun

The Chinese yo-yo (or diabolo) is an ancient toy believed to have originated from the Ming Dynasty between 1386 and 1644 AD. It is pulled with two sticks connected by a string and can whistle at higher speeds. Unlike its Western counterpart, the Chinese yo-yo is not connect to string, allowing more complicated tricks to be performed. Today, not only has it evolved into a distinctive performance art, but it also serves as a unique reminder of Chinese heritage and culture.

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

X4242: Let the Robots Win? A Conversation about Technology and Our Time

Luke Joyner, Race Wright, J.D. Zamfirescu

As we enter the second decade of the century, we are in a perpetual state of technological flux, for the first time in history. Changes that in the past took years or even generations are now measured in months, and there is no evidence that the acceleration of innovation will slow anytime soon. Some embrace the pace of technological growth, while others fear it. Most of us have feelings somewhere in between.

As we all struggle to keep up with what's new out there, this class will pause to think a bit about the ramifications of our digital age, and address some questions that get lost in the speedy shuffle.

What attitudes do people have toward new technologies? Do societal forces reward or suppress certain attitudes, over time? How does technology change our personal routines? Do we (college graduates in our mid-to-late 20s) have different opinions even from you (high schoolers in your late teens)? Does technology shrink generations? Does the societal impact of technologies change as they move from cutting edge to mainstream? When does technology enhance meaning? When does technology kill meaning? Does technology

democratize society, or homogenize it, or both? What are the side effects of free flowing information and communication? Are online friends really friends? Is there room for non-digital or semi-digital technologies in a digital age? Do you love technology, or does it terrify you? Should we let the robots win?

This class will be an open conversation, and we would like everyone to come ready to participate. We will bring three different opinions* and a lot of examples and ideas to the table.... but we also want to hear your opinions and examples and ideas too. We can't wait to see where the conversation goes.

* JD is a software engineer, Luke is a graduate student in architecture, and Race is Scottish.

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

A3986: Make a dodecahedron from beads

Christie Chiu

Want to make useless geometric shapes* out of beads? NOW YOU CAN! But hey, they look impressive.

*One shape: A dodecahedron. A fancy one.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

H3953: Market Economics: Supply and Demand

Zoe Thorkildsen

You hear about supply and demand on the news all the time, but what do they really mean? And are the newscasters even using the words correctly? (Answer: sometimes.) Learn about Adam Smith's theory of the invisible hand, and about how markets reach equilibrium. We will also discuss elasticity of demand and supply and what implications they have for buyers and sellers in a market.

Any remaining time will be open for questions about economics in general.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

S3981: Mass-less and Frictionless: Why?

Alyssa Zisk

The pulley is mass-less and frictionless. The plane is of uniform density or charge (but has none of the other one), has no thickness, and extends to infinity in all directions. Why do we do this, and why is it okay? Also, what degree of accuracy do we need before it ISN'T okay?

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm

H4225: Medicine in Haiti

Joseph Bentivegna

Dr. Bentivegna spent a volunteer year as a physician in Haiti and this course will give the student background in the diseases and problems in this country. It will also discuss international development in relationship to the recent earthquake..

Open to students grades 9 through 12

Maximum Size: 0

Sat 8:05pm–8:55pm Sat 7:05pm–7:55pm

W4156: Modular Knitting

Katherine Rudolph

Knit something small... create something bigger! Together we can become more than the sum of our individually-knitted parts!

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

S4075: Penalty Kick and Game Theory

shaopeng zhang

Have you ever watched a soccer penalty shootout? Are you amazed at some really awesome goalkeepers who saved many kicks? Contrary to intuition, they are not technically better but are more knowledgeable. This course will tell you how great goalkeepers make decisions and the game theory concepts behind that. You may also find the theory useful in daily life, when you have to make a decision or help others make a decision.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm Sat 8:05pm–8:55pm

S4041: Physics Problem Solving

Ravi Charan, Anubhav Sinha, David Xiao

The class will discuss selected physics problems and problem solving strategies, focusing on the style of mathematics used in physics problems. Especially stressed will be the use of the binomial theorem in making rigorous approximations. Problems will be taken from David Morin, An Introduction to Classical Mechanics.

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

S3848: Physics of String Music

David Lerner

Even wanted to know why a string plays the note it does or why an A on a piano sounds different than that of a guitar? Come find out the answers to these questions and more!

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm Sun 9:05am–10:55am

S4068: Planet Earth from Before to Now

Peter Hedman

We will consider the entire history of our planet, from the Big

Bang to yesterday. This task will require us to think in terms of vast space and deep time, to apply many disciplines of science to unravel the often-incomplete records written in the rocks or inscrutably smeared in the skies. From space dust, to stromatolites, to ammonites, to humans its all part of the same story. Consider this class a conceptual introduction to geology and astronomy in which we will investigate how we know what we know.

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm Sun 9:05am–10:55am

W4124: Poetry! Short Stories! Writing Games!

Paul Hemberger

Want to have fun with words? We'll do freewrites, construct found poetry, write the shortest short stories we can imagine (Hemingway wrote a famous one of just six words!), create fine odes and love letters to our ephemeral classmates, and play Balderdash and the wonderful Paper Folding Game.

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm

S3934: Quantum Tunneling, Black Holes, and The Weird Universe

Nabil Iqbal, Hiro Miyake

It turns out that behind the scenes nature works in bizarre and wonderful ways. We'll explain some of these ideas, ranging from the very small where particles routinely walk through walls and almost anything can happen to the very large where the fabric of space and time itself is curved, a glance at the sky can show you the birth of the universe, and mysteriously named Black Holes are inescapable for anything, even light itself. We'll discuss these cryptic sentences and explain how weird our universe really is.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

A3941: Rock Opera: The Definition and Legacy of an Era-Part 1

James Penna

Rock Opera- quite possibly the most expressive and important form of musical arts in mankind's history. This lecture is the first of a two-day exploration of the genre "Rock Opera." This first lecture will consist of watching The Who's seminal rock opera "Tommy," followed by heavy jiving and discussion. Of course movie snacks will be provided. Note- meant as part of a two-day series, so please also register for the "Part 2" class on Sunday.

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

M4151: Tensor Calculus Is Easy!

Colin McSwiggen

When I was in high school, I desperately wanted to learn general relativity, but I had heard that in order to do so I

would have to master a terrifying form of math known as tensor calculus. Einstein himself, it was said, could barely figure out tensors. It turns out that tensors are no big deal. In fact, I can teach you the basics of working with them in just two hours. At the end, if we have time, I'll even briefly lay out the mathematics underlying general relativity, so you can see how it all works for yourself.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

X3994: The Horror! - Tabletop RPGs in the Horror Genre

Abbie Popa

An introduction to horror role-playing games with a focus on writing and running your own game. We'll talk about, among other things, what makes a good game, how to achieve balance or grittiness and how to deal with players of various types. Specific questions welcome.

NB: This is not intended to be a teaching of the specifics of a given system, but rather an introduction to horror role-playing games in general. That said, I know Call of Cthulhu and Nemesis best.

Open to students grades 9 through 12

Maximum Size: 0

Sat 8:05pm–8:55pm Sat 7:05pm–7:55pm Sat 9:05pm–9:55pm

H3856: The Privacy Architecture of Facebook

Chris Peterson

Everybody knows that privacy is a problem on social network sites.

But what is privacy, and what kind of problem is it? Why do these problems occur, and what can stop them?

This course will introduce students to some basic theories of privacy as a sociolegal construct. It will then discuss the environmental or architectural elements of privacy that are often invisible in our world. It will describe how these factors contribute to Facebook privacy problems, and what steps we might take to fix them.

This class is taught from an interdisciplinary humanities perspective. It will feature wide-ranging discussion about the various issues, and plenty of time for derails and interesting explorations of marginally related issues with privacy and social software.

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–8:55pm

S3842: The Science of Stem Cells

Christopher Cervantes

In this class, we will learn about both the science and lab techniques involved in stem cell research. In addition, we will address important questions pertaining to the benefits and

controversies with using these cells.

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm Sun 4:05pm–6:55pm

M3920: The Truth About the Complex Numbers

Daniel Zaharopol

The complex numbers are an amazing mathematical object. But they are also an amazingly hard space to deal with. You can't define a consistent square root, for example — the square root has to take on two different values. And taking logarithms is even worse: a logarithm has infinitely many values to it!

We're going to study the complex numbers and uncover how they really work. Our exploits will take us through what it means to take the derivative of a complex-valued function, on to a bit about integration, and finally talking about Riemann surfaces. Along the way, I'll mention interesting things that come up such as the Riemann hypothesis.

Open to students grades 7 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

E4022: Trains in Japan

Genevieve Patterson

How can a train levitate? Why is the Shinkansen the fastest commuter train on earth? If 30 million people take the Tokyo subway everyday, why is it still the most on time subway system in the world? In this class I'll introduce students to technology of Japan Railways. Topics covered will include the Tokyo Metro, the largest subway system in the world, the history of Japan Railways, Magnetic Levitation and applied Superconductivity, and how to read enough Japanese to find your way around Japan by train.

Open to students grades 7 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm Sat 7:05pm–7:55pm Sun 5:05pm–5:55pm

M4149: Turning a Pea into the Sun: The Banach-Tarski Paradox

Chris Kennedy

The Banach-Tarski Paradox is one of the crown jewels of "weird mathematics"—the art of using standard mathematical tools to come up with truly bizarre results. In this case, the result we'll come up with is this: it's possible to slice up a sphere into five pieces, rearrange them using rotations and translations, and end up with two spheres of the same size as the first.

Along the way, we'll see plenty of math that's interesting in its own right—groups, Cayley graphs, uncountable sets, and a little hyperbolic geometry. By the end of this class, you'll understand that math is a beautiful and strange beast.

Open to students grades 9 through 12

Maximum Size: 0

Sat 7:05pm–9:55pm

S4397: Understanding Proteins: A path to curing cancer

Stephanie Bachar

Almost all of us are touched by cancer in some way. So, what does it take to cure it? One tactic is to kill ONLY the cancerous cells.

But cancer is an incredibly complex disease where a few of your own cells accumulate genetic mutations that allow them to grow out of control, creating tumors. So, how do we target the cells we want?

Find out how understanding protein-protein interactions allows us to answer that question and has led to the advent of personalized treatments for cancer patients.

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm

E3843: University and Enterprise Physical Security

Andrew Brockert, Jack Carrozzo

Lots of people teach "information security", but far fewer research and discuss physical security in large-scale networks, including university environments. There are many ways to own a campus, and given the time we have, we'll address as many as we can.

The goal of the course is to give you a nuanced view of physical security, including movement sensors, magnetic and RFID card readers, and master-keyed physical lock systems. We will also discuss the social implication of the use and abuse of these systems.

Open to students grades 10 through 12

Maximum Size: 0

Sun 9:05am–10:55am Sat 7:05pm–8:55pm

X3966: Vicious Card Games (and how to win): Canfield!

Christina Jaworsky

Spit, Egyptian War, Canfield, Spoons: Each of these games goes by many names, and the way to win each one is speed. In this class, we will learn the rules and variations of uncivilized card games and strategies to increase your speed and beat your friends.

In this section, we will be warming up with a basic game and then learning a lesser known crazy game called Canfield.

Open to students grades 10 through 12

Maximum Size: 0

Sat 7:05pm–7:55pm Sat 8:05pm–8:55pm

S4369: Chicken Soup for the Science Geek's Soul, Gr. 11-12

Reena Joubert

This course will happen in the format of stand-up comedy, with breaks for tea, comfort food, and introspection.

It requires no further explanation.

Open to students grades 11 through 12

Maximum Size: 0

Sat 8:05pm–8:55pm

S4095: Exoplanet Detection

Kristin Berry

Read too many fluffy science news articles on exoplanet discoveries and wondered what *actually* goes into locating and characterizing an exoplanet?

We'll cover the standard methods for locating exoplanets and derive basic physical relationships we can use to figure out their planetary and orbital properties. Then, we'll look at some real data from the Kepler mission, and apply what we've learned to extract useful information from it.

Open to students grades 10 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm Sat 8:05pm–8:55pm

W4174: Fool nature!

Alina Kononov

Learn to make tissue paper flowers that look real.

Open to students grades 7 through 12

Maximum Size: 0

Sat 8:05pm–9:55pm

W4375: How to See Maths: A Slideshow of Visual Proofs

Benjamin Sena

Come see how simple math is when you can see it. Never really understood why the Pythagorean Theorem works or have trouble remembering trig identities? Don't worry, you'll leave enlightened.

Open to students grades 7 through 12

Maximum Size: 0

Sat 8:05pm–9:55pm

X4204: Internet Reeducation, Part 2

Vicki Crosson, Chris Merrill, Duncan Townsend

The Internet Reeducation Project is dedicated to educating the populous about the Internet through a high-intensity lecture and seminar series designed to expose the participant to a maximum number of historically significant memes and videos in minimum time.

For more information, see <http://web.mit.edu/cmerrill/www/reeducation.html>

This is part two a series. Sign up for one, or both. But remember...double sessions are SO INTENSE!

Open to students grades 7 through 12

Maximum Size: 0

Sat 8:05pm–8:55pm

H4202: LGBTQ Teen Literature

Leah Byland, Nathaniel Harrington

Young adult, or "teen", literature has existed for centuries, but only since the 1950s and -60s has it developed as a specific area of literature. Young adult literature containing LGTBQ (lesbian, gay, bisexual, transgendered, queer~questioning) characters and themes has been around for just as long, but

only in the last twenty years has it really exploded as an area of young adult literature. Come and discuss books mostly new but some not so new, their importance in a social and political context, their relevance to the gay rights movement as a whole, and their relevance on an individual level.

Open to students grades 11 through 12

Maximum Size: 15

Sat 8:05pm–9:55pm

S4101: Light: Wave or Particle?

Rena Katz

With Slinkies, ping pong balls, water, and chalkboards we will explore two different ways of thinking about light, with examples including the two-slit paradox and solar sails.

Open to students grades 9 through 12

Maximum Size: 0

Sat 8:05pm–8:55pm Sun 6:05pm–6:55pm

X4058: Patrol

Paul Weaver

Shoot your friends!! Its Patrol!!

Patrol is a game sponsored by the MIT Assassins' guild. Participants are divided into a number of teams. Each player is armed with a dart gun and a small number of rubber darts. Each player also wears a colored headband denoting what team he/she is on and whether or not he/she is currently alive. The object of the game is to shoot members of the other teams without getting shot. If shot, the player can resurrect by visiting the resurrection floor. The main goal, however, is to have fun.

Please bring a signed permission slip available here: <http://www.mit.edu/~assassin/PatrolPermissionSheet.txt>

Open to students grades 9 through 12

Maximum Size: 0

Sat 8:05pm–9:55pm

C4052: Streaming Algorithms

Paul Christiano, Jelani Nelson

Imagine you have one normal-sized sheet of scratch paper to write on and a list of a million numbers. You read the list, making notes on your scratch paper as you go. Afterwards, someone asks, "How many times did 1134547 appear in that list?" You look at your scratch paper and respond, "Between 15000 and 16000 times," and you are right. How can this be possible? You have kept track approximately of millions of things while only writing down thousands of digits. Programs which try to extract conclusions from huge quantities of data on the internet find themselves in scaled-up versions of this same situation. The volume of data being continually presented swamps the available memory, requiring new algorithmic ideas. We will discuss some of the problems and solutions in this field.

Open to students grades 10 through 12

Maximum Size: 0

Sat 8:05pm–9:55pm

X4092: The Anatomy of a EuroTrip*Jeremy Rossmann*

The best club in Prague?? The best museum in Berlin? The best restaurant in Florence? Where to get whale in Reykjavik? What hostel to stay at in Budapest?

Want the answers? This is the class for you!

This class will consist of travel tips for high school students contemplating a trip abroad, in Europe or elsewhere. It will draw heavily from personal experience and entertaining anecdotes from the teacher's own EuroTrip.

We will cover how to get cheap flights, get around, find the best hostel, find the best bars/clubs, where the best cultural attractions are and much more!

Open to students grades 10 through 12

Maximum Size: 0

Sun 9:05am–10:55am Sun 2:05pm–3:55pm Sat 8:05pm–9:55pm

C4235: The Architecture of Microsoft Windows*Travis Grusecki, Tanya Kortz*

Why is your PC so awesome? Perhaps because it runs Windows! This course provides a survey of the architecture of Microsoft Windows with an emphasis on the features and design decisions that directly affect the security, reliability, and performance of the operating system.

Open to students grades 9 through 12

Maximum Size: None

Sat 8:05pm–9:55pm

X4001: Advanced Theoretical Dominion*Nathan Benjamin, Sergei Bernstein*

So you know how to play Dominion – want to study some theory? Learn about the Persian Offense, the Gardens Gambit, and the Defensive Duke. And then try some of these theoretical calculations in practice! All skills welcome.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm

C4279: Data Structures*Shaunak Kishore, Jacob Steinhardt*

How can computers efficiently manage large amounts of data? In this class, we will answer this question. Learn how to quickly look up a name in a database and how to determine how much of your data lies in a given range. As a bonus, we will develop an efficient algorithm for string matching (a string is a sequence of characters or numbers).

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm

S4224: From Universe to Multiverse: The New Cosmological Picture*Khristian Erich Bauer-Rowe*

According to theoretical cosmology, there is a strong possibil-

ity that we live in a multiverse. What does this mean? What are the physical and philosophical ramifications of such a scheme? This class will also introduce students to basic ideas in cosmology, such as string theory and quantum mechanics.

Open to students grades 10 through 12

Maximum Size: None

Sat 9:05pm–9:55pm

M4213: Generalized Isoperimetric Problem*Yunzhi Gao*

Have you ever heard of isoperimetric problem? Namely, how to find a closed plane curve of a given perimeter which encloses the greatest area? Interested in its generalizations? What if the curve must be inside a square? What if the curve must be inside a convex region? We will discuss these problems and the proofs of them.

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm Sun 6:05pm–6:55pm Sun 1:05pm–1:55pm

H3962: Generic Awesomeness of the 19th Century, Part I*Ellen Finch, Dana Reback*

NAPOLEON.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm

H4036: Introduction to French*Rachel Ah Chuen*

Interested in learning French? This is the right course to learn basic french.

Open to students grades 7 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm Sun 9:05am–9:55am

M4081: Introduction to Ramsey Theory*Louis Wasserman*

Ever wanted to learn some combinatorics, but never had the chance? Ramsey theory is an excellent place to start.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm

X4066: It's a free country! Students' rights to free speech*Leonid Grinberg, Paul Kominers*

The right to free speech is one of the most treasured institutions of

the country, but yours may be a bit more limited than you think. In this class,

we'll look at past cases and explore some of the legal boundaries on

what students in public schools can and cannot say.

Open to students grades 9 through 12

Maximum Size: 0

Sat 9:05pm–9:55pm**W4250: Origami Cranes***Katherine Karwoski*

Come learn how to make a paper crane, or if you already know, come make more!

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05pm–9:55pm Sun 5:05pm–5:55pm****S4379: Phenomena that would be called paranormal if we didn't have explanations***Stephen Face*

Ever wonder why sound travels at 343 meters per second? or why light bends and splits when traveling through certain materials? or how magnets work? Using simple models, these and other phenomena will be derived and given explanations.

*Open to students grades 10 through 12**Maximum Size: 0***Sat 9:05pm–9:55pm****M4148: Prime Rib, Please. Extra Prime, Hold the Rib.***Dylan Yott*

As the title suggests this class is all about primes. The numbers, not the ribs!

Prime numbers are an extremely interesting and fundamental subject in mathematics that have prompted many important questions. How many primes are there? What patterns can we discern from the prime numbers? What impact do prime numbers have on our lives? Some of these questions we know a lot about, others very little. Either way, it shows that primes are a very interesting field with surprisingly far-reaching consequences.

Come on down to see what the deal is with these amazing numbers!

*Open to students grades 7 through 12**Maximum Size: 0***Sun 4:05pm–4:55pm Sat 9:05pm–9:55pm****E4171: Solar Cells and the Energy Challenge***Burhan Saifaddin*

The sun is the major energy source on Earth. Photovoltaics (Solar Cells) could help the world reduced its carbon emissions, improve its energy security and economical well-being. Come to learn how solar cells work and to learn about some of the major problems facing the Solar Cells industry.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05pm–9:55pm Sun 9:05am–9:55am****S3971: The Kuiper Belt***Christina Jaworsky*

What are all those asteroids doing way out beyond Neptune? How do we find them? Why isn't Pluto a planet? This class

will answer these questions! We will be learning about the objects in the Kuiper Belt and the methods astronomers are using to find these very dim objects in the night sky.

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05pm–9:55pm****S4094: The THINK Design Lab – Your Creativity Sparked!***THINK TechFair*

This is a hands-on workshop guiding students through the innovative thinking process. Come if you feel like being creative, or want to learn how to develop creative projects. This will be a mind-broadening experience to empower your creativity for meaningful purposes. Note: Remember to also check out another class called "From Ideas to Reality – How to Create and Implement." In that class, THINK organizers will provide a conceptual overview of how to come up with creative ideas, how to implement the idea, and what it takes to transform your ideas into reality. For any questions or concerns, please contact techfair-think@mit.edu

*Open to students grades 9 through 12**Maximum Size: 0***Sat 9:05pm–9:55pm****W4206: Trash and Textiles***Vicki Crosson, Katherine Rudolph*

Knit, sew, crochet...make a soft and squishable thing...it's all so cliche.

Ever considered ditching the yarn? Tossing the cotton cloth? Grab some needles and start knitting with a more exciting medium. Trash bags? VHS tape? Copper wire? You name it.

Pick up an iron, and make a robust plastic "fabric" that you can sew...

Come make crazy-weird things with us.

This is *not* going to help you learn to knit...but if you know, come play with non-yarn materials with us! And if you don't, come see what you can make anyways.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05pm–9:55pm****X4258: ZDI.002: Zombie Pathology***Eli Stickgold*

How realistic is the threat of a zombie-like plague, and more importantly, how can knowing about it help you save yourself from the ravaging hordes?

A continuation of ZDI.001, ZDI.002 will delve more deeply into the possible causes of a 'Zombie Plague,' how to identify which is going on in an emergency situation, and how to use that knowledge to your advantage.

*Open to students grades 7 through 12**Maximum Size: 0***Sat 9:05pm–9:55pm Sun 10:05am–10:55am Sun 1:05pm–1:55pm**

H4404: What We Say to People, What People Hear*Josh Shaine*

I don't understand! What do you mean? How could you do that to me? Have any of these been said to you? Did you know the answer? If you aren't sure, take this course. We'll discuss some of the reasons you are so misunderstood. The class will be lecture/discussion, with references to major theories and theorists as an inclusion, but not the major focus. The purpose of this course is to give you some tools for self-examination. It is neither for counseling nor for therapy.

*Open to students grades 7 through 12**Maximum Size: 0***Sun 9:05am–10:55am****M3922: Accelerated High School Math***Lester Kim*

I will cover the prerequisites for calculus, linear algebra, and other advanced math subjects. Topics will include: proofs, sets, functions, trigonometry, complex numbers, polar coordinates, sequences, limits, series, and possibly some calculus if time allows.

*Open to students grades 7 through 12**Maximum Size: 0***Sun 9:05am–11:55am****S4107: Basics of Lagrangian Mechanics***Timothy Chu*

Like Physics, but hate solving complicated systems and force diagrams? Discover ideas that make problems in Newtonian Mechanics as dead as disco.

*Open to students grades 11 through 12**Maximum Size: 0***Sun 9:05am–10:55am Sun 11:05am–12:55pm****C3840: Circuits: logic gates, Karnaugh maps and the quest for truth tables***Andrea Lincoln*

We begin our journey with transistors. From these transistors we build logic gates (NOT, OR, AND, XOR, etc). From these logic gates we build circuits. We use Karnaugh maps to go from a truth table to a circuit.

*Open to students grades 9 through 12**Maximum Size: 0***Sun 9:05am–10:55am Sun 11:05am–12:55pm Sun 4:05pm–5:55pm****M4289: Combinatorial Game Theory***Jayson Lynch*

Ever wanted to prove who can win a game? Interested in Nimbers and Surreal Numbers? Love playing games like Hex, Chess, Nim, or Dots and Boxes? Then join us for some games and proofs as we explore this fun and fascinating field.

*Open to students grades 7 through 12**Maximum Size: 0***Sun 9:05am–11:55am****A3898: Design a Building: An All-Day Studio***Luke Joyner*

This is an all day comprehensive studio class that will give you a chance to work on a real architecture project, in teams of three.

In the morning (9 to 12 and if more time is desired, informally during lunch from 12 to 2), we will walk to a site on the MIT campus (bring comfortable shoes and be ready to be on your feet all morning) and do sketches and measurements and take pictures of the surroundings.

When we come back from lunch in the afternoon (2 to 5) each team will take the morning's site work and come up with a design for a building, taking into account a series of constraints (what the building is for, zoning restrictions, how much space is needed, etc.) I'll be giving teams feedback throughout the process, and we'll pause at least once for teams to give each other feedback.

Finally, from 5 to 7, each team will present their work to a panel of outsiders, who will, along with other students in the class, give feedback and ideas about the final designs from many perspectives. As in any real architecture project, and any Splash class, the end is only the beginning...

All work will be done by hand, with the exception of taking pictures at the site for reference. If you have a digital camera, bring it, and also bring the cable to attach it to a computer. Also bring your favorite pens, pencils or sketchbooks if you'd like.

*Open to students grades 11 through 12**Maximum Size: 0***Sun 9:05am–6:55pm****S4043: Food Investigators***Jiyeon Baek, Stephanie Tsai*

Ever wonder if you can cook up a neat experiment right in your very own kitchen? We'll be doing some hands on projects such as DNA extraction and chromatography with food! We'll also be teaching the concepts behind each experiment. Come if you want to learn and do science with simple everyday materials!

*Open to students grades 8 through 11**Maximum Size: 0***Sun 9:05am–10:55am****W3855: Fractal Construction***Anubhav Sinha*

Discover the mathematical beauty of self-symmetric objects by building part of a giant fractal!

*Open to students grades 7 through 12**Maximum Size: 0***Sun 9:05am–11:55am****S4093: From Ideas to Reality – How to Create and Implement***THINK TechFair*

Did you ever have random ideas come across your mind? Was it because you thought your idea was too random that you did not make an effort to turn it into reality? THINK will lead you through a systematic way of carrying an idea into reality. Additionally, THINK founder from MIT TechFair will share her story of founding THINK from just a simple idea. This is a conceptual overview accompanied with testimonies from THINK organizers. Note: Remember to also check out another class called “The THINK Design Lab,” a hands-on workshop that teaches you how to be creative. For any questions or concerns, please contact techfair-think@mit.edu

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–9:55am

H3963: Generic Awesomeness of the 19th Century, Part II

Ellen Finch, Dana Reback

REVOLUTIONS OF 1848.

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–9:55am

A3818: How to Write Bad Fanfiction

Deena Wang

Have you ever read something so horrible on the internet that you needed brain bleach? Want to inflict unspeakable horrors upon the minds of others using only a shot glass, a traffic cone, and a bottle of coke? Then come learn how to write bad fanfiction!

Class includes theory behind bad fanfiction, and a brainstorming session afterwards.

Warning: Will most certainly contain mature themes, violence, and distasteful behavior

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–9:55am Sun 10:05am–10:55am

H3949: Infant and Early Childhood Neurodevelopment

Tobie Tepfer

Learn about the milestones that developing babies and toddlers are typically expected to achieve in the realms of receptive and expressive language, fine and gross motor stages, feeding, social-emotional behavior, problem solving and sensory integration.

Why is it important that babies stick their feet in their mouths? Can you tell if newborns are going to be typically developing? Why do toddlers make up words that we can understand, anyway? Learn these answers and more. Better yet, bring your own questions!

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–9:55am

E3899: Intro to Chemical Engineering

Lonna Gordon

Where do physics, mathematics, and chemistry come together as a logic puzzle? In chemical engineering.

Chemical engineers are the people behind everything. From canned soup to medicine to cleaning up oil spills, chemical engineers design the process to make it happen.

Use science, math, and chemical engineering principles to design a process to produce jam, artificial lungs, or clean up pollution.

New this year: design a distillation column and separation process and learn about the career potential in one of the highest paid engineering professions.

Open to students grades 10 through 12

Maximum Size: 0

Sun 9:05am–9:55am

M4245: Introduction to Option Pricing

Vlad Kontsevoi

Options are contracts giving an individual to buy or sell an underlying security at a certain price at a certain date. These are traded, for instance, on the Chicago Board Options Exchange (CBOE). But what is the price of such a security? Get ready for a wild ride – a whirlwind of pricing theory starting from the basics and ending with a sketch of the Black-Scholes.

Open to students grades 10 through 12

Maximum Size: None

Sun 9:05am–11:55am Sun 4:05pm–6:55pm

C4269: Introduction to Python

Benjamin Agre

A short 2 hour introduction to python with some hands on activities. This will assume you have no background in computer science and no background in programming. We'll cover basics, have you do some simple exercises and just learn some python.

Also remember children

<http://xkcd.com/519/>

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–10:55am

M3952: Introduction to Symbolic Logic and Proofs

Zoe Thorkildsen

This class is all about the foundations of proving statements. We'll start with the underlying theory behind proofs (symbolic logic) and then take some time to prove a few simple theorems from number theory.

Open to students grades 8 through 12

Maximum Size: 0

Sun 9:05am–10:55am

H4178: Introductory Latin

Pamela Alvarez

A basic introduction to the Latin language

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–10:55am

W4371: Jam Session

Benjamin Sena

Bring your instrument. Come jam.

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–6:55pm Sun 9:05am–11:55am

H4100: Languages: Getting by while hopping countries

Vicki Crosson

comprendre un peu de mehreren Sprachen para viajar y comunicar?

Have you ever wished you could speak a little bit of many languages so that you can communicate with a wide range of people?

Learn a few things about how to learn the basics and set yourself up to learn as you go through a foreign country, even if it's only for a few days.

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–9:55am

X3808: Make Chainmail!

Alyssa Zisk

Knights wore chainmail, so someone had to know how to make it, right? Well, now you can learn, and there is much more than just armor. (Armor is pretty cool though. I mean, really, someone swinging a sword at your arm not causing the loss of the arm is useful...) I'll try to teach at least two weaves, more if there's time.

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–10:55am Sun 11:05am–12:55pm Sun 2:05pm–3:55pm

X4395: Making Chainmail!

Katherine Karwoski

Come learn how to make chainmail like in medieval times. I'll be teaching European 4-in-1. Keep whatever chainmail you make!

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–9:55am Sun 10:05am–10:55am Sun 2:05pm–2:55pm

W3973: Mao (Card game)

Christina Jaworsky

I brought the cards. I am the dealer. Oh, wait. You expect me to tell you the rules? That's not happening.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–9:55am

S3910: Medical Ethics

Xuetao (David) Zhang

As medical science advances, society will have to deal with an ever increasingly complex web of ethical issues. For example, should there be a free, but regulated, market for kidney transplants? If a couple divorces, who gets the frozen embryos they had stored away? Can a surrogate mother get an abortion without the biological parents' consent? Is it OK to allow one person to die if his organs can save several lives? Under what conditions, if any, is human cloning acceptable?

Open to students grades 10 through 12

Maximum Size: 0

Sun 9:05am–9:55am Sun 10:05am–10:55am Sun 11:05am–11:55am

H4219: Nationalistic Music of the Romantic Period

Lizi George, Elizabeth Qian

Ever wonder where some of the greatest themes in Romantic music came from? You probably haven't. But now you are! Come find out.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–10:55am

H4317: Phalanx, Warband and Legion: Warfare in the time of Caesar

Alexandre Todorov

This course will cover the military history between the expansion of the Roman Republic and the formation of the empire. It is for all students who are interested in seeing how and why these ancient soldiers fought.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–10:55am Sun 4:05pm–5:55pm

C4187: Programming and Debugging Workshop

Ken Arnold

Come with your partly working projects, crazy ideas, language frustrations, cool demos, whatever. I might not have heard of the language you're using, but I can try to help you think clearly about debugging or crafting code. Or we can just sit around and talk about programming. It's okay to be a geek.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–9:55am Sun 10:05am–10:55am

C3862: Promiscuous Mode: Network Protocol Analysis

Harvey Yee

Do you want to be in Promiscuous mode(Monitor Mode)? You may if you are a network engineer. Join us in learning what is involved in Network Protocol analysis, and along the way learn about network architecture and protocols. Depending on what is available in the class room, a demonstration of a wired or wireless network session will be provided. A free copy of Linux LiveCD will be provided so that you can continue your learning of network protocol analysis after this

class.

Newly added based on popular demand is a demo of a router operation.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–11:55am

C4335: Randomized Algorithms

Shaunak Kishore, Jacob Steinhardt

Is it okay if an algorithm works 'almost all' the time? In this class, we'll see how computers can use randomness to run faster. We'll give randomized algorithms for finding medians, for testing if a number is prime, and for finding structures in graphs. Along the way, we'll prove that the probability that our algorithms fail is less than the probability that the computer spontaneously bursts into flames.

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–9:55am

A3940: Rock Opera: The Definition and Legacy of an Era-Part 2

James Penna

The second part of a two day series! Rock on! Students will partake of Pink Floyd's seminal progressive rock trip known as "The Wall." Further jiving and discussion of the rock opera afterward. Meant to be taken in conjunction with the first day's lecture on the Who's "Tommy," so unless you are familiar with "Tommy," please register for both classes-Part 1 and Part 2.

Open to students grades 10 through 12

Maximum Size: 0

Sun 9:05am–10:55am

E3929: Rocket/Composites Design and Fabrication Class

Ryan McLinko

Ever want to learn how rockets are designed and built? How about how to use composite materials, which if used properly, can have significant benefits over traditional materials, such as metals. This class will discuss how rockets work and what goes into the design of a rocket. Then it will discuss how composites are generally fabricated and students will get a chance to make their own rocket fins out of composite materials.

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–10:55am Sun 11:05am–12:55pm

M4255: Rubber Band Sculptures: a Knot Theory Perspective

Zachary Abel

After introducing a cool method for building geometric sculptures out of household rubber bands, we study the knot-theoretic limitations of the medium. Specifically, consider the task of building a graph out of rubber bands, where each edge corresponds to a single rubber band, and each node non-trivially connects all incoming edges (locally). Which graphs

can be built? No previous knot theory experience is required, but you must enjoy looking at lots of pretty diagrams. (To use this method in practice to build a huge rubber band sculpture, consider attending the Walk-in Seminar "Gigantic Rubber Band Web".)

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–9:55am

W4200: Scrabble and Banagrams!

Lauren Kuntz, Curran Oi

Need a break from numbers and equations? Think word games are fun? Want to learn how you can win a game of scrabble or banagrams? Come join us for some word fun and we'll teach you awesome tips. Random conversation also included.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–12:55pm

S4286: Space: More Than the Final Frontier

Frank Centinello, Ben Corbin, Christopher Tam

Past, present, and future of space exploration, including new discoveries and technologies along with the basic science that allows this. This will include a presentation of data from the Moon collected by the Lunar Reconnaissance Orbiter in large format! Explore the floor of Tycho Crater and the Taurus Littrow Valley, the Apollo 17 Landing site.

Meet students who have worked on space missions such as the Lunar Reconnaissance Orbiter, in government organizations such as NASA, the US Air Force Research Lab. Plan to participate in an inspiring dialog on the status and future of space exploration.

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–12:55pm Sun 9:05am–10:55am

A3762: Splash Concert Choir 2010

Lance Earle-Dawalga

Like to sing? Have you ever had the urge to get together with total strangers - and some friends?

Then this class is perfect for you!

Please specify your voice part, and if you can, drag friends.

The goals in this class are to work on blending, tone quality, vibrato (when and when not to use), singing with Divisis, maintaining pitch, holding longer notes, and choreographical skills (for certain pieces).

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–11:55am

S4264: Systems Biology: Understanding and Designing Biological Systems

Arvind Thiagarajan

Are you a math/physics person easily irked by the way biolo-

gists tend to make everything qualitative? Turns out there's a lot of people in biology like you: they're called systems biologists!

It turns out that the behavior of a cell (or any biological system) doesn't depend very much on this gene or that gene as much as it depends on how much of one transcription factor or another are present, and how strongly these factors affect different reactions. When you get to the bottom of this stuff, you find that statistical mechanics and stochastic physical processes are the driving force for all of the interesting things in biology.

Join this class if you think it would be cool to do biology with physics and math, and actually pull cool results out.

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–9:55am

X4411: The Art of Hair Curling with a Hair Straightener

Teresa Nguyen

Yes, curling your hair is an art, especially with a hair straightener! Think this is impossible? Its not! This course will focus on how to get the perfect curls with a hair straightener, achieving soft waves, and a great soft shine. Lab included: curling your own and/or the teachers hair.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–10:55am Sun 1:05pm–2:55pm

S4021: The Incredible Water Bear!

Ana Lyons

Come learn about, see with your own eyes, and maybe even befriend the incredible water bear!

As this miniature beast is the first member of the animal kingdom to successfully survive exposure to outer space, become a model for cutting-edge cryptobiosis research, and recently make news headlines about helping solve the quantum superposition of living organisms paradigm, you might be surprised to learn that the water bear (a transparent microscopic invertebrate with eight legs, claws, and eye spots that belongs to the phylum Tardigrada) can actually be found in virtually any film of water, fresh or marine - even in your backyard.

As an oddball of the animal kingdom, you probably wont learn about tardigrades in your high school biology class, but come learn the little-known history of the phylum (consisting of over 1000 species), how to collect and view the adorable critter on your own with just a few basic tools, and build up your repertoire on the most recent tardigrade research with applications to medicine, molecular biology, systematics, ecology, and even quantum physics.

We'll have demonstrations of live organisms and cool hand-outs, plus we'll even talk about ways that YOU can contribute to the growing pool of tardigrade knowledge. Before you know

it, you'll be your local water bear expert!

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm Sun 9:05am–10:55am

S3740: The Theory of Evolution by Natural Selection

Michael Katz

This class will cover the theory of evolution by natural selection as laid out by Charles Darwin in "The Origin of Species" and the intellectual background in which Darwin formed the theory. We will also cover improvements to the theory since the historic publication, and examine examples of evolutionary forces in action.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–10:55am Sun 11:05am–12:55pm

M4266: To Infinity, And Beyond!

Stephen Xu

Can you think of a set with infinite elements? There are plenty of them out there - all the even numbers, all the natural numbers, all the real numbers ... but how would you say how big these sets are? Are some kinds of infinity "bigger" than others? In this class we will look at infinite sets and how they relate with one another.

Open to students grades 7 through 12

Maximum Size: 0

Sun 9:05am–9:55am

A4195: Truth in Comedy: Improv Comedy

Ryan Foote, Paul Hlebowitsh

Do you have the funny? Do you want to learn how to get it? Come learn about the truth in comedy as taught by MIT's premier improv group: Roadkill Buffet.

Open to students grades 9 through 12

Maximum Size: 0

Sun 9:05am–10:55am

A4290: Costume Makeup 101

Courtney Hilliard

This isn't your grandma's makeup! Play around with costuming makeup and gain some tricks of the trade. Learn how to make fake wounds and scars; use props and prosthetics to change your look; experiment on yourselves and each other.

You must inform the teacher if you have an allergy to latex, aluminum, or any other compounds that may be common in makeup or costuming materials. Liquid latex is very common in costuming, and we'll be using a lot of it, so use your judgment.

Open to students grades 9 through 12

Maximum Size: 0

Sun 10:05am–12:55pm

M3852: Fun Math Proofs

Jessica Mahoney, Dylan Yott

Do you like math? Me too! In this class I'll show you some of my favorite proofs. At the beginning of class, I'll put a list of proofs on the board, and as a class, we can vote on which ones to do. If you like math, then you'll love this class.

Just a few of the things we might do:

Proofs by contradiction, proofs by induction, proof of the area of an ellipse (requires calculus knowledge), proofs by infinite descent, proofs without words, and more!

Open to students grades 7 through 12

Maximum Size: 0

Sun 5:05pm–5:55pm Sun 10:05am–10:55am

H3965: Generic Awesomeness of the 19th Century, Part III

Ellen Finch, Dana Reback

GERMAN AND ITALIAN UNIFICATION.

Open to students grades 9 through 12

Maximum Size: 0

Sun 10:05am–10:55am

X3921: How Your Brain Lies To You

Daniel Zaharopol

Think you're perfectly logical? Think that you see everything around you? That you remember things just how they happened? Turns out, you don't.

We'll see just how your brain doesn't work the way you think it does. It misleads you. It takes shortcuts, and tells you things that aren't true. Be aware of where your brain goes wrong, and you'll be smarter, better able to avoid being misled, and more aware of what's around you.

Open to students grades 7 through 12

Maximum Size: 0

Sun 10:05am–11:55am

A4356: Introduction to AutoCAD

Robert A. R. Arlt Jr, Jennifer Hope

We will be learning some simple solid modeling techniques.

Open to students grades 7 through 12

Maximum Size: 0

Sun 10:05am–11:55am

C4103: Introduction to Object-Oriented Programming in Java

Stephen Poletto

In this class, we will explore object-oriented programming, using Java as the language of study. This class assumes no prior experience with programming. Students will learn what objects are and how to design programs using them. We will consider simple programs to start and move on to more advanced topics like inheritance and polymorphism. Because of the limited time constraint, this class will move quickly.

Open to students grades 9 through 12

Maximum Size: 0

Sun 10:05am–11:55am

H3731: Japanese Folklore: Kitsune, Oni and Yuurei, Oh My!

Jennifer Yoo, Samantha Yoo

Ever wondered what a "tanuki" really is, or what the difference is between a youkai and a yuurei? Find out the answers here! Join us as we explore Japanese folklore and superstitions.

Open to students grades 7 through 12

Maximum Size: 0

Sun 10:05am–11:55am

W4355: Liquid Nitrogen Ice Cream!

Paul Handorff, Han Beol (Esther) Jang

Ice cream is delicious, but unfortunately it takes an awfully long time to make. Fortunately, liquid nitrogen can expedite the process! Liquid nitrogen is a lot like the nitrogen that makes up about 78% of air, except much colder—nitrogen boils at 77 K, or -196 degrees Celsius! We'll start by making some classics like vanilla and chocolate, then move on to more adventurous flavor combinations.

Open to students grades 7 through 12

Maximum Size: 0

Sun 10:05am–1:55pm

W3987: Papercutting

Christie Chiu

This course is an introduction to the Chinese art of Papercutting, which Wikipedia says is the art of cutting paper designs that originated in the 6th century (go figure.)

We will be working on some cute panda designs ^.^

Open to students grades 7 through 12

Maximum Size: 0

Sun 10:05am–11:55am

S3943: Skin cells to Stem cells

Rui Dai

Embryonic stem cells are the epicenter of enormous controversy. However, what if you can induce your own skin cells into pluripotent skin cells? In 2006, that's exactly what Yamanaka's lab did. In this class, we will learn about the developing field of induced pluripotent stem cells and the mysteries that have yet to be discovered.

Open to students grades 9 through 12

Maximum Size: 0

Sun 10:05am–10:55am

A4330: The Physics of Music

Russell Cohen

A segment of the popular HSSP class, "The Music Class You've Never Taken", this class will take a whirlwind tour of the Physics behind music. Topics will include:

The physics of sound formation; resonance; human hearing and sound perception, indoor acoustics, acoustic compression, and why Yo-Yo Ma's cello costs 2.5 Million Dollars.

Open to students grades 9 through 12

Maximum Size: 0

Sun 10:05am–11:55am

S3726: What is Life?*Sam Sinai*

What separates the living organisms from the rest of the world? How are we as complicated as we are today? Are there living organisms outside the earth?

These are the sort of questions we address in this class, in a way you have probably not seen before.

Open to students grades 9 through 12

Maximum Size: 0

Sun 10:05am–11:55am

S4055: Basic Cell Biology*Melissa Ko*

How are cells defined? How do they function? How do cells move, communicate, and specialize for unique functions in multicellular life?

We will discuss components of the cell, basic processes, and what cells do in organisms as complicated as humans.

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

H3983: Basics of International Relations*Kathleen Fitzpatrick*

An overview of the theory and practice of international relations will be presented. What exactly is a treaty? What's the difference between sovereignty and suzerainty? What's the difference between an ambassador and an envoy? What does it mean for a nation to recognize another nation? Does international law take precedence over national law? Can any world leader call any other world leader at any time? What's the protocol for doing so? How do nations organize visits between world leaders?

Open to students grades 10 through 12

Maximum Size: 0

Sun 11:05am–11:55am Sun 1:05pm–1:55pm Sun 3:05pm–3:55pm

M3849: Become a LaTeXer!*Jason Gross*

Want to learn how to use LaTeX to format your mathematical formulae like this: $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$? Want to make your English teachers think you're crazy for having your papers formatted nicely in scientific form? Come learn the basics of LaTeX, the standard mathematical typesetting language. Works on any platform. We provide the computers. But I'll tell you how to install it on your own computers.

Although we'll provide example mathematics to typeset, you'll probably get more out of the class if you bring your own mathematics to typeset (e.g. notes or homework from your math class).

If you want to use your laptop instead, you should install MiKTeX and TeXnicCenter (either together from <http://www.tug.org/protext/>, or separately from <http://miktex.org/2.8/setup> and

<http://www.texniccenter.org/resources/downloads/29>), or another LaTeX editor (if you don't use windows) before you arrive; the installation of MiKTeX can take about half an hour to an hour.

Open to students grades 7 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

M4388: Complex Analysis in all its Glory*Jordan Moldow*

$$f(a) = \frac{1}{2\pi i} \oint_{\gamma} \frac{f(z)}{z-a} dz$$

This is Cauchy's Integral Formula, which relates any "nice" function's value at a point to its values along a surrounding path. It is an extremely powerful statement in Complex Analysis (calculus of a complex-valued variable). With Cauchy's Formula, a function's interior behavior is completely determined by the boundary; if you know merely the border values of a function, you know every other value of the function inside the region. Such exactness cannot be found anywhere outside of pure mathematics.

This class will build from a solid foundation of calculus and complex analysis to derive Cauchy's Integral Formula. Why will we do this? Because it is glorious.

Open to students grades 10 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

A4018: History, Sub-genres, and Appreciation of Metal Music*Nathan Partlan*

Musical taste is controversial. Heavy Metal has always been especially so. Come learn about the storied and rich history of Metal. Be captivated by the energy of it, the uncompromising devotion to making music that is good instead of popular. Break free of the reins of lackluster, auto-tuned pop and discover the heights of music's potential. Note: We will not discuss musical theory in great detail.

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–11:55am

X3923: Intro to Hipster Culture*Justin Monestime*

Urban Outfitters, skinny jeans, flannels, and other hipster icons have become major aspects of the mainstream American lifestyle. Together we will study just how Hipsters came to be, what exactly being a Hipster entails, and where the culture might be going.

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–11:55am Sun 12:05pm–12:55pm

X4319: Intro to Triathlons*Alexander Sirota*

Students will learn the basics to each three sports of a triathlon. They will learn how to create a training sched-

ule suitable for their goals. We will explore basic training principles and how to best use your strengths and weaknesses to optimize performance. Injury prevention and stretching routines will also be included. Bring clothes you can stretch in!

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–11:55am Sun 1:05pm–1:55pm

E4259: Introduction to Amateur Radio

Piper Hunt

Come learn about ham radio! This class will review the basics to radio circuitry and operation, as well as how to get licensed and get involved with this nifty hobby.

Open to students grades 7 through 12

Maximum Size: 0

Sun 11:05am–11:55am Sun 12:05pm–12:55pm

H4407: Introduction to Positive Disintegration - Part 1

Josh Shaine

Dr. Kazimierz Dabrowski's Theory of Positive Disintegration (TPD) provides a lot of explanations for why some of us feel as if we fit into this world so poorly.

In this session, we will explore the basics of TPD, including OverExcitabilities, Dynamisms, and Levels of Development of personality.

So, if you are looking for alternate explanations for why some things bother you far more than they bother most folks, join us!

Open to students grades 7 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

E4322: Introduction to Probabilistic Robotics and Bayesian Inference

David Rosen

From outer space to abandoned mines to urban disaster areas, robotic agents are at the forefront of exploration in hostile environments. To successfully complete these missions, a robot must be able to operate for extended periods of time with little or no input from human controllers; this includes the ability to gracefully handle uncertainty and error.

In this class, we'll see how to use the theory of probability to build robots that are better, smarter, and more resistant to uncertainty and error, with a heavy emphasis on real-world examples (e.g., rockets, self-driving cars, rescue robots, and perhaps a submarine or two).

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

X4313: Knots for a Dangerous World

Vincent Lee

It's an unpredictable world out there, and you need to be

ready for anything! This class will teach you all the knots that you need to get yourself out of a tight spot or to fix a problem in tension!

Open to students grades 8 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

X4199: Learn to juggle!

Robert Myers

Come learn to juggle 3 balls and start on the path to dexterous greatness!

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–12:55pm Sun 1:05pm–2:55pm

X4128: Live, Laugh, Lead: Exciting Leadership Activities

Michaela LaVan, Kenny Lam, Amanda Mok, Christopher Ohlmacher, Victoria Sun, Jia Zhu, David Zou

Crossing deadly rivers of molten chocolate, escaping explosive minefields, and erecting great pyramids. Now what does all this have to do with Leadership? Come and find out...

Do you like games, teamwork, creative problem solving, or having fun? Want to know how this can help you become a better leader? Come and participate in fun interactive activities, and maybe learn a thing or two about leadership.

The Leadership Training Institute (LTI) is a high mentoring program right here at MIT and will be sending mentors to lead what will surely be a jam pack session of excitement and thoughtful conversation.

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

M3864: Pictures and Proofs

Katherine Rudolph

Rulers and protractors are for the weak! What lengths and angles can you construct using only a compass and straight-edge? We'll start from the very beginning of mathematical constructions and see how far we can go, proving things all the way!

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–12:55pm Sun 1:05pm–2:55pm

A4318: Simple Baking

Jim Nguyen, Joyce Wong, Joe Wong

Learn how to create a couple favorites from scratch: Rice krispie treats and apple crumble! No baking expertise necessary (Trust me...).

Open to students grades 10 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

S4310: Statistical Mechanics

Arvind Thiagarajan

Why can't time go backwards? No, it's a serious question: take any kind of system in motion, then go through and reverse all the velocities at a given instant and time and let the system run. If you think about it, you'll realize that this effectively causes any series of events to run exactly in reverse, i.e. it makes time run backwards.

If this can happen, how come it never does? How come a broken cup never reassembles spontaneously (after all, the reverse process happens more often than we would like)?

In this class, we'll answer this question, give you an idea of what the direction of time even means, and tell you how to think about complex physical systems where you can't possibly hope to understand everything exactly. With Statistical Mechanics, you'll be ready to look at most processes in the world (not just textbook friendly ones) and get a handle on them.

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–11:55am

X4302: The Internets: Legacies of “Awesome”

Joseph Ong

From the over 9000 years that have passed since the inception of the internets, many legacies have come and died. From the infamous days of fark.com, to the hilariously political actions of Project Chanology against the Church of Scientology, internet subculture has molded and formed a new definition for the concept we call “awesome”.

So, what exactly constitutes awesome? Virality? Interactivity? The pure presence of the lulz? Perhaps. Yet, awesome itself is not restricted to the world of memes, as one may think. For example, through its power of completing the homeworks of children all over the world, WolframAlpha has also been labeled a vast sea of awesome. Even today, inspired by Awesomeness, the Awesome Foundation grants of \$1000 a piece are being given out via the internets to people in real life (is this real life?) to fulfill real life awesomeness (i.e. Google the Boston Hammock).

So, how do these people actually detect whether an idea is truly awesome?

Well, in this class, through discovery of the many over 9000s of awesome that exist on the internet (I will bring you to some of these awesome objects, but you too, will suggest awesome things for us to analyze), we will analyze exactly what makes them so “awesome”. Who knows – perhaps one day, as a result of this class, you yourself may invent awesomeness on the internet.

Open to students grades 9 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm Sun 11:05am–12:55pm

M4088: The Symmetries of Things

Sachi Hashimoto

How many ways can I rotate a tetrahedron? How many ways can four people stand in line? What do these questions have to do with each other? In this class we will take a look at the symmetries of objects. This will be an introduction to the field of group theory. You already know a bunch of groups, like the real numbers, polynomials, and modular arithmetic, without even realizing that they're groups. We'll talk about what kind of structure all of these groups have, and what kind of structure more unfamiliar groups have—like the rotations and reflections of polygons. We will also be using Cayley graphs to visualize this symmetry and get a feel for what the structures are. If you like playing with different systems of rules, if you would like to twist the idea of multiplication, define new notions of addition, and learn with some very awesome math, take this class.

Open to students grades 9 through 12

Maximum Size: 0

Sun 11:05am–12:55pm

M3837: Who Wants to be a Millionaire?

Dylan Yott

In May 2000, the Clay Mathematics Institute announced a list of seven of the most difficult open problems in mathematics. Here's the fun part: each problem has a \$1,000,000 reward for a solution.

In this class, we will discuss what each of the problems means, why it is difficult, why it is important, and any work or thoughts about possible solutions.

In addition to the problems, we will discuss fun topics and problems related to the fields of each problem. These include: analytic number theory, physics, computability, topology, and more!

If you like math, money, or both, this class is a must.

Open to students grades 7 through 12

Maximum Size: 0

Sun 11:05am–12:55pm Sun 2:05pm–3:55pm

S3911: A Dog with a Human Brain: The Future of Genetic Engineering

Xuetao (David) Zhang

Will it ever be possible to create a dog with a human brain? I will discuss this and other surprising possible future advances in genetic engineering. In addition to technological challenges, I will discuss the ethical and political debates as well.

Open to students grades 10 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm Sun 1:05pm–1:55pm Sun 2:05pm–2:55pm

W4115: A Solar Car? Can It Do Sweet Jumps?

George Hansel

An introduction to MIT's Solar Electric Vehicle Team, our shop, and two of our solar cars.

Open to students grades 7 through 12

Maximum Size: 0

Sun 12:05pm–3:55pm

A4098: Camp Rock 2: Learn the Dance

Tara Ebsworth

Want to learn the 'Can't Back Down' dance from the Disney Channel Original Movie Camp Rock 2: The Final Jam? It's on! Get ready to have some fun and tear it down, Camp Rock style! Bring your moves, your dancing shoes (or just your regular shoes), and let's rock hard or go home.

<http://www.youtube.com/watch?v=r0kycFwF7Mo>

Open to students grades 7 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm

W3878: Candy Wrapper Art

Laura McKnight

For too long, candy wrappers have been oppressed by their candies. For too long, they have been carelessly thrown away while the candy that they held is enjoyed. No longer! Come, join the revolution and learn how you can make the wrappers of Starbursts and 5gum in to awesome art! (You'll probably get to eat the candy you unwrapped too)

Open to students grades 7 through 12

Maximum Size: 0

Sun 12:05pm–1:55pm

S4367: Chicken Soup for the Science Geek's Soul, Gr. 9-10

Reena Joubert

This course will happen in the format of stand-up comedy, with breaks for tea, comfort food, and introspection.

It requires no further explanation.

Open to students grades 9 through 10

Maximum Size: 0

Sun 12:05pm–12:55pm

H4321: Copyright: Laws and Implications

Alex Dehnert, Leonid Grinberg

We often hear scare stories about kids who download songs from the Internet and then gets sued for millions. Downloading music and other media is considered by many to be equivalent to stealing.

But what is it that the kid steals when he downloads a song, and from whom does he steal it? We would like to think that it is the music itself, but the downloaded file just contains a bunch of numbers that the computer uses to make sound. And why is the fine so high? Surely, the song doesn't cost thousands of dollars, especially when a CD with a dozen of them costs just a few bucks.

In this class, we will discuss the theory behind copyright laws, and what the court cases and battles that go into them are. We will also discuss some of the interesting implications of these laws (such as the fact that 80-year-old Mickey Mouse cartoons are still under copyright).

Open to students grades 9 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm

X3732: Durak

Sergei Bernstein, Svetlana Chekmasova

Have you ever played the Russian card game durak? It's a lot of fun and we will be teaching you how to play it! Afterwards, we'll play it for a while!

Open to students grades 9 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm

M4059: Intermediate Olympiad Geometry

Vlad Firoiu, Damien Jiang

We will explore a variety of topics often seen in geometry problems on national and international mathematics Olympiads. Important techniques, such as cyclic quadrilaterals, spiral similarity, homothety, and inversion will be covered.

Open to students grades 9 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm

H4078: Introduction to Latin

Christian Ferko

Salvete! In this class, we will quickly cover the basics of Latin grammar and learn enough vocabulary to construct simple sentences. We will also take a look at a few authentic selections from Roman writers and see if we can figure out what they mean. You should take this class if you're interested in languages and want to see why Latin is so precise, logical, and beautiful.

Open to students grades 7 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm Sun 5:05pm–5:55pm

W4323: Oobleck will blow your mind!!!!!!!!!!!!111!!!!eleven!!!1!

Stephen Face

What the *** is oobleck?! In short, a non-Newtonian fluid that we will make tons of. You can run on it, you can pound it, but move too slow and you'll be covered with a gooey mess.

Open to students grades 7 through 12

Maximum Size: 0

Sun 12:05pm–1:55pm

X4164: Spit shining boots & pocket mischief

Andrew Thompson

The suede combat boot has led to the demise of shiny shoe knowledge. Come learn to spit shine leather. While couching students along with creating the perfect mirror shine I will introduce a few amusing science toys/demonstrations that can be made with stuff you'd find in your pockets or desk.

Open to students grades 7 through 12

Maximum Size: 0

Sun 6:05pm–6:55pm Sun 12:05pm–12:55pm

C3961: The Languages of the Internet

Greg Brockman

Just like humans speak to each other to communicate, so do web browsers, mail clients, and pretty much any piece of software that uses the internet. Many of the protocols they use to communicate are in plaintext and are human readable, meaning that you can understand and speak them directly.

Learn to craft email from arbitrary addresses while speaking SMTP, or send crafted requests to webpages while speaking HTTP. This class will both show you what is happening under the hood in software you use every day, as well as give you an understanding of what parts of a protocol you can trust and what can be forged.

Open to students grades 9 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm

X4208: The Wikipedia Game!

Joshua Alman

One day in an especially boring chemistry class, you're distracting yourself by reading up on your favorite Italian composer, gambist, and singer, Claudio Monteverdi. Then, out of the corner of your eye, you see your chemistry teacher approaching! Quick! You have to get back to the page on polytetrafluoroethylene, which you're supposed to be reading. But, your laptop's keyboard is broken, the disambiguation pages and pages about years have recently been deleted, and the navigation bar on the left of the page has been eaten by bears! The only way to get to the page you want is by using links to travel from one page to another!

Come play the Wikipedia Game, and practice dealing with this real life situation!

Open to students grades 7 through 12

Maximum Size: 0

Sun 12:05pm–12:55pm

C4038: Androids, Handbells, Rock Band, and Scheme

Jonathan Sailor

What the heck?

In this course, we'll use a Scheme-ish language to program Android phones to act like handbells, and play songs with them.

You won't write a traditional smartphone program, but we'll talk a little about smartphone programming concepts and challenges, and you'll get to use literally cutting-edge research code.

<http://www.youtube.com/watch?v=WMYLJUKMPbA>

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

A4344: Art of Improv

Rahat Bathija

Students perform improv, Basically teaching and doing "Who's Line is it Anyways?" type stuff.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–1:55pm Sun 2:05pm–2:55pm

A4311: BOOM Photoshop

Vincent Lee

A crash course in Photoshop techniques and theory. We will start with the basics of the program and speed on to advanced to techniques and world replication.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

S4334: Bird Calls

Evan Kuras

Ever wonder if birds were doing more than just trying to wake you up in the morning? Learn how to recognize and make numerous bird sounds. We will also look into the role of nature in the development of language and music. You will leave with the impressive ability to make bird calls. Don't tell your mom.

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–1:55pm Sun 2:05pm–2:55pm

X4179: Capital Constrained Value Investing

John Curtice

Learn to do your investing homework by examining special situations type value investments where you can gain a competitive advantage.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–1:55pm

S3713: Chemical Sensors

Chris Kennedy

How do you detect a bomb without a metal detector, x-ray equipment, or any kind of search? The answer lies in chemical sensors, which are extremely sensitive devices that can pick up traces of TNT, nerve gas, or other dangerous chemicals from several meters away. We'll examine the inner workings of chemical sensors that rely on polymers that conduct electricity, which currently give the most sensitive equipment known to man. If you like chemistry, you'll like this class.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–1:55pm

M4099: Combinatorial Nonsense!

Timothy Chu

Not combinatorial sense!

Open to students grades 8 through 12

Maximum Size: 0

Sun 5:05pm–5:55pm Sun 1:05pm–1:55pm

X4400: Creating a Better World - In College

Elizabeth Holmes, Julia Kajan

We all wish to change the world right? Learn about how you can improve the world around you while in college. Topics will cover leading student organizations, fund-raising, marketing & development. During the course, students will be utilizing various programs & learning about the use of social media & technology. This will be an interactive course - get ready to participate!

Students should be comfortable using Macs, & should bring their passions, ideas and causes to the course!

Open to students grades 10 through 12

Maximum Size: 0

Sun 1:05pm–4:55pm

X4416: Effective Communication and Conflict Resolution

Andrew Cowan, Meri Jade Piltser

Effective Communication and Conflict Resolution for negotiating social difficulties in a positive and constructive manner.

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

H4442: Game Design 101: Part 2 (Technical Production)

Alex Chisholm

In this hands-on, activities-based workshop, the Learning Games Network, a non-profit spin-off of the MIT Education Arcade, will support students interested in competing in the National STEM Video Game Challenge (<http://www.joanganzcooneycenter.org/Initiatives-31.html>).

Game Design 101: Part 2 will cover the following:

- Thinking about user interface, art, sound, dialogue, and music
- Basic interactive programming strategies
- Technical tools, including Scratch, StarLogo, Alice, GameStar Mechanic, and Kodu
- Testing and balancing

We will work with students on preliminary programming exercises to introduce them to select resources, as well as provide links and reference materials to support their subsequent technical development.

Open to students grades 7 through 8

Maximum Size: 0

Sun 4:05pm–6:55pm Sun 1:05pm–3:55pm

A4308: Great Modulations in the History of Music

Russell Cohen

From the transparent modulations roots of the common prac-

tice period to the truck-driver modulations of modern pop music, this course will undertake an in-depth study of several amazing modulations. We will begin with an (brief) overview Roman Numerals look at the general idea of modulation. From there, we will dive in depth into some of the greatest modulations of all time.

Open to students grades 10 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

H4382: History of the Star Wars Galaxy (Part 3)

Evan Ehrenberg

Overview of the history of the Star Wars Galaxy covering material from 30,000 BBY to 25 ABY. This is a four-part course focusing on character profiles, important events (including the Great Hyperspace War, the Sith War, the Mandalorian War, the Second Sith War, the Battle of Ruusan, the Clone Wars, the Galactic Civil War, the Birth of the New Republic, and the Yuuzhan Vong Invasion), weapons and technology (everything from blasters and lightsabers to energy shields and cloaking devices), and vehicles and vessels with a focus on the use and development of the force by the Jedi Order, the Sith, and other lesser known factions throughout. Class will consist mostly of lecture with short breaks for discussion of the material.

Part three of this course will cover history from 5 ABY to approx. 25 ABY. This will cover events from the creation of the New Republic to the beginning of the Yuuzhan Vong invasion.

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

H3879: I Know It When I See It

Paul Kominers

How the US deals with obscenity is, by definition, incredibly poorly defined, most famously codified when Justice Stewart declared that “I know it when I see it”. In this class, we’ll discuss why obscenity is so hard to pin down in law and both how and why we deal with it as we do right now.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–1:55pm

X3999: Introduction to Dominion

Nathan Benjamin, Sergei Bernstein

“I throne room a throne room and play two bridges!” Come and learn to play (or just play) the great card/board game Dominion. Dominion is a strategic deck-building card game that is fun, addicting, and awesome! Players of all skill welcome.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

M4309: Introduction to Induction

Ruth Byers

Are all horses the same color? Don't answer that. Instead, come to this class, and watch me prove it using mathematics.

Induction is a method of mathematical proof, and it allows you to prove interesting statements very elegantly. Like that all horses are the same color.

Learn to use (and misuse) induction to do math and confuse your friends.

Open to students grades 7 through 8

Maximum Size: 0

Sun 1:05pm–1:55pm

H4244: Myanmar : Home of Burmese Pythons

Suan Tuang

Want to learn about the country that has one of the biggest pythons on the planet and yet is a country with GDP capita of just \$462? When was the last time a Nobel Peace Prize winner wasn't allowed to receive his/her Nobel Prize due to government intervention?

Learn about the Noble Laureate who spent 14 of the past 20 year in house arrest. Expand your cultural horizons and learn about the country of Myanmar (formerly known as Burma).

We will discuss current state of Myanmar while covering various topics such as the military government, ongoing elections, living conditions, etc.

Open to students grades 7 through 12

Maximum Size: None

Sun 1:05pm–1:55pm

S3958: Probabilistic Modeling

Jacob Steinhardt

In the early days of artificial intelligence, researchers tried to model decision-making by chains of logical deductions.

We have now come to realize that logic is much too strict for making everyday decisions. A much better approach is to use probabilities to represent uncertainties about the state of the world, and then update those probabilities based on new information.

In this class I will lay down the fundamentals of probabilistic modeling, then go into examples of applications. These examples will cover hypothesis testing in experiments, improving the accuracy of measurements, de-blurring images, data mining, and modeling human thought.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

E4015: Really, Really, Really, Really, Really, Really, Really, Really, Really Small Things: an Introduction to Nanotechnology

Liza Plotnikov

Let's say you have a brick of pure gold. What color do you

think it would be? Probably yellow, right? Okay, let's say you take your brick of gold and cut in in half. Now what color is it? Probably still yellow, right? Alright, now what if you cut your brick of gold in half so many times that you wind up with a teensy piece that's only a couple hundred atoms across. Of course you'd find that its color is...red? Turns out that stuff tends to behave really weirdly when it's small. Why? Come find out.

Open to students grades 10 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

X3926: The Science of the Electric Guitar

John Snyder

Have you ever wondered how guitar greats achieve their signature sound? Have you ever listened to a song and thought to yourself, What the heck is that sound? Or have you just wondered how a guitar turns sound into electricity and back? From Jimi Hendrix to Jonny Greenwood, the best guitar players have been those who push the envelope of sound wave manipulation. The electric guitar (and the HUGE array of effects that can go along with it) has always been the instrument of the adventurous, but what makes this versatility possible? In this course we will look at the physics and electronics of this incredible instrument, the sounds that defined rock music and its myriad descendants, and the history that got guitar music to where it is today.

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

S3812: The development of the human mind

Timothy Brady, Adena Schachner

What can studying infants tell us about how the mind and brain works? In this class we will discuss everything from whether a young child understands morality to the origins of math. Do young children "know" the laws of physics – and how could we tell if they did? Will giving a 5-month old sticky-mittens make them smarter when they grow up? How about 'Baby Einstein'?

We'll review the evidence on what kinds of knowledge we born with, and what we learn as babies to try to get an understanding of the adult mind.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

S4280: Time Travel and the Fourth Dimension

Michael Shaw

People have been fascinated by the idea of playing with time for generations. Whether in a Tardis or a DeLorean, or perhaps the Starship Enterprise, our culture is inundated by fictional characters who travel through time as we do space.

Lets meet in the here and now to discuss the there and then. We'll see how fiction portrays time travel, and what science has to say. Einstein teaches us that time is not so

absolute as we might think, and modern physics proposes tantalizingly plausible universes full of higher dimensions, and closed time-like curves.

Join us on our quest through time, as we study the future, the past, and paradoxes of all varieties. Go home and tell your friends that you are an expert in temporal mechanics.

Open to students grades 9 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

S4158: When Cells Die.

Andrew Thompson

A mini-introduction to pathology, the study of disease. We will explore the body's various tissues through examples of micro-anatomy and describe the changes they undergo as they encounter insult, injury and death. Hopefully your basic biology knowledge will be sharpened to explain many sophisticated phenomena of disease and death.

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–2:55pm

W4193: Wikinovels

Alan Huang

A wikinovel is a story written collaboratively by many authors using a wiki. We don't have a wiki, so we'll be using paper. (You know, that thing people wrote on before the Internet.)

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–6:55pm

X4288: World Conquest (Axis And Allies)

Tyler Hamer

The year is 1940. It has been a year since Nazi Germany begun their blitzkrieg across Europe and Europe sits under their strangle hold. Who will you join, the Axis or the Allies and more importantly who will win?

Come and join us as a Jap, a G.I., a comrade, a Tommy, or even the Third Reich to duel it out in Axis and Allies.

Open to students grades 7 through 12

Maximum Size: 0

Sun 1:05pm–3:55pm

S4083: A brief introduction to electromagnetism; or, how not to build a railgun.

Sam Bankman-Fried

In this class, I'll describe how one could attempt (and why one might fail) to build a railgun: an elegant device that uses electric current to accelerate a projectile.

First, however, I'll give a brief introduction to electromagnetism: electric fields, voltage, current, resistance; magnetic fields, the magnetic force on charged particles.

Open to students grades 9 through 12

Maximum Size: 0

Sun 6:05pm–6:55pm Sun 2:05pm–2:55pm

E4010: Bicycle Maintenance and Repair

Ethan Lewin

Being able to maintain and repair your own bicycle is a useful skill that will save you money and time. I will cover the basics, including lubrication, brake replacement/adjustment, tube replacement, chain replacement, and wheel alignment. I will also describe the different types of bicycles and how to decide whether a bicycle in a particular price range is worthwhile or not.

Open to students grades 9 through 12

Maximum Size: 0

Sun 2:05pm–2:55pm Sun 3:05pm–3:55pm Sun 4:05pm–4:55pm

H3998: Español: Spanish from the Basics

Zachary Haney

Hola! Would you like to read Don Quixote de la Mancha in the original? How about Borges? Garcia Marquez?

We will begin with the first words you might want to know and move on to be able to read actual Spanish. The goal I have is that you will see that it is unnecessary to always employ English to learn Spanish. If done well, very little translation will be used to elucidate this concept. By the end of course, we will have you set on the right path to learning a language spoken by over 300 million people (the third most spoken language in the world).

Nos vemos pronto!

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

M3886: FUNDamentals of Calculus

Ian Martin

Learn the basics of derivatives and integrals. A good background in algebra is definitely recommended, but I'll do my best to stay away from trigonometry for the benefit of younger students. If you're currently taking or have already taken calculus, you will probably be bored.

Open to students grades 8 through 11

Maximum Size: 0

Sun 4:05pm–5:55pm Sun 2:05pm–3:55pm

S4106: Feynmanomena

Amber Bennoui

Feynman wasn't your typical physicist - renowned for his quirky sense of humor and remarkable discoveries in quantum electrodynamics, he's right up there with the likes of Maxwell and Newton.

We'll discuss his Caltech years, ogle the sweet shuttlecraft named after him and look at a few of his published papers. An extensive knowledge in physics isn't required but you must have a good sense of humor!

Open to students grades 9 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

W4176: How to Dance like Napoleon Dynamite

Katelin Schutz

Do you want to know if this boogie is for real? Do you wanna get so sweaty practicing some dance moves? Do you want to have some skills? (Because, you know, girls only want boyfriends who have great skills You know, like nunchuck skills, bow hunting skills, computer hacking skills) Well, then theres nothing left for you to do but dance!

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

H3970: How to Read a Poem

Lance Ozier

Have you ever read a poem and wondered what is going on? Or, as the poet T. S. Eliot once wrote, have you had the experience but missed the meaning? In this class you will learn eight simple techniques to help you make more sense of the poems you read.

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

X4147: Introduction to Japanese Mahjong

Kyumin Lee, Tiffany Lin, Chung-an Wu

Exciting. Challenging. Competitive. Cutthroat. What are we talking about? Why, Japanese mahjong, of course! Come and see why mahjong isn't just for gambling parlors and old ladies anymore.

Open to students grades 9 through 12

Maximum Size: 0

Sun 2:05pm–4:55pm

H3830: Introduction to Mandarin Chinese

Stephen Hou

Did you know that more people speak Chinese than any other language in the world? Or that Chinese is a tonal language, where shifts in musical pitch affect the meaning of every word? Or that Chinese verbs never conjugate, and nouns & adjectives don't have gender? This class is an introduction to Standard Mandarin, the official form of Chinese spoken in mainland China, Taiwan, and Singapore. We will start with pronunciation and basic conversational phrases, followed by some simple grammar and dialogues. We will learn how to pronounce Chinese names and numbers. Finally, we will discuss some common Chinese idioms with roots in Chinese history and culture. This class is designed for those who are fascinated with languages, rather than for students who simply want to memorize a lot of phrases, so the emphasis will be on the linguistic and cultural aspects of the Chinese language.

Open to students grades 10 through 12

Maximum Size: 0

Sun 2:05pm–4:55pm

H4413: Introduction to Positive Disintegration - Part 2

Josh Shaine

In Part 2, we'll look more deeply into Dabrowski's Theory of Positive Disintegration and how the different levels of development are reflected in behaviors and emotions.

Among the ideas we will explore are positive maladjustment, auto-psychotherapy, and syntony vs. empathy.

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

M4338: Lies, Damned Lies, and This Class

Jacob Hurwitz

Mark Twain once quipped: "There are three kinds of lies: lies, damned lies, and statistics." Learn how to spot a damned lie by taking this class in basic statistics! (Side effects of this class may include the urge to write angry letters to newspapers every time they misuse or misunderstand statistics.)

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

A3839: Operating a Giraffe at Subzero Temperatures

Victor Hung, Rex Lam, Victoria Sun

Ever wish you were an astronaut? Harry Potter? Or operating a giraffe at subzero temperatures? Be whoever you want to be with our improv acting seminar! Prepare yourself for a class that suddenly becomes a rocket ship, with diamonds in your hands that suddenly become tickets to that favourite show. I'm on a horse.

Open to students grades 7 through 12

Maximum Size: 0

Sun 3:05pm–3:55pm Sun 2:05pm–2:55pm

C4306: Reaching down to the Operating System Kernel

Dan Noe

What does a computer operating system kernel (core) do? In the most basic sense, it is a special program that manages shared resources by virtualizing them. In a typical computer, the operating system provides access to resources like the CPU, memory, hard disk and other hardware devices.

Each task running on the operating system runs as if it is in its own virtual container, as if it has its own CPU and memory. Programs running in unprivileged mode are prevented from interfering with others. How does the OS kernel accomplish this? How does the hardware support the OS kernel? Well discuss how, using generic examples.

Well also look at some easy, generic examples of how files are stored on disk and discuss some of the differences between modern operating systems like Linux, Windows, and Mac OS X.

Open to students grades 8 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

W4209: Rock-Scissors, and other interesting games

Joshua Alman

Rock-Scissors is a 2-person game. The players face each other, and begin by exclaiming Rock! Scissors! while raising one hand in a fist, and swinging it at each word. Then, they cry out Shoot! and each player either leaves her hand in a fist, signifying rock, or extends her index and middle fingers, signifying scissors. If both players make the same move, then the result is a tie, but if not, then the player who uses rock wins.

This may seem like a silly game at first, but under the right circumstances, it might not always be best to use rock. Come play rock-scissors and other such games, and learn strategies to beat all your friends!

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–2:55pm

H3734: Samurai versus Ninja

Jennifer Yoo, Samantha Yoo

Samurai - “One who serves.” Ninja - “One who is hidden.” Almost everyone knows a little about these warriors. But what exactly were they like? Come and learn from the very warriors themselves! Find out from each how to think, act, fight, live, and even die like a samurai and ninja. Which one will you be?

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

W3739: Set

Jonathan Chien, Alex Cole, David Huang

Learn how to play Set, the best game ever! Challenge pros at Set! Win FABULOUS prizes. Beginners and experts welcome. We will be running multiple games to accommodate all skill levels.

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

H4425: The History of Middle-Earth: the Second Age (and a little bit of the Third Age)

Raisa Lardie

JRR Tolkien’s The Lord of the Rings takes place fairly late in the overall timeline of Middle-Earth; what happened before that? Come learn about the rich history of Arda as we follow the events that ultimately led to Biblo Baggin’s discovery of the One Ring.

The final part in a three-class series, the Second Age sees the forging of the Rings of Power, and all the disasters that brought, such as: the War of the Elves and Sauron, the birth of the Ringwraiths, the corruption of Nmenor against the Valar and the elves, and the Last Alliance of Elves and Men

(among other things). We will also cover the Third Age up to the events immediately preceding The Hobbit and The Lord of the Rings.

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–2:55pm Sun 4:05pm–4:55pm

M4281: The Magic of Wedge Products

Andrew Geng

Did you ever find it suspicious that the cross product only works in three dimensions? Does it disturb you that physics makes such heavy use of cross products? What about matrix determinants? How come it’s possible to compute a cross product using a determinant?

What sort of quantity do you need to describe angular momentum in 4 dimensions anyway?

This is why we have the wedge product (try looking it up on MathWorld or Wikipedia)! You can compute it using two easy rules, and it can be used to find both cross products and determinants! Well warm up with a quick review of cross products, and then well define the wedge product and see how far we can go!

Open to students grades 9 through 12

Maximum Size: 0

Sun 2:05pm–2:55pm

A4370: Three- and Four-Chord Songs

Benjamin Sena

Perhaps you’ve seen Four Chord Song by The Axis of Awesome or The Pachelbel Rant on YouTube. Come learn most of the songs you’ve ever heard in two hours.

Open to students grades 7 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

X4080: War, Diplomacy and Trade Simulation

Derreck Barber, Enrique Cintron, Enrique Cintron, Evan Hefner

Need to sharpen your warfighting or politicking skills? After taking Introduction to Diplomacy, War and Trade, come practice in the most underplayed hot-spot in the world: East Asia. Rich with natural resources, key strategic islands, and ambitious great-powers-to-be, peace in East Asia is getting hard to come by. Come and lead one of eight elements: Japan, China, Taiwan, North Korea, South Korea, Russia, Vietnam, and the United States, controlling their diplomatic, military and economic actions in the great East Asian conflict of 2012. Accomplish your countrys goals by fighting on land, sea and air, or if you prefer, by using diplomacy, backstabbing, and market manipulation.

Open to students grades 9 through 12

Maximum Size: 0

Sun 2:05pm–6:55pm

H3997: What is art?

Nora Rsnen

What is art to you? See the ways in which professionals in various fields have addressed this question, and whether or not you agree with them. As students, we will discuss art from cultures around the world and try to come up our own answer to this age-old question.

Open to students grades 9 through 12

Maximum Size: 0

Sun 2:05pm–3:55pm

S4350: AC Circuits and Complex Impedance

David Field, Anand Oza

We will learn how to analyze AC circuits in a very simple and elegant manner, by introducing the idea of complex impedance (the analog of resistance in a DC circuit).

Open to students grades 9 through 12

Maximum Size: 0

Sun 3:05pm–3:55pm

X3811: Black Thumb Support Group

Jennifer Melot

Do you kill your houseplants and can't figure out why? Come to this class to learn the basics of houseplant care... and take home a small (and hard to kill) plant to get a fresh start in plant husbandry!

Open to students grades 7 through 12

Maximum Size: 0

Sun 3:05pm–3:55pm

A4291: Drawing Fantastical and Alien Creatures

Courtney Hilliard

Want to do better than the loads of crappy dragon art out there on the Internets? Or maybe draw aliens that don't look like Star Trek characters? Want to sit and art with your pals while learning from each other and a teacher? This is the place to be.

Drawing Fantastical and Alien Creatures is an interactive art class. Students will bring their own pencils and paper (or other art supplies) and learn how to create plausibly structured fictional non-human creatures. The class is question-based; what material is covered depends on what students ask, and they will brainstorm among themselves as well as receiving answers from the teacher. Want to do better than the loads of crappy dragon art out there on the Internets? Or maybe draw aliens that don't look like Star Trek characters? Want to sit and art with your pals while learning from each other and a teacher? This is the place to be.

Drawing Fantastical and Alien Creatures is an interactive art class. Students will bring their own pencils and paper (or other art supplies) and learn how to create plausibly structured fictional non-human creatures. The class is question-based; what material is covered depends on what students ask, and they will brainstorm among themselves as well as receiving answers from the teacher.

Open to students grades 10 through 12

Maximum Size: None

Sun 3:05pm–4:55pm

H4295: I'm Not a Prescriptivist, But...

Diyang Tang

Everyone has a word-related pet peeve. Is there a word other people misuse that makes you a bit sad, since you like the word so much? Come exalt over words, but also come prepared to celebrate the fluidity of the English language and how word meanings change.

Open to students grades 9 through 12

Maximum Size: 0

Sun 3:05pm–3:55pm

A3915: Intermediate Poi

Nathan Lachenmyer

Tired of the same old three-beat and butterfly patterns? Come to this class to learn a variety of new tricks and how to transition smoothly between them! Aimed at people who have practiced poi on their own before or have taken a course during a previous Splash.

Open to students grades 7 through 12

Maximum Size: 0

Sun 3:05pm–3:55pm

C3730: Intro to Movie Making

Christopher Kelly

This class will be focused on learning the basic skills to make an effective movie using the software Microsoft Movie Maker. Students will learn the fundamental keys to movie-making, the shortcuts to making beautiful films, and much more!

Open to students grades 7 through 8

Maximum Size: 0

Sun 3:05pm–4:55pm Sun 5:05pm–6:55pm

X3863: LockPicking 101

Harvey Yee

Come to this class to get a hands on introduction to the science and art of lockpicking a combination lock using two different methods, one physical and one analytical.

Come and explore the art, science, and history of lockpicking.

This year you will have extra time to develop your lockpicking skills.

Open to students grades 9 through 12

Maximum Size: 0

Sun 3:05pm–5:55pm

E3853: Physical Security

Eric Van Albert

Learn just how insecure the world around us is. Covers everything from social engineering to lock picking to RFID cards.

Open to students grades 9 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm Sun 3:05pm–4:55pm

A3993: Screenprinting

Moni Gallegos, Nikita Khlystov

Like to draw? Have a bunch of awesome sketches lying around at home? Come learn how to screenprint, so you can wear your own rad designs and make limitless numbers of posters for everyone to enjoy! We will be drawing some cool designs in groups, learning the techniques of printing using screens, fancy photoemulsion, and ink, and making posters and/or t-shirts with your very own design on them. Designs can be hand-drawn or digitally made, and each student will print his or her own copy of the group's design.

Open to students grades 11 through 12

Maximum Size: 0

Sun 3:05pm–6:55pm

S4163: Stupid human tricks

Andrew Thompson

We'll cover some of the more unusual examples of how the human body can be an example of exquisite functional design or completely stupid fail. From here I hope to encourage discussion and question & answer of any bodily myth, mystery, or ailment. Stomach growling. Entoptic images. Knuckle cracking. The valgus knee and how Bigfoot has to be a guy in a furry suit. Maple Syrup Urine Disease...

Open to students grades 7 through 12

Maximum Size: 0

Sun 3:05pm–4:55pm

A3719: To Infinity and Beyond! The History of Pixar

Ari Donnelly

Do you find yourself looking at all your old toys that you haven't played with for years, and feeling very guilty? Have you ever tried tying a thousand balloons to your chimney in the hope that your house will take off and fly away? Have you been neglecting to call the pest exterminator for months on end, out of fear that the rats in your house will stop cooking exquisite French cuisine for you if you do so?

Do want to know who's responsible for these strange feelings you keep having? Come to Infinity and Beyond! You'll find out how these pesky Pixar people got their start, and how they have become one of the most successful and critically acclaimed film studios of all time*.

*You'll also learn why this last part of the sentence is a big understatement.

Open to students grades 8 through 12

Maximum Size: 0

Sun 3:05pm–3:55pm

M4272: Topics in Analytic Number Theory

Paul Handorff, Joseph Ong

Analytic number theory is a branch of number theory that uses mathematical analysis to solve number theoretic problems. In this class, we will delve into the field of analytic number theory by looking at several notable problems: divergence of the sum of the reciprocals of primes, the twin prime conjecture, the Collatz conjecture, and Dirichlet's Theorem on arithmetic progressions.

Open to students grades 9 through 12

Maximum Size: 0

Sun 3:05pm–4:55pm

C4247: Unix is your friend (Or, how I stopped worrying and learned to love the command line)

Andrew Farrell

Linux and Mac OS are both based on Unix and we'll show you a bit about how they are structured, how to start using the command line, how to configure things, and how to write short scripts to automate things you do all the time.

Open to students grades 9 through 12

Maximum Size: 0

Sun 3:05pm–4:55pm

S4017: Why do Metals Conduct Electricity?

Liza Plotnikov

Why do metals conduct electricity? Why do insulators insulate? What the heck is a semiconductor? In this class we'll talk about what gives a material its electrical properties. We'll also learn how these properties can be tweaked to build electronic devices (like the computer you're using to read this course description).

Open to students grades 10 through 12

Maximum Size: 0

Sun 3:05pm–4:55pm

H4060: Women in Poetry

Melissa Ko

Together, we will read and discuss poems by poets such as Marianne Moore, Sylvia Plath, Elizabeth Bishop, Maya Angelou, Emily Dickinson, Anne Bradstreet, and Adrienne Rich.

We will talk about women in the history of poetry and see how poetry (in terms of content and style) reflects the changing role of women in society. We will also go through several poems for enjoyment's sake.

Open to students grades 9 through 12

Maximum Size: 0

Sun 3:05pm–4:55pm

H4003: Alternative Lifestyles throughout the Ages

Zachary Haney, Nora Rsnen

For ages people have been railing against any form of sexuality other than heterosexual monogamy. With the recent suicides regarding bullying, it is important to understand that sexuality has always been more diverse than simply straight. In this class we'll discuss alternative sexualities, such as gay and lesbian, in various historical contexts, from the philosophies of the Ancient Greeks, to medieval Japanese paintings, to what the Bible REALLY has to say.

Open to students grades 10 through 12

Maximum Size: 0

Sun 4:05pm–6:55pm

C3715: Beginner's Cryptography

Amber Bennoui

1205011814 081523 2015 051403150405 011404 040503150405

1305191901070519! (Learn how to encode and decode messages!)

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm

S3957: Being Optimal

Jonathan Losh, Jacob Steinhardt

A vast pile of evidence suggests that humans (even very intelligent humans) have suboptimal habits. Come to this class to find out which of these things you do — then find out how to stop.

Open to students grades 9 through 12

Maximum Size: 0

Sun 4:05pm–4:55pm

X4324: Bollywood, Bhangra and Hip-hop Fusion!

Anshul Bhagi, Akansha Kumar, Lakshman Sankar

Do you want to learn new dance styles, get an aerobic workout, and have fun all at the same time? Come learn some moves from Bhangra, Hip-Hop and Bollywood dance that will impress everyone on the dance floor. Bhangra is an energetic dance from the Indian state of Punjab and Bollywood dance is, well, the main dance of Indian pop culture. Fuse these dances together with Hip-hop and get a healthy dose of fun Indian culture!

Open to students grades 9 through 12

Maximum Size: 0

Sun 4:05pm–6:55pm

M3870: Differential Equations

Benjamin Horowitz

Differential Equations are the most powerful mathematical tools ever created to understand the world. They are essential to understanding economics, biology, chemistry, geology, physics, meteorology, sociology, and tons more. Also differential equations are interesting in a purely mathematical context, and have an extensive theory of existence and uniqueness of solutions. Come to embrace differential equations from both a computational and theoretical perspective; covering topics like separation of variables, homogeneous and non-homogeneous linear equations, Laplace transforms and systems of linear equations. Also, I will cover some cool qualitative methods (linearization of non-linear systems, phase diagrams) if time permits.

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm

S3875: Exoplanets

Laura McKnight

18 years ago, we discovered a planet outside of our own solar system. Come learn about how we discovered this and other planets, what we've learned from them, and where we're hoping to go in the future. Why? Because space is cool.

Open to students grades 9 through 12

Maximum Size: 0

Sun 4:05pm–4:55pm

H3714: FCC v. Fox

Paul Kominers

The case FCC v. Fox could completely reshape how much power the government has over what you say or do on the airwaves. It's currently being appealed to the Supreme Court. In this class, we'll learn the legal history of FCC v. Fox—what preceded it, what the current state of the case is, and where it's probably going.

Open to students grades 9 through 12

Maximum Size: 0

Sun 4:05pm–4:55pm

W4352: FLCL

Robert A. R. Arlt Jr, Jennifer Hope

Come try and figure out just what FLCL is.

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–6:55pm

W4253: How to Speak Ridiculously Fast

Ho Chit Siu

Radio ads and rap artists are way too slow. Learn to talk at the speed of thought! Or learn to read something out loud faster than your brain can actually process it!

Learning from an aspect of the extreme sport of Policy Debate, you will learn to speed read out loud, speak fast clearly, and speak clearly in general (the last one will probably be the most helpful, but the first two will be more awesome).

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–4:55pm

H4031: Introduction to Thai 2

Abhabongse Janthong, Sasilada Sirirungruang, Phumpong Watanaprakornkul, Tana Wattanawaroon

Want to be cool and speak Thai “nid noi” on your next trip to Thailand? This class focuses on sentence formation and useful expressions for tourists in Thailand. Vocabulary on numbers, everyday items and activities will also be taught. After this course, you will know how not to be a “farang” clown saying words used by opposite gender.

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–6:55pm

X3809: More Chainmaille

Alyssa Zisk

So you can make some chainmaille already, but you want to know more? I'll teach a few weaves that were not covered in any of the Make Chainmaille! sections, probably ones that are used for chains or jewelry instead of sheets. We might also play with scales or other funky pieces.

Open to students grades 9 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm

Sun 5:05pm–5:55pm Sun 4:05pm–4:55pm

C4366: Optimizing graph-search run times, with applications to Cambridge

Patrick McDaniel, Stephen Serene

Graphs are a ubiquitous formalism in computer science and beyond. In particular, rapid graph search is a classic problem for computer science. In addition, rapid locomotion is a classic problem for humans. Coincidence? We think not.

Under the guidance of seasoned MIT trackmen, you'll run into Cambridge, then explore a variety of search algorithms as we navigate our way back to MIT, where post-run bananas and chocolate milk will be waiting. Total mileage will be around five.

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm

S3968: Origins of Modern Science from Copernicus to Newton

Lance Ozier

Only 500 years ago, most people thought the Earth was the center of the universe and that there were only four elements: earth, air, water, and fire. Come learn how five men, two supernovas, and the Black Plague changed all that.

Open to students grades 8 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm

H4162: Show-and-Tell Poetry Workshop

Colin McSwiggen

NOTE: In order to participate in this class, you must bring a poem, written by you, to share with the group.

This is a course for people who have experience writing poetry and want to get feedback on their work. We will each bring one poem in any style to read, and we'll discuss each poem in turn. As we go, we'll cover some general points of style and technique for both stage poetry and page poetry, as well as tips for getting published.

Don't expect the advice of a master - I am not a widely published poet, just a student writing on the side. This is mainly an opportunity for you to air out your work in front of an audience of other writers.

Open to students grades 9 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm

C4210: Sort Yourself

Michele Pratusevich

The modern world is all about data - data in databases, data in lists, data in Google, data on your computer. But with all this data, we have to know how to use it. One of most fundamental ways to use data is to sort it. This class will explore various sorting algorithms - we'll even sort in $O(n)$ time! Impossible you say? Well, I say you're wrong.

Open to students grades 9 through 12

Maximum Size: 0

H4226: The Sounds of Speech

Christopher McNally

In this class, I will explain the fundamentals of phonological study: what sounds make up human language, how they are produced and why they exist in the way they do. This will be fairly introductory; if you've memorized the whole of the International Phonetic Alphabet, this class is not for you. If you're new to linguistics, though, or having trouble pronouncing those silly sounds in a foreign language you've recently taken up, do come!

Open to students grades 7 through 12

Maximum Size: 0

Sun 4:05pm–4:55pm

H4214: Things You Could Do in Ancient Rome but Not Today

Reuben Aronson, Dora Gao, Claire Nauman

A brief survey of ancient Roman history from the Regal Period to the fall of the Empire through compelling narratives, with a special attention to the stranger stories. Come learn about deadly figs, collapsible boats, political manipulation, civil wars, insane emperors, and well-honored horses. This course will also equip its students with the necessary responses in case they are ever trapped in an awkward yet deadly conversation with a deranged emperor. Note: some raunchy yet historical material may not be suitable for younger grades.

Open to students grades 9 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm

S4150: What is Graphene? And Why is it Worth a Nobel Prize?

Chris Kennedy

As you may know, the 2010 Nobel Prize in Physics went to Andre Geim and Konstantin Novoselov for the discovery of graphene. Graphene, a sheet of carbon atoms just one layer thick, is one of the most interesting and most-studied materials in modern physics. In this class, we'll examine how to make it, what it could be used for, and why all its wonderful world-changing applications are still a little ways off.

Open to students grades 9 through 12

Maximum Size: 0

Sun 4:05pm–4:55pm

S4353: What's a Climate Model, Anyway? Understanding and Predicting Global Climate Change

Reena Joubert

Almost any article on global warming will mention these things called "climate models." What are they, and why are they so important in studying climate change?

Just as you are made of flesh and bone, a climate model is made of math - math that describes the physics and chemistry of our atmosphere, biosphere, geosphere, and oceans.

In this class, we'll first look at the (basic) science of global warming, and then we'll use some thermal physics to build an

extremely simple climate model, often called the Simple EBM - the tiny egg that hatched the much larger (read: hundreds of thousands to millions of lines of Fortran code) models that give us modern global warming predictions. If we have time, we'll also build on the Simple EBM to make slightly more complex models, and see what we can deduce!

Open to students grades 10 through 12

Maximum Size: 0

Sun 4:05pm–5:55pm

H4383: History of the Star Wars Galaxy (Part 4)

Evan Ehrenberg

Overview of the history of the Star Wars Galaxy covering material from 30,000 BBY to 25 ABY. This is a four-part course focusing on character profiles, important events (including the Great Hyperspace War, the Sith War, the Mandelorean War, the Second Sith War, the Battle of Ruusan, the Clone Wars, the Galactic Civil War, the Birth of the New Republic, and the Yuuzhan Vong Invasion), weapons and technology (everything from blasters and lightsabers to energy shields and cloaking devices), and vehicles and vessels with a focus on the use and development of the force by the Jedi Order, the Sith, and other lesser known factions throughout. Class will consist mostly of lecture with short breaks for discussion of the material.

Part 4 of this course will cover material regarding weapons and technology, as well as the various ships and characters from Star Wars. If students are interested, Legacy Era (40-137+ ABY) history may be discussed.

Open to students grades 7 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm

M4364: Infinitely Many Proofs of Infinitely Many Primes!

Jacob Hurwitz, Jordan Moldow

How many primes are there? INFINITELY MANY! How many different ways can you prove that? INFINITELY MANY! Unfortunately, Splash isn't infinitely long, so we'll only have time to cover $\infty - 1$ ways.

Open to students grades 9 through 12

Maximum Size: 0

Sun 5:05pm–5:55pm

X3933: Insects!

Davie Rolnick

Would you like to learn about beetles with suction cups, ants that explode, and wasps that use metal-tipped drills? About why fruit is red, how to avoid mosquitoes, and what the fireflies are talking about when they glow? About insects that look like poop, insects that hide in poop, and still others that eat it? About how there is a world of fascinating life visible in a single square foot of weeds? In this class, we will explore insect ecology from the rainforests of Bolivia to the sidewalks of MIT, see why insects are so interesting and, in many cases, beautiful, and find out how to see and study miracles in one's own backyard.

Open to students grades 7 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm

C3892: Intro to iPhone (iOS) Application Development

Mark Servidio, Tarun Singh

This course will provide an introduction to programming on the iPhone (iOS) platform.

Open to students grades 9 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm

H4034: Intro to the Japanese Language: Part 2!

Kimberly Baldauf, Daniel Gray

Still interested in Japanese despite having taken our other class? Come get some more exposure to the language, then have more information thrown at you, including how to find lessons in your area and what you should study on your own.

Open to students grades 9 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm

C4271: Introduction to Programmatic Debugging

Benjamin Agre

So you've messed around with a computer, you might have started tearing it apart, hell you might even have some idea how things work. Well this is going to teach you how to programmatically debug programs, to reason about what they're doing, how they're doing it.

We'll show you how some well known pieces of software work, as well as some things about plugin writing for VDB.

There will be a brief refresher on assembly at the beginning of the class. There will also be a brief introduction to vtrace framework.

Open to students grades 9 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm

X3889: Life is Short – Eat Dessert First

Stephanie Bachar, Catherine Redfield

With some good rules of thumb, and some science, you don't really need to pay attention to the recipe. In this class, we'll talk about the point of basic cake ingredients, and then make cakes from scratch without recipes.

Open to students grades 9 through 12

Maximum Size: 0

Sun 5:05pm–6:55pm

M4072: Logarithms and Exponentials

Charles Hsu

Logs and Exps are two of the most commonly used functions in highschool and college math and science. Want to have a crash course in the two and cover basically every introductory concept there is regarding these functions?

Open to students grades 8 through 12

Maximum Size: 0

Sun 5:05pm–5:55pm**M4186: Matrix Factorization for Fun and Profit***Ken Arnold*

Netflix know what movies you'll like. Amazon knows what books you'll enjoy. How do they do that? We'll learn about matrix factorization, which is just about expressing complex data using simple patterns. We'll also talk about how you can use the same ideas to help computers think about relationships between words (did it ever bother you that the dictionary defines words using other words?), let you program computers in English, and even predict the future—or more interestingly, predict the present.

*Open to students grades 7 through 12**Maximum Size: 0***Sun 5:05pm–6:55pm****X3976: Probability in the Game of Bridge***Brian Hamrick, Sherry Wu*

The game of bridge has countless facets where you can improve your bidding and play. One of the most important is determining what the optimal line of play is for a given hand. In order to do this, one should be aware of all of the subtleties that arise when computing probabilities of success. Come learn how to analyze the effectiveness of various plays and bidding systems.

*Open to students grades 7 through 12**Maximum Size: 0***Sun 5:05pm–6:55pm****C4102: Programming for Sound: Real-Time Audio Processing with MaxMSP***Stephen Poletto*

In this course, we'll take a look at MaxMSP, a visual programming environment used for real-time digital signal processing. Max programs are made by arranging and connecting simple objects, each of which performs a specific function. These objects are combined in a data-flow system within a visual canvas. By mapping data from external controllers (video game controllers, iPhone, midi controllers, etc.) the performer can process and sequence live audio to create an interactive musical performance.

*Open to students grades 9 through 12**Maximum Size: 0***Sun 5:05pm–6:55pm****X4011: Splash Contra Dance***Ruth Byers, Louis Wasserman*

Ever see how they dance in Jane Austin movies? Replace “stately” with “wild,” and the baroque violin with a ragtag string band, and double the tempo and you have contra. Contra is easy to learn and fun to do. Come give it a try with us! Beginners and experienced dancers welcome.

*Open to students grades 7 through 12**Maximum Size: 0***Sun 5:05pm–5:55pm****A4113: The Big Bang Happened Everywhere***Molly Swanson*

We live in a universe full of mysteries. You've probably heard that our universe started in a “Big Bang”, but what does that really mean? It's not a “bang” in the traditional sense, but a stretching of space itself. Understanding the true nature of this expansion reveals a surprising fact: the Big Bang happened everywhere! What's more, over 90 percent of our universe is made up of substances we don't understand: dark matter and even more mysterious dark energy. Please come join us for an exciting discussion about our amazing universe.

*Open to students grades 10 through 12**Maximum Size: 0***Sun 5:05pm–6:55pm****X4237: The Gentlemen's Game: Bridge and Bridge Conventions***Aditya Kalluri, Arvind Thiagarajan*

Some games transcend amusement. Some games surpass idle enjoyment to become showcases of human intellect and strategic achievement. Join us for a whirlwind introduction to bridge, referred to by many as the chess of card games. In one hour, you'll learn the basic rules of bridge, as well as the strategies and bidding conventions that make it the high-class game of MIT-worthy intellectuals everywhere.

*Open to students grades 7 through 12**Maximum Size: 0***Sun 5:05pm–6:55pm****W4076: Balloon Animal Bonanza***Jessie Mueller*

Want to impress your friends? Intrigued by the balloon twisting of a clown? Learn to make a balloon dog and more! No experience (or large red nose) required. **Note: Balloons contain latex**

*Open to students grades 7 through 12**Maximum Size: 0***Sun 6:05pm–6:55pm****S4328: Evolution of proteins and gene-regulatory networks***Stephen Serene*

From Darwin's time to just a few decades ago, most of what we knew about evolution came from looking at fossils, plants, and animals. Since then, aided by the incredible growth of biotechnology, people have started to understand evolution on its fundamental molecular scale. I'll introduce you to some neat results from this field, focusing on ways to understand evolution using mathematical objects called directed graphs (and some undirected ones, too). In particular, I'll talk about antibiotic resistance, whether evolution is reversible, how fast evolution can go, and when evolution allows cooperation.

*Open to students grades 7 through 12**Maximum Size: 0***Sun 6:05pm–6:55pm****H4351: Introduction to Macroeconomics***Rahat Bathija*

Teaching students a basic introduction of Macroeconomics. Explaining basic econ concepts, and showing how the macro economy works.

Open to students grades 11 through 12

Maximum Size: 0

Sun 6:05pm–6:55pm

X4074: The Natural History of Tea

Peter Hedman

Tea is the second most popular beverage in the world, after

water. From the hearty breakfast tea of England, to delicate flavors of green and white teas, to the pungent aroma of Pu-erh tea - all originate from the leaves of the same plant: *Camelia sinensis*. How can one plant do so much? Find out as we explore the history of tea, sample various teas, and test our palettes in the process.

Open to students grades 7 through 12

Maximum Size: 0

Sun 6:05pm–6:55pm