



Course Catalog

2018-2019

Including Full Year and Semester 1 Courses

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MATHEMATICS

MATH: Pre-algebra

Rita Lahiri

Pre-algebra encompasses the study of integers, order of operations, expressions and equations. This course emphasizes mathematical concepts with real-world applications. While learning the language of algebra, students develop critical thinking skills and problem solving skills. This course also highlights effective class participation and study skills.

- Ratios & proportion
- Number systems
- Expressions & equations
- Mental math
- Statistics

MATH: Algebra 1

Rita Lahiri

In this course, students will learn to use variables to represent unknown quantities to solve algebraic equations and inequalities. Modeling and problem solving are at the heart of the curriculum. Mathematical modeling consists of recognizing and clarifying mathematical structures that are embedded in other contexts, formulating a problem in mathematical terms, using mathematical strategies to reach a solution, and interpreting the solution in the context of the original problem. Students must be able to solve practical problems, by representing and analyzing the situation using symbols, graphs, tables or diagrams.

- Expressions, equations & functions
- Solving linear equations
- Graphing linear equations & functions
- Writing linear equations
- Solving and graphing linear inequalities
- Polynomials & factoring
- Statistics

MATH: Geometry

Clark Ragsdale

Geometry is primarily the study of spatial relationships, with a principal focus on two dimensional and 3D space. We will begin with lines and angles and then progress to various families of shapes and their relationships: triangles, quadrilaterals, circles, etc. Besides understanding fundamental concepts, we will also look at how objects change as they undergo various transformations: translations, rotations, reflections, and dilations. We will also use projects to help make the connection between mathematical concepts and the real-world.

- Reasoning and proofs
- Parallel and perpendicular lines
- Congruent triangles/relationships with triangles
- Similarity
- Right triangles and trigonometry
- Quadrilaterals
- Properties of transformations
- Properties of circles
- Measuring length and area
- Surface area and volume of solids

MATH: Statistics – Data Science (Semester 1)

Wendy Huth

Statistics is centered around large project investigations of relevant applications of math. This course will place students in a collaborative environment where they will engage in project-based learning. They will explore methods of representing mathematical information symbolically, visually, and numerically. As a required course for entering high school, this course will prepare students to work in collaboration with their peers, analyze and effectively present data, perform experiments with statistical results in science classes, and create meaningful and effective projects throughout their high school body of work.

- Data analysis
- Descriptive statistics
- Sampling and experimental design
- Statistical distributions
- Inferential statistics

MATH: Algebra 2 (Semester 1)

Rita Lahiri

Algebra 2 provides students with a foundation for upper level mathematics by incorporating mathematical reasoning, communication skills, and increasingly sophisticated real-world problems. Students will learn to manipulate more advanced mathematical functions and algorithms. Quadratic functions are thoroughly investigated including graphing and multiple methods of solving which require an introduction to complex numbers and advanced algebraic techniques. Real-world applications will be investigated by modeling of quadratic functions. Students will also explore rational functions and master working with radicals and rational exponents.

- Quadratic functions
- Quadratic modeling
- Radicals and rational exponents
- Rational functions

MATH: Trigonometry (Semester 2)

Wendy Huth

In this course, students learn trigonometric functions as well as the application of the functions in real-life problems. The students will analyze, graph and solve trigonometric functions. In order to improve logical thinking and mathematical reasoning, there is an emphasis on the verification of trigonometric identities using all of the fundamental trigonometric identities.

- Trigonometric functions
- Trigonometric identities
- Applications of trigonometry

MATH: Precalculus (Semester 1)

Shin Ou

Precalculus applies advanced data analysis techniques to working with a variety of functions. Students will examine conic sections, logarithmic, exponential and polynomial functions. Sequences and series will also be explored. Students will strengthen their conceptual understanding of problems and mathematical reasoning in solving problems. We will consider numerical, graphical, and algebraic solutions for all functions and discuss when each of these solutions is applicable. The course's focus on problem solving is enhanced with the use of technology.

- Exponential and logarithmic functions
- Analytic geometry - conic sections
- Polynomial functions
- Sequences & series

MATH: Advanced Financial Algebra (Semester 2)

Clark Ragsdale

While a pure math curriculum is standard in virtually every high school in the United States, how do these math concepts translate into real-world situations that students will face as adults? This course attempts to bridge the gap between theoretical concepts and actual life-skill mathematics: economic tradeoffs in buying a car; what to consider when investing for retirement, and why stocks and bonds exist; how statistics and consumer surveys are used to improve the performance of a small business; etc. Most of the modules will include hands-on projects so students can practice implementing the math concepts that they learn in class.

- Personal finance: stock ,market, investing, saving, taxes
- Independent living: renting, buying a car, buying a home, budgeting
- Business: industries, corporate structures, role in the economy, marketing
- Entrepreneurship: starting a business, buying a business, financial management tools

MATH: Introduction to Mathematical Reasoning: Proof & Logic (Semester 1)

David Romero

This course is designed to help students develop their mathematical reasoning ability and, in particular, their ability to read and write proofs. Elementary logic is introduced to familiarize students with the various forms of mathematical statements. Set theory will be explored throughout the course as it serves to illustrate many of the points of logic used in proof construction.

MATH: AP Calculus AB

Wendy Huth

This course teaches students to approach calculus concepts and problems when they are represented graphically, numerically, analytically, and verbally, and to make connections amongst these representations. Calculus concepts will be applied to the functions students have studied the past few years. The real-world applications of calculus will be explored using derivatives, integration and differential equations. Students learn how to use technology to solve problems, experiment, interpret results, and support conclusions.

- Limits
- Derivatives
- Applications of derivatives
- Integration
- Differential equation

MATH: AP Calculus BC

Wendy Huth

AP Calculus BC is roughly equivalent to both first and second semester college calculus courses. It extends the content learned in AB to different types of equations (polar, parametric, vector-valued) and new topics (such as Euler's method, integration by parts, partial fraction decomposition, and improper integrals), and introduces the topic of sequences and series. The AP course covers topics in differential and integral calculus, including concepts and skills of limits, derivatives, definite integrals, the Fundamental Theorem of Calculus, and series.

SCIENCE

SCI: Ecology: Inquiry, Investigation, and Action

Ashley Gam

This course focuses on familiarizing our 6th and 7th grade students with the process of scientific research. Students will learn experimentation skills that enable them to ask their own questions and conduct their own investigations. These skills include microscopy, field sampling, plant and animal identification, experimental design, hypothesis testing, and basic statistics. Students will also develop a land management plan as a culminating project.

SCI: Physical Science

David Romero

Students in grade 8 will be introduced to topics in physics, chemistry and engineering. Topics covered will include motion, atomic theory, and energy. Lab skills and engineering practices will be spread throughout the course. The goal of the course is to improve students' understanding of the physical world and expand their scientific curiosity.

SCI: Biology: Evolution, Genetics, and Development

Ashley Gam

Evolution and developmental biology are unifying themes in biology. Rather than thinking and learning about biology as isolated concepts and facts, this course aims to approach the field of biology as a set of processes: a process for gaining new knowledge AND as a way of understanding biological phenomena. We will use techniques, tools, and skills employed by biologists to see how they are used to investigate evolutionary questions. We will also examine elements of cell biology, genetics, developmental biology, anatomy, and physiology in order to understand what we know about our own evolutionary history and how we know it.

SCI: Chemistry

Clark Ragsdale

This course is intended to help students realize the important role that chemistry plays in the world around them as well as its place within the intersection of technology and pure science. Topics to be studied include: chemistry laboratory skills, the classification and structure of matter, ratio and proportion of chemical reactions, reaction stoichiometry, acid-base chemistry, kinetics, and thermodynamics. Critical thinking (the ability to carry out systematic thought processes in making decisions and solving problems), inquiry (solving problems through scientific investigation) and science ethics are stressed in this class.

SCI: Advanced Chemistry

Clark Ragsdale

This course is an in-depth exploration of chemistry for students who have had one year of intro chemistry. All topics that are covered for AP chemistry will be covered with the addition of the following:

- Topics usually not emphasized on the exam, such as organic and nuclear chemistry.
- More experimental understanding through both standard and inquiry-based experiments.
- More thorough coverage of topics since the AP exam date does not set the pace.

** Prerequisites for the course are Introductory Chemistry and Algebra 2.*

SCI: Conceptual Physics

David Romero

The goal is for students to critically analyze information and generate new knowledge. Students will develop certain scientific abilities or habits of mind and practice thinking like a physicist. In simple terms, students will not be learning a collection of facts but learning how to do physics.

Physics is the study of the physical world. Feynman would say it is the most fundamental and all-inclusive of the sciences. Muller would describe it as the liberal arts of "high-tech". The implication being if we have a question about the world around us, the physicist has both pertinent knowledge and a way to analyze it. For pedagogical purposes, we will focus on topics that are relatively simple (note: this does not mean easy). For aesthetic purposes, we will focus on those topics considered fundamental to our understanding of nature.

Topic covered include: motion, light & waves, electric and magnetic fields, dynamics.

** Conceptual Physics or AP Physics 1 serve as a prerequisite for all physics electives.*

** Conceptual Physics and AP Physics 1 are offered in alternate years.*

SCI: AP Physics 1

David Romero

"AP Physics 1 is an algebra-based, introductory college-level physics course. Students cultivate their understanding of physics through inquiry-based investigations as they explore topics such as Newtonian mechanics (including rotational motion); work, energy, and power; mechanical waves and sound; and introductory, simple circuits." - College Board

The philosophy and routines in this course are very similar to Conceptual Physics since they are both introductory courses. This course covers much more material. The workload is higher and we have 50% more class time than a standard class.

More attention is paid to mathematical rigor and methods. There is some overlap in material with Conceptual Physics but not much.

* *Math requirement: Algebra 1 and Geometry.*

* *Conceptual Physics or AP Physics 1 serve as a prerequisite for all physics electives.*

* *Conceptual Physics and AP Physics 1 are offered in alternate years.*

SCI: AP Physics C

David Romero

The AP Physics courses are intended to be representative of courses commonly offered in colleges and universities. AP Physics C: Mechanics and AP Physics C: Electricity & Magnetism are specifically designed to match those calculus-based introductory courses typically taken by physics and engineering students.

The aim of an AP secondary school course in physics should be to develop the students' abilities to do the following:

- Read, understand, and interpret physical information – verbal, mathematical, and graphical.
- Describe and explain the sequence of steps in the analysis of a particular physical phenomenon or problem; that is,
 - describe the idealized model to be used in the analysis, including simplifying assumptions where necessary;
 - state the concepts or definitions that are applicable;
 - specify relevant limitations on applications of these principles;
 - carry out and describe the steps of the analysis, verbally, mathematically, or graphically; and
 - interpret the results or conclusions, including discussion of particular cases of special interest.
- Use basic mathematical reasoning – arithmetic, algebraic, geometric, trigonometric, or calculus, where appropriate – in a physical situation or problem.
- Perform experiments and interpret the results of observations, including making an assessment of experimental uncertainties.

LANGUAGE ARTS

ENG: English Composition 1

Sarah Derr

This class provides students with a foundation of skills that will serve them in their advanced English coursework at LSG. As we explore essential questions related to broad themes of identity and community, students will develop both expository and creative writing techniques. We will analyze classic and contemporary assigned texts as a group, while students will have ongoing opportunities for individual choice reading. Socratic seminar is a key component of this course: students will engage in frequent discussions that will become increasingly self-directed as the year progresses.

ENG: English Composition 2

Sarah Derr

This course builds upon the work done in English Composition 1 with increasingly challenging texts and writing assignments of greater length and complexity. Students will be expected to take a more formalized ownership in their choice reading and writing, culminating in an end-of-year multi-genre research project.

ENG: Contemporary Fiction & Journalism (Semester 1)

Dan Clinton

How does literature reflect our changing understanding of nature? Modern science has increasingly challenged the romantic conception of nature as pristine, self-sufficient, and distinct from the sphere of human activity. Genetic engineering has produced new crops and new debates about intellectual property that hinge on what counts as natural. Climate scientists have proposed that we now live in the Anthropocene, an epoch in which human activity has left its mark on the geological record. Meanwhile, chirpy digital assistants have become a household fixture at the same time that figures such as Elon Musk and the late Stephen Hawking hand down stern warnings about the existential danger of strong A.I. These new discoveries and anxieties have produced literature fixated on artificial beings and unnatural landscapes. We will read a series of works that ask us to cope with the unnatural and rethink the place of human experience in a world that has become increasingly unfamiliar.

TLDR: Yes, we'll be reading a heap of science fiction.

ENG: History of Detective Fiction, 1840-Present (Semester 1)

Dan Clinton

How many times can you change the channel (if you still watch TV the old-fashioned way) without finding a murder mystery? Detective fiction has become a ubiquitous part of popular culture and a part of our mental equipment for thinking through problems of psychology, sociology, and even truth itself.

Fictional detectives, with their preternatural powers of perception and deduction, challenge us to think about how we know what we know. And the bizarre cases they solve often test the limits of rationalism. In this course, students will examine the evolution of the detective story, the problems of narrative perspective that this genre raises, and its relationship with the ideal of a rational public sphere.

This course will focus on fundamentals of plot, point-of-view, and detail. My hope is that the repetition of an underlying formula will help students recognize authorial style and work up to the abstraction of Borges, Freud, and Gilman.

ENG: American Modernism: 20th Century Fiction (Semester 1)

Dan Clinton

The self-made man is a persistent ideal in American life, for better and for worse. This national myth encourages us to favor personal ingenuity over collective responsibility. Rags-to-riches stories offer the assurance that anyone can make it and that social mobility is not merely a fond hope. And yet in literature characters who set out to remake themselves and transcend circumstance are often punished for their presumption. This course will focus on a series of narratives that test the limits of self-determination. How are we supposed to function in a culture that celebrates independence but abhors social-climbers and fakes? What is the role of authenticity in a democracy?

SOCIAL SCIENCE

SOSC: US History - Leadership Lessons for a Changing World

Jim Percoco

Leadership Lessons for a Changing World will study seminal leaders in US history based on the premise of political scientist James MacGregor Burns' theory of "transformational leadership." Emphasis will be placed on America from 1860 to the present with a focus on Abraham Lincoln, Theodore and Franklin Roosevelt, Lyndon Johnson, Martin Luther King, Jr., and Robert F. Kennedy, among others. Texts will include, *A Little History of the United States* by James W. Davidson, *Leadership in Turbulent Times* by Doris Kearns Goodwin, and *The Soul of America* by Jon Meacham.

SOSC: Journeys of the Spirit (Semester 1)

Jim Percoco

Students will be exposed to a number of first-hand travel accounts of people of various backgrounds going on a pilgrimage to uncover things about themselves and the world. Readings will focus on travels in the Middle East and Europe with students encountering Abraham, Francis of Assisi, and Chaucer, among others. Films will be used to highlight different books we will read together and the course will be taught in a Socratic seminar format based on the Saint John's College model.

SOSC: Modern American History (Semester 1)

Jim Percoco & Kevin Oliveau

The five years of 1968-1973 in the United States proved to be challenging and inspiring, affecting all aspects of American life and culture from sports to the entertainment industry to politics and leadership. In this course students will examine the crucial moments from this five year period and how the events, people, and ideas generated then have shaped the United States of 2018. Seminal moments from this time period include the assassination of Martin Luther King, Jr. and Senator Robert F. Kennedy, increasing American involvement in Vietnam, the rise of psychedelic music best exemplified by Janis Joplin and Jimmy Hendrix, motion pictures such as *2001: A Space Odyssey*, the birth of free agency in professional sports, and the Watergate break-in. President Richard Nixon was at the apex of political power reshaping the American political landscape in so many ways and social norms of every kind were seemingly tested at every turn. Learn what it was like to be an American a half-century ago.

SOSC: Cognitive Bias and Decision Making (Semester 1)

Kevin Oliveau

This course focuses on common cognitive mistakes often made by the human brain. We will explore sources of bias, probabilistic thinking (including how to apply Bayes' Theorem), and how to make more precise and accurate predictions about future events.

SOSC: The Enlightenment – The Source of All Good Ideas (Semester 1)

Kevin Oliveau

We will be reading Steven Pinker's newest book *Enlightenment Now* which explains the core values of the Enlightenment: reason, science, humanism, sympathy, and progress. Application of these values has improved life for humans by all objective measures, despite the false claims of many doomsayers. However, continued progress is not foreordained. We must continue to apply these tools to solve new problems which confront humanity.

FOREIGN LANGUAGE

Spanish

Vanessa Moreno

FL: Spanish 1 — This is an introductory course to both the Spanish language and the cultures where the Spanish language is spoken. This course aims to develop basic and intermediate communicative skills in Spanish as a second language and to build basic knowledge about the cultures of the Spanish-speaking world. This course emphasizes fundamental grammatical structures and the acquisition and assimilation of practical vocabulary in conjunction with the development of the four language skills: writing, reading, speaking and listening. The use of audio and visual materials in class help students develop listening and speaking skills, enabling them to express themselves in Spanish from the start of the course.

FL: Spanish 2/2 Intermediate — A continuation of the first year course. By the spring semester, second year work is beginning and the classes are conducted primarily in the target language. Supplementary readings and other materials are introduced for reinforcement. Conversational language is emphasized. At the intermediate level, we will focus on more advanced grammatical structures and the continuation of acquisition and assimilation of more precise vocabulary in conjunction with the development of the four language skills: writing, reading, speaking and listening.

FL: Spanish 3 — The objectives of this course are identical to those of Spanish 2 Intermediate; however, this course is for students who have already studied Spanish 2 and display a good understanding of the language, but who are not sufficiently prepared for Spanish IV, needing more grammatical instruction. The pace will be faster, the second half of *Realidades 3* is used as the third year program in an articulated sequence of instruction.

FL: Spanish 4 — This course is designed to enhance the Spanish language learning process through exposure to historical, cultural, literary themes as well as daily news. In addition, with the acquisition of more grammatical instruction and vocabulary, students will do individual and group projects, read works of short fiction, and follow current events in the Hispanic world. This course will use informative and thought-provoking films to focus on the contemporary history, art and culture of Spain and Latin America. Supplementary literature, texts, articles, video clips, music and presentations will provide background to historical events. Students will participate in debates and activities that promote effective oral and written communication.

FL: Spanish 5 — In this course, students continue to develop proficiencies across the full range of communication (interpersonal, presentational, and interpretive), honing their critical reading and analytical writing skills. This course will use informative and thought-provoking films to focus on the contemporary history, art and culture of Spain and Latin America. Supplementary literature, texts, articles, video clips, music and presentations will provide background to historical

events. Students will participate in debates and activities that promote effective oral and written communication.

French

Carmen Carraway

FL: French 1 — In this course, students learn the basics of communication in French. With a strong emphasis on conversation, our curriculum takes us from basic greetings to units that center around food, household objects, places in a city, family, and daily activities. Students create and maintain a vlog throughout the year in which they describe themselves, their friends, and their surroundings.

FL: French 2 — In French 2, our studies center around a year-long class project in which each student takes on the persona of an imaginary resident of an apartment building in Aix-en-Provence, France. Using this structure as our starting point, students get to know their neighbors, make friends and enemies, plan parties, and even solve a murder mystery! Class is almost exclusively in French. Throughout the year, students will encounter many new vocabulary units, and they will learn to communicate fluently in the past and future.

FL: French 3 / French 4 — At this level, we use authentic resources such as French films, news articles, novels, poems and podcasts to study advanced structures and learn sophisticated vocabulary. Class is conducted entirely in French, and students frequently use the language to deepen their understanding of French culture.

FL: French 5 Advanced — This course is designed around six themes: global challenges, science and technology, contemporary life, personal and public identities, families and communities, and beauty and aesthetics. Students read articles, listen to podcasts, watch videos and engage in meaningful discussions throughout the year, with the goal of being able to sustain informed, nuanced conversations in French about topics such as politics, social issues, and world events.

FL: Post-AP: Advanced French Literature — This course is designed to replicate undergraduate French literature seminars. Throughout the year, we will analyze 19th and 20th century French poems, novels, and plays, including seminal works by Jean-Paul Sartre, Honoré de Balzac, Charles Baudelaire, and Émile Zola. The discussion-based classes are conducted entirely in French, and are largely driven by student interest.

Latin

Michael Hendry

FL: Latin 2 — Latin 2 is a transitional phase between Latin 1 and 3, doing much the same things as Latin 1 but in greater depth. We will build on what we learned in Latin 1, expanding our knowledge of Latin grammar and vocabulary and Roman history and culture. We will also start reading bits of unabridged, unaltered Latin literature in Latin 2, though most of that will have to wait for Latin 3 and 4.

FL: Latin 3 — Latin 3 students will continue reviewing Latin grammar and building their vocabulary. Readings will include selections from such authors as Martial, Catullus, and Horace. Students will explore a combination of adapted readings, English translations and targeted passages from Latin texts, introducing them to some of the most important authors and works of classic Rome.

Chinese

Shin Ou

FL: Chinese 2 — This course continues the development of the four language skills. At this level, students learn more complex grammar patterns and expand their vocabulary. They read longer texts, write longer essays, watch more complex film clips, and receive more intensive training in expressing their ideas through oral presentations. Further acquaintance with Chinese culture and history is included.

FL: Chinese 3 — This course consolidates previously-learned materials and adds further depth to students' control of the four skills. Vocabulary and grammatical structures are reviewed, and practice is given in using these structures. Chinese idioms are introduced. Readings include literary works as well as other types of materials. Further acquaintance with the history and culture of Chinese-speaking people is developed through readings, interviews, and films.

ELECTIVES

Developing Mathematical Mindsets

David Romero & Clark Ragsdale

This course attempts to take current research and best practices in mathematics education to complement our existing mathematics program. Sources will include Jo Boaler, the National Council of Teachers of Mathematics and others.

- The structure of the class will consist of routines like: “Visualize. Play. Investigate.”
- The main philosophy or mantra will be: “Mistakes, struggle, and challenge are critical for brain growth.”
- The goal for students is they experience mathematics as an open creative subject and view themselves as powerful agents in their learning process. Students will be expected to persevere in exploring and solving challenging problems. Attention will be paid not only to answers, but also to justifying solutions and analyzing the reasoning of others.

Computer Science

David Romero

Students will learn how to use basic data types and control structures to build their own algorithms. There will be a heavy emphasis on planning, iterative design and readability of code. Based on student population, this course will reinforce and apply topics in other courses, especially math.

Physical Computing

David Romero

This is a course on the interaction of code with the outside world.

The programming in this course is more basic but makes heavy use of fundamentals like variables, arrays, functions and loops. Students will learn basic electrical engineering and design simple circuits that sense and interact with their environment. This course is more design heavy, with readings on design, interactivity, and various methods of signal transduction. Students who continue on in the spring will focus on developing a semester-long project of their choosing.

This course is modeled on a graduate course of the same name at NYU's Tisch School for the Arts. See the following links and books for more details:

- <https://itp.nyu.edu/physcomp/>
- <https://itp.nyu.edu/ranch/projects/>
- <http://lauren-mccarthy.com/>
- *The Art of Interactive Design* – Crawford
- *The Design of Everyday Things* – Norman
- *Physical Computing* – O'Sullivan & Igoe

Public Speaking

Clark Ragsdale

The ability to speak before a group with confidence and clarity is an important 21st century skill. At each grade level, LSG students are provided with opportunities to find their voice and express their opinions in developmentally appropriate ways. Students complete a project where they create and present to their class and/or to the school community. 8th graders also take a public speaking class, culminating with each student delivering a speech on the topic of his or her choice.

Art & Design (Semester 1)

Danielle Ferrin

Combining the tools of creating with the tools of how to create, this class will focus on teaching art skills and techniques through individual and group design projects. This semester will include sculpture, product design, painting, drawing, collage and mixed media, and even class-choice.

Physical Education

Dan Merold

All middle school students take physical education classes. The program fosters integrity, respect, responsibility, and participation by focusing on cooperation, effort, and development in a fun environment over winning and losing. A primary goal is for students to enjoy being active in order to create lifelong habits of physical activity. Students learn to take risks, try something new, and develop their physical fitness in a safe and positive environment. Classes increase their self-confidence while providing them with experiences in teamwork, sportsmanship, collaboration, critical thinking, and resourcefulness.

CLUBS & EXTRACURRICULARS

Our clubs and extracurricular activities are discussed and decided upon during the first few weeks of school. We strongly support and encourage student-led clubs with faculty oversight. In recent years, the most popular have been:

- Model UN
- Odyssey of the Mind
- Human Powered Vehicles
- Guitar
- Monarch Butterfly Garden
- Chess
- Animation
- Slam Poetry
- Literary Magazine
- Yearbook

Additional interests expressed for 2018-2019:

- Drama
- Golf team
- Gamer
- Programming / 3D modeling