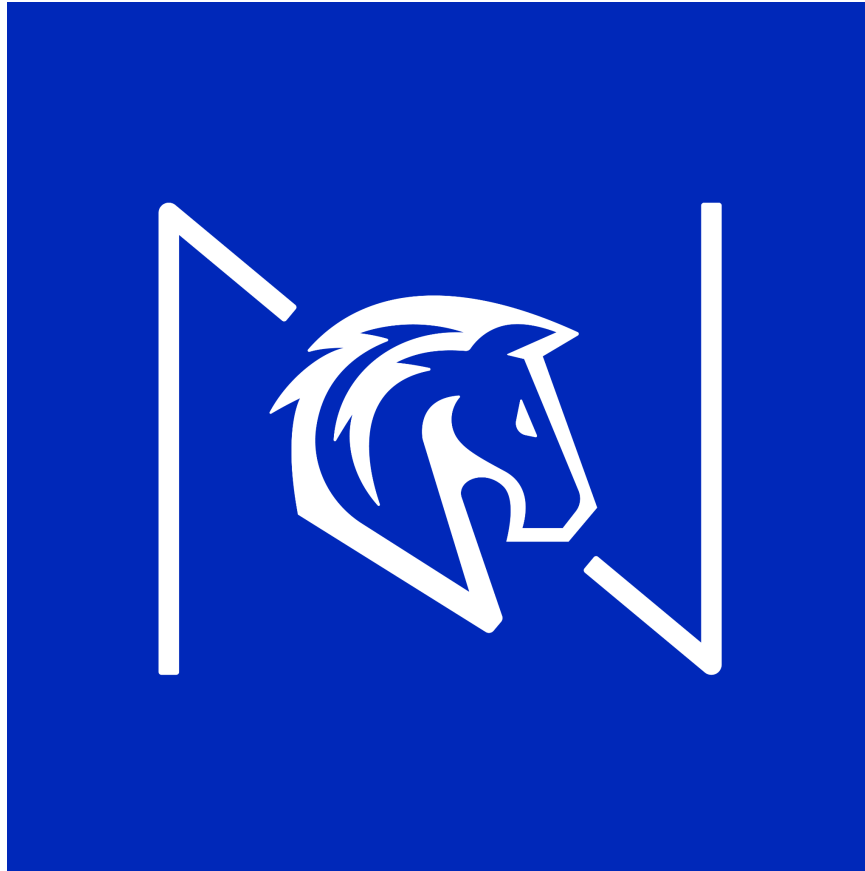


# The Nueva Upper School



## 2024-2025 Course Catalog

# Table of Contents

<a href="#"><u>Nueva Graduation Requirements</u></a>	3
<a href="#"><u>Scheduling Tips from College Counseling</u></a>	4
<a href="#"><u>UC Approved Courses</u></a>	6
<a href="#"><u>Department Course Flow Charts</u></a>	7
<a href="#"><u>Computer Science</u></a>	8
<a href="#"><u>Economics</u></a>	15
<a href="#"><u>Engineering, Fabrication, &amp; Design</u></a>	19
<a href="#"><u>English</u></a>	26
<a href="#"><u>History</u></a>	30
<a href="#"><u>Interdisciplinary</u></a>	36
<a href="#"><u>Languages</u></a>	42
<a href="#"><u>Math</u></a>	49
<a href="#"><u>Performing Arts</u></a>	56
<a href="#"><u>Science</u></a>	60
<a href="#"><u>Social Emotional Learning (SEL)</u></a>	71
<a href="#"><u>Visual Arts</u></a>	73

Courses can also be found on the Glide App: [2024-25 Nueva US Course Catalog](#).

# Nueva Graduation Requirements

Discipline	Years	Required Courses
English	<b>4 Years</b>	3 year-long courses (ENG101, ENG201, ENG301) 2 semester-long courses (ENG401 & ENG450)
History	<b>3 Years</b>	(HIST101, HIST201, HIST301)
Math	<b>3 Years</b>	Stage not Age
Physical Education	<b>4 Years*</b>	<a href="#">US Nueva Physical Education</a>
Performing/Visual Arts	<b>1 Year</b>	Performing: two semesters of any two courses <b>OR</b> Visual: 2 semesters, Intro & Advanced, in same medium
Quest	<b>4 Years*</b>	
Science	<b>3 Years</b>	2 Years (CHEM101 & BIO101) 1 Year of two semester-long electives or one year-long elective
SEL/DWI	<b>4 Years</b>	(SEL101/DT104, SEL201, SEL301, Senior Block/SEL401)
World Languages	<b>3 Years^</b>	Stage not Age ^Consecutive Years of Same Language

\* or every year of enrollment at Nueva

## Core Course Load By Grade Level

Grade	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8
<b>9th</b>	ENG101	SEL101/ DT104	HIST101	MATH101	Language 1	CHEM101	Arts Part 1**	Arts Part 2**
							Elective 1	Elective 2
<b>10th</b>	ENG201	SEL201	HIST201	MATH201	Language 2	BIO101	Elective 1	Elective 2
							Elective 3	Elective 4
<b>11th</b>	ENG301	SEL301	HIST301	MATH301	Language 3	Sci. Pt. 1**	Elective 1	Elective 2
						Sci. Pt. 2**	Elective 3	Elective 4
<b>12th</b>	ENG401	Senior Block/ SEL401	Elective 1	Elective 2	Elective 3	Elective 4	Elective 5	Elective 6
	ENG450		Elective 7	Elective 8	Elective 9	Elective 10	Elective 11	Elective 12

\*\* indicates core courses leading to graduation requirements, but which can be taken in any grade level. Students choose classes from an array of possibilities.

The yearly number of available elective slots are broken down below for each grade level:

- 9th & 10th Grade: 2-4 electives (based on when Art classes are taken)
- 11th Grade: 6 electives
- 12th Grade: 12 electives

**NOTE:** These numbers are dependent on when a student decides to take their Arts classes and their third year of Science classes. In addition, the elective length (semester or full year) also impacts the number of electives available to students.

# Scheduling Tips from College Counseling

---

As we prepare students to apply to college, we are acutely aware that students will apply at the end of a distinct Nueva education. So as you contemplate your own path to college, we hope that you will do so with the same awareness. While Nueva's philosophy, pedagogy, and curriculum were not designed with college preparation explicitly in mind, students who buy into Nueva's goals are exceptionally well-prepared to apply. The flexibility Nueva affords students frees them from "typical" high school competition (more AP courses is better...) and helps students develop habits of lifelong learning that will serve them well both in life generally and when they apply to college. We routinely hear from college admission offices that they find Nueva's applicants *interesting*. It is our strong belief that worrying about what colleges expect from high school students would be a waste of the opportunities of Nueva and therefore also unhelpful in college admissions.

## NINTH GRADE

- The most important task of ninth grade is to figure out what high school is all about. How do you study best?
- If you haven't already mastered time-management skills, this is a good time to practice those.
- Learn where to find help if you need it, and never be afraid to seek it out. Teachers are here to help you master their disciplines, make interdisciplinary connections, and help you develop your talents and abilities — if you hit a bump in the road, they want to help you over it!
- Read, read and read. There is no better way to learn vocabulary and writing skills.

## TENTH GRADE

- College is still a long way off, and it's much too early for you to be thinking about building a college list. That said, tackling an interesting curriculum and working hard in your classes will help you achieve your college goals later.
- Pursue your passions and interests in and out of the classroom, and don't shy from taking risks.
- As for course selections, if you are thinking about becoming an engineer, you probably want to double up on your science by taking Physics 101 this year, if you haven't already.

## ELEVENTH GRADE

- Continue to do well in your classes. First, the grades you earn in junior year will often be the most recent grades colleges will see, especially if you apply under an early action or early decision plan.
- Additionally, your letters of recommendation may come from junior-year teachers, so it's important that your teachers know how hard you work and how much you can contribute to a classroom.
- If you are thinking about becoming an engineer, and didn't take Physics, this is the year to do it.
- Remember you must complete three years of the same world language to fulfill Nueva's graduation requirements.

## SENIOR YEAR

- At this point you'll be working closely with your college counselor and likely have developed relationships with faculty mentors. Use them as resources when selecting senior year courses.
- Standard college counseling wisdom is "all five all four" - taking all five core academic subjects all four years.
- However, this is the year when you may consider dropping a subject if it frees you to explore more deeply a primary area of interest (but do consult your college counselor before making this decision final!).
- This is the last chance to take a class at Nueva you have wanted to and haven't had the chance.
- Take advantage of your time with your teachers - you will likely never again be surrounded by such an accomplished, engaged, and compassionate group of educators!

# UC Approved Courses

This is a list of all the UC approved courses Nueva has on offer, categorized by their UC designation and more courses are in the process of getting UC approved. Virtually every Nueva student will exceed the a-g requirements for UC eligibility (as well as maximize the eight semesters of honors weighting) by simply fulfilling the Nueva graduation requirements, this list is only provided as a reference. For more information, use these links: [UC requirements](#) and [GPA calculation](#).

## A - History/Social Science

American Government\*  
American Indian History\*  
Asian America\*  
California History: By Foot, Hoof and Rail  
Capitalism & Apocalypse\*  
Chinese History through Material Culture\*  
Crisis and Conservatism  
Environmental Humanities  
History 10 - Modern World  
History 11 - US History  
History 9 - World to 1500  
International Relations\*  
Postcolonial Latin America\*  
Religion and Modernity\*  
Urban Studies\*

## B - English

Adv. Literature Seminar  
Afterlives of Classics  
AIDS History and Culture\*  
American Literature\*  
Celebrating the Margins\*  
Creative Writing  
Gender and Sexuality in America\*  
Literary Foundations

## C - Mathematics

Abstract Algebra\*  
Advanced Probability\*  
Algebra Techniques  
Calculus\*  
Complex Analysis\*  
Cryptology  
Differential Equations\*  
Geometries Beyond Euclid  
Graph Theory and Applications  
Infectious Disease Dynamics and Modeling\*  
Intro to Knot Theory  
Linear Algebra\*  
Math 1  
Math 2  
Math 3  
Mathematical Modeling\*  
Multivariable Calculus\*  
Quantum Information  
Statistics\*

## D - Science

Adv. Chemistry Consulting  
Adv. Mech Engineering\*  
Advanced Mechanics\*  
Applied Engineering: Oceans\*  
Biology Research Teams 1\*  
Biology Research Teams 2\*  
Biology\*  
Bioorganic Chemistry\*  
Chemical Engineering\*  
Chemistry  
Climate Science & Action  
Computer Graphics  
Drug Design\*  
Intro to Mech Engineering\*  
Modern Physics\*  
Optics & Astrophysics\*  
Physics  
Physics Research  
Semiconductor Processes\*

## E - Language other than English

Adv. Japanese Topics\*  
Chinese 1  
Chinese 2  
Chinese 3  
Chinese 4\*  
Chinese Culture and Society\*  
Japanese 1  
Japanese 2  
Japanese 3  
Japanese 4\*  
Spanish 1  
Spanish 2  
Spanish 3  
Spanish 4\*  
Spanish Communication\*

## F - Visual & Performing Arts

Adv. Ceramics & Clay  
Advanced Drawing  
Fall Production  
Groove Workshop  
Intro Art & Fabrication  
Intro to Ceramics & Clay  
Intro to Drawing  
Intro to Mixed Media  
Intro to Music Production  
Intro to Painting  
Jazz Ensemble  
Musical Theater  
Steel Drum Band

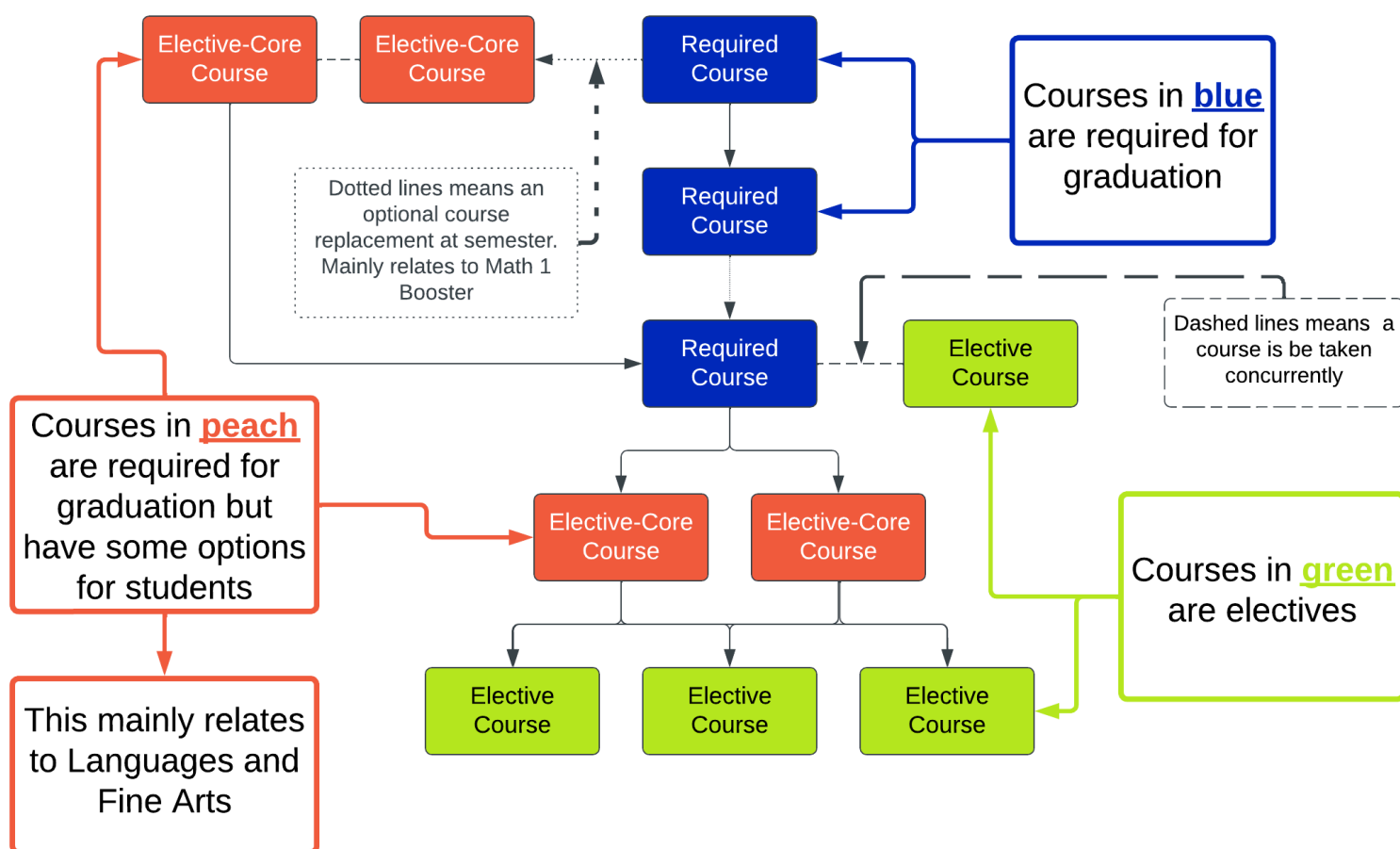
## G - Elective

Advanced Machine Learning  
Applied Game Theory\*  
Asian America  
Business Analytics  
Cinema Studies  
Computational Biology  
Computer Internals  
Computer Vision\*  
Creature Comforts  
Economic Inequality  
Economic Thesis Seminar  
Environmental Economics  
Film & Stage Prop Making  
Financial Econometrics  
Full Stack Web Development\*  
History of Technology  
International Relations\*  
Intro to CAD  
Intro to Comp Programming  
Introduction to Entrepreneurship  
Intro to Game Programming\*  
Intro to Machine Learning\*  
Intro to Macroeconomics  
Intro to Mechatronics  
Intro to Microeconomics  
Intro to Psychology  
Introduction to Speech and Debate  
IntroFab: Metal  
Japanamerica: Japanese Pop Culture\*  
Journalism  
Latin the the Classical World  
Mechanisms of Cancer\*  
Models of Group Decisions  
Philosophy of Consciousness and Personhood\*  
Programming with OOP\*  
Queer Japan  
Research in Psychology\*  
Sensory Neuroscience\*  
Translation Studies  
What Is Philosophy?  
Yearbook Media Production

# Department Course Flow Charts

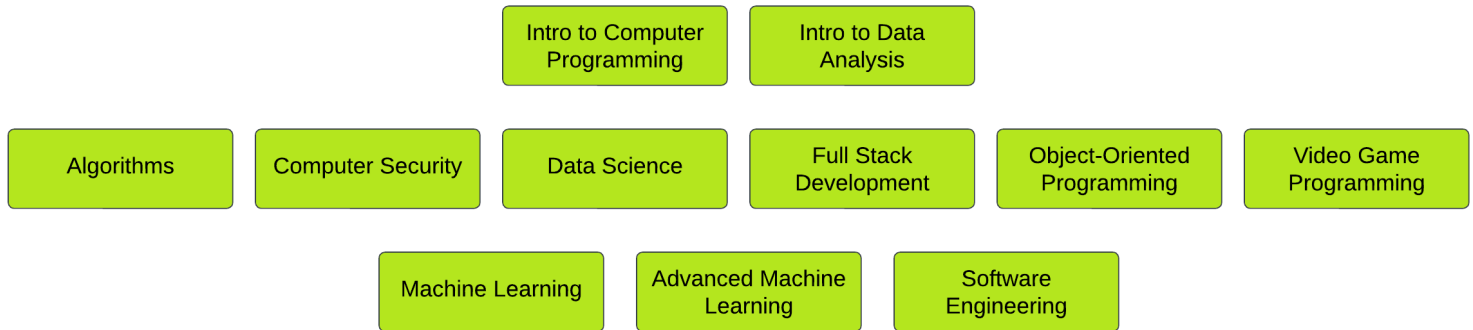
Each department contains a course flow chart, visually displaying to students different course progressions within the department. Flow charts represent courses being offered for the *stated school year* and will be updated yearly to reflect changes in course offerings. Finally, flow charts show prerequisites and corequisites for courses *in the department*. Please note that some courses have prerequisites which are in other departments. For example, Physics has a corequisite of Math 2 or higher.

The diagram below is a legend, which explains the meaning of the different colors and connecting lines. Families are encouraged to familiarize themselves with this legend. In addition, families need to review course prerequisites and corequisites, as some courses have requirements connected to other departments.



# Computer Science

**Flow Chart Note:** Courses sorted top down by no experience/prerequisites to needing 2 or more CS classes during US career. Please read course prerequisites carefully.



---

## Advanced Machine Learning

*Term: Spring Only*

*Open to Grades: 10th - 12th*

*Prerequisites: At least one non-intro Computer Science Course at Nueva HS.*

*Corequisites: None*

*Repeatable: No*

You might enjoy this course if...

- You enjoyed Intro Machine Learning
- You're curious about how Neural Networks work
- You want to see math concepts applied outside of math classes

Helpful prior experience...

- Intro Machine Learning
- Comfort thinking conceptually about math
- Working with data in numpy and pandas
- You must be comfortable reading and writing code in at least one programming language

During this class, we will cover the following topics...

- Dense Neural networks for regression and classification
- Convolutional Networks for Image identification
- Training and Tuning Neural Networks

## Algorithms

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Open to students with beginner programming experience (1 or more computer science electives or equivalent experience).*



*Corequisites: None*

*Repeatable: No*

You might enjoy this class if ...

- You think you might want to study computer science in college
- You want to know if “computer science” and “programming” are the same thing (spoiler alert: they’re not)
- You’re interested in learning about all the things that fall into “computer science” that don’t involve any actual programming
- You like puzzles and/or math, and the feeling of things making sense

Helpful prior experience ...

- Foundational programming skills (Intro, Applied, or equivalent experience) needed to complete some assignments
- Concepts from Math 2 (limits and logarithms) are helpful but not required

During this class, we will cover the following topics and skills:

- Proofs: how can we ensure code is correct, won’t run forever, etc
- Asymptotic analysis: how long will code take to run?
- PageRank and SEO: how does Google rank search results, and how can we game that system?
- Data structures: beyond arrays, lists, and objects
- Stable matching: the best problem in all of computer science
- Techniques for designing and analyzing algorithms: finite state machines, dynamic programming, relaxation
- Advanced topics in theoretical computer science: distributed algorithms, randomized algorithms, complexity theory

## **Computer Security**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Open to students with beginner programming experience (1 or more CS electives or equivalent experience).*

*Corequisites: None*

*Repeatable: No*

You might enjoy this class if ...

- You’re curious about the various types of threats against online systems, and how to protect against them
- You enjoy having freedom to choose your own projects and topics of exploration, and you can use that freedom responsibly

Helpful prior experience ...

- No prior experience with computer security is required
- Foundational programming skills (Intro, Applied, or equivalent experience) will be needed to complete some assignments

During this class, we will cover the following topics and skills:

- Legality and ethics of computer security and hacking
- Defending against injection attacks with user input validation
- Cryptography: how to transmit a message so that only the recipient can read it
- Authentication: how do I prove I am who I say I am
- Authorization: how to allow users to access what they are allowed to access, but no more and no less

- Forensics: what's happening inside my computer, or what happened in the past

## Data Science

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Open to students with beginner programming experience (1 or more computer science electives or equivalent experience).*

*Corequisites: None*

*Repeatable: No*

You might enjoy this class if ...

- You're not a CS person, but you think it might be important to know how to work with data
- You're curious about how data can be used to gain insights, persuade decision makers, and influence policy
- You like infographics and novel ways of presenting information, and you'd like to learn to design your own
- You want some more practice programming
- You enjoy having freedom to choose your own projects and topics of exploration, and you can use that freedom responsibly

Helpful prior experience ...

- Foundational programming skills (Intro, Applied, or equivalent experience) needed to complete some assignments

During this class, we will cover the following topics and skills:

- Ways to get data
- Cleaning up data
- Using statistical tools to gain insights on datasets
- Recognizing and avoiding bias in surveys
- Using R, Ruby, and Tableau
- Creating novel, efficient, and aesthetically pleasing data visualizations
- How to answer questions, gain insights, communicate findings (and win arguments) using data

## Full Stack Web Development

*Term: Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: Open to students with beginner programming experience (1 or more computer science electives or equivalent experience)*

*Corequisites: None*

*Repeatable: No*

You might enjoy this course if...

- You want to know how to build a website!
- You're curious about how the internet works
- You're looking to build useful skills to prepare for Software Engineering

Helpful prior experiences...

- Foundational programming skills (Intro, Applied, or equivalent experience) needed to complete assignments
- Some familiarity with classes and objects
- Used the internet and looked at HTML

During this class, we will cover the following topics...

- How to create both a front end and back end for a website and what those words mean
- Major structural pieces of a functioning website
- Organizing your data for storage and for use
- Understanding abstraction at a large scale

## Intro to Computer Programming

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

You might enjoy this course if...

- You want to learn how to program
- You want to dive deep into programming and how to do it well
- You're looking for a place to get started on your CS pathway

Helpful prior experiences...

- Open to all curious folks!
- Any form of problem solving, from organizing steps in a lab, to rubik's cubes, to writing a structured essay

During this class, we will cover the following topics...

- How to write basic python (variables, loops, functions, ect)
- How to organize and structure data
- How to create games and other interactive visuals
- How to think like a programmer
- How to begin planning a project and make it on your own

## Intro to Data Analysis

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

You might enjoy this course if...

- You want to learn how to program
- You think data is neat
- You want to use data to analyze words, numbers and other things!
- You want to learn python to make graphs and other things

Helpful prior experiences...

- Open to all curious folks!
- Any form of problem solving, from organizing steps in a lab, to rubix cubes, to writing a structured essay

During this class, we will cover the following topics...

- How to write basic python (variables, loops, functions, ect)

- How to organize collected data (numbers and words!)
- How to analyze and manipulate data
- How to create graphs and other visuals for data
- How to structure large amounts of data
- How to use Python and Colab to write up a Lab or Analysis Report
- How to begin planning a project and make it on your own

## Machine Learning

*Term: Fall Only*

*Open to Grades: 10th - 12th*

*Prerequisites: At least one non-intro Computer Science Course at Nueva HS.*

*Corequisites: None*

*Repeatable: No*

You might enjoy this course if...

- You want to know how Machine Learning Works
- You like working with data
- You want to see math concepts applied outside of math classes

Helpful prior experience...

- Comfort thinking conceptually about math
- You must be comfortable reading and writing code in at least one programming language

During this class, we will cover the following topics...

- Classical models such as: Linear Regression, Classification, and Clustering
- Organizing and preparing data for a model
- Validating models to make sure they work well
- Ethical considerations of models and the decisions we make in creating them

## Object-Oriented Programming (OOP)

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: Open to students with beginner programming experience (1 or more computer science electives or equivalent experience).*

*Corequisites: None*

You might enjoy this course if...

- You want to make games or you want to model interactions (in nature, between people, etc)
- You want to be a more efficient programmer...by being LAZIER 😊
- You want to learn how to structure larger, more complex programs (more than one file)
- You want to learn more about Classes and Objects
- You want to understand the organization of all those Libraries you've used and will use!

Helpful prior experience...

- Foundational programming skills (Intro, Applied, or equivalent experience) needed to complete assignments

During this class, we will cover the following topics...

- Classes and Objects

- Inheritance and the organization of connected classes
- Common strategies for writing well organized classes
- How to think through and plan out larger projects

## Software Engineering

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: At least one non-intro Computer Science Course at Nueva HS and comfortable reading and writing code in at least one programming language*

*Corequisites: None*

*Repeatable: Yes*

You might enjoy this class if ...

- You've ever wondered what the difference is between programming for homework and real-world software development
- You want a taste of what it's like to work in the software industry, and/or learn about different roles that aren't just programmers
- You like using your programming ability to help people and make them happy
- You enjoy having freedom to choose your own projects and topics of exploration, and you can use that freedom responsibly

Helpful prior experience ...

- If you have developed an app (web, mobile, or otherwise), that can be helpful but not necessary

During this class, we will cover the following topics and skills:

- How to build software that people actually want
- Software prototyping and iteration
- Task estimation, prioritization, and building a minimum viable product
- Documentation and specification
- Testing and development paradigms
- Defensive programming: finding and preventing bugs
- Code reviews

## Video Game Programming

*Term: Spring only*

*Open to Grades: 9th - 12th*

*Prerequisites: Open to students with beginner programming experience (1 or more computer science electives or equivalent experience)*

*Corequisites: None*

*Repeatable: Yes*

You might enjoy this course if...

- You want to understand the process of making video games better
- You like being creative and coming up with new ideas
- You like making things for other people to play with

Helpful prior experiences...

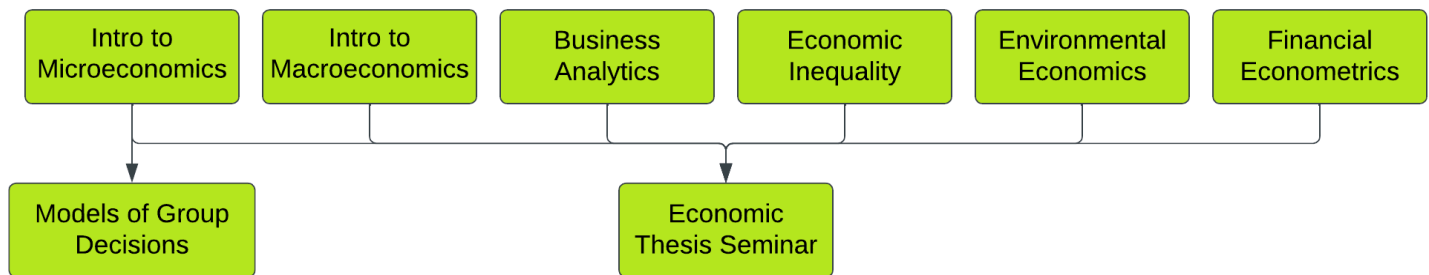
- Playing or enjoying of games of any type

- Foundational programming skills (Intro, Applied, or equivalent experience) needed to complete some assignments

During this class, we will cover the following topics...

- Basics of the Godot Game Engine
- Controls and interaction with your game
- Using Tilemaps to create levels
- Creating enemies and items
- Addings physics to games

# Economics



---

## Business Analytics

*Term: Fall*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

This elective explores the quantitative tools of management science in different business models. The course is structured around four modules. The first three modules investigate three distinct analytic methodologies, while the final one pits the students, in small groups, in a business plan competition. The first module explores “Models of Optimization”, using the framework of mathematical programming. We learn to use linear inequalities to represent decision problems and exploit convexity to approximate optimal solutions. The second module examines “Models of Dynamics”, using the framework of causal loop diagrams to track stocks and flows. We proceed to use computational tools for assessing the growth behavior and path dependence in different business practices. The third module introduces “Models of Uncertainty”, using the framework of queueing systems and their networks. We learn about Markov Chains and proceed to design Monte Carlo simulations to propagate risk through a network of business decisions.

## Economic Inequality

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Economic Inequality is the driving force behind many of the most significant political upheavals of the 21st century. Our one-semester course will leverage macroeconomic models and statistical tools in order to understand and forecast the effects of economic inequality around the globe. Students will begin the semester by teaching each other about the mechanics and importance of all major indexes to measure economic inequality. We will then move on to reading and critiquing Piketty's *Capital in the 21st Century* in order to understand the history and effects of capital ownership and formation. The class will then dive into texts, pilot programs, and proposals concerning universal basic income programs which will culminate in a series of academic debates. Our analysis will proceed to examining the economic underpinnings of racial inequality in America through closely looking at both mass incarceration and

federal housing policy. Students will conclude the semester by interviewing different stakeholders in their own communities about affordable housing development in order to test the hypothesis that homeowner incentives are aligned opposite to the social good. While our class will involve statistical methods and close reading of challenging academic texts, there are no required prerequisites. Students who have previously taken macroeconomics will find this a relevant application of those tools to broader and more complex issues.

## **Economic Thesis Seminar**

*Term: Spring Only*

*Open to Grades: 11th - 12th*

*Prerequisites: Any Economics class & History 10 (HIST201)*

*Corequisites: None*

*Repeatable: Yes*

Economic Thesis Seminar is a team of researchers that spends each Spring semester making innovations in the most exciting areas of economic research. In prior classes, we have 1) Worked hand in hand with a brand new United Nations commission to investigate the potential for blockchain to solve environmental market failures. 2) Designed a radically new insurance model with the potential to eliminate the influence of Super PACs. 3) Modeled the economic effects of LibGen on the academic publishing industry. 4) Forecasted the economic and health effects of the creation of a legalized sex work market in California, and so many more groundbreaking projects. Most of our projects utilize some form of mathematical modeling and data analysis but there is also absolutely the need for researchers who will take on roles more focused on writing and reading research. Expected workload for this class significantly exceeds the average asked of students in other classes. This course is exclusively open to 11th and 12th graders who have taken at least one prior high school economics class.

## **Environmental Economics**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Environmental economics is possibly the most consequential field of the entire discipline, while simultaneously being the subject which traditional economics fails most comprehensively to understand. This course will be a focused semester-long attempt to answer some of the most complex and meaningful questions facing economists today. How should we quantitatively value the lives of future generations? How do we know the true worth of an environmental good that is never traded on a market? Is there a way to design an international climate change agreement that does not implode with greed? Which forms of environmental regulation most effectively align the interests of corporations with those of society? We will grapple with this field of economics through analyzing academic papers, mathematically assessing environmental policies through algebra and calculus based microeconomic models, and creating expansive independent research projects. Our class continues to be the only high school in the nation chosen to participate in the Electricity Strategy Game, originally developed by the economist who currently governs California's electricity grid. After years of improvements and iterations by your peers, you will spend a month immersing yourself fully in the simulation. Students will role-play as investors within our state electricity spot market so that we can feel first-hand the real incentives facing stakeholders.

Note: Intro to Microeconomics (ECON 101) is a helpful but not required prerequisite.



# Financial Econometrics

*Term: Fall Only*

*Open to Grades: 10th - 12th*

*Prerequisites: Math 3 (MATH301)*

*Corequisites: None*

*Repeatable: No*

This elective explores financial time series and stochastic processes that model them. Along the way, we encounter Markov chains, martingales and arbitrage, the Capital Asset Pricing model, the Black-Scholes framework and the derivative pricing revolution it spawned, as well as a series of stylized facts about the ubiquitous observed deviations from the Efficient Market Hypothesis. Our focus will be on data analytics, using data sets from a wide range of financial markets across the risk spectrum. Throughout the semester, students will curate a portfolio of investments based on their data analyses and the systematic forecasts they generate. MATH301 is a required prerequisite and Calculus, Advanced Stats or Applied Stats are preferred preparation.

# Intro to Macroeconomics

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Macroeconomics is the study of the most pressing issues facing global economies today. This course will introduce students to the tools and models necessary to understand current and historical events. Students analyze the cause and effects of economic crises through considerations of growth, inflation, employment, income, productivity, and trade. They will gain insight into fiscal policy and monetary policy by grappling with the following questions: What policies and economic conditions lead to the Great Depression and the Great Recession? Could the New Deal have rescued the United States economy if World War II had never occurred? Why was the United States Federal Reserve desperate to increase inflation after the 2008 Great Recession? Who are the winners and losers of modern free trade agreements? Is it possible to achieve economic equality while maximizing economic growth?

# Intro to Microeconomics

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Our course will introduce students to the core questions, models, and tenets of Microeconomics. Together, we will analyze the economic rationale and consequences of choices made by consumers, businesses and government within the context of our broader economic system. Through academic texts, news articles, case studies and a multitude of in-class games and simulations - we will expand our understanding of why economic decisions are made and how to predict and evaluate their far-reaching consequences. Given that the field has been practically reinvented by behavior economists over the past several decades, we will turn a very critical eye to the neoclassical economic view of the world while simultaneously learning of its inner workings. Our goals for the class are as follows:

- Understand consumer behavior, non-cooperative game theory, and the limits of economic rationality
- Predict and understand firm behavior in terms of price, quantity, market entry, and efficiency
- Analyze a variety of market structures including competitive markets, monopolies, and oligopolies

- Explore the causes and effects of market failures
- Understand the effects of government policies on market outcomes including consumer and producer surplus
- Build a strong analytic foundation that will enable successful future forays into the world of economics

## **Models of Group Decisions**

*Term: Spring Only*

*Open to Grades: 10th - 12th*

*Prerequisites: Intro to Microeconomics (ECON101) and Math 2 (MATH201)*

*Corequisites: None*

*Repeatable: No*

In this elective we will read widely to familiarize ourselves with elements of Political Economy and the role of institutional arrangements for aggregating preferences in a historical and global context. We will explore modeling paradigms, from game theory and auctions to voting schemes, in an attempt to disentangle the non-market forces that shape the economy. Limits to rationality and a host of behavioral norms and biases will challenge us to develop rich enough models to accommodate them. This course probes the interface between social science and mathematics, both in substance and in modes of inquiry, involving readings and debate, as well as computer modeling of interacting economic agents.

**Flow Chart Note:** Due to the number of EFD electives without prerequisites, the flow chart is stacked for ease of reading.



*Repeatable: No*

- You are interested in how engineers design and test heat shields and what happens when they fail
- You are interested in more complex mechanical devices like gears and linkages and how they can be used
- You are interested in engineering drawings and manufacturing methods for making functional parts and assemblies

- Intro physics
- Basic chemistry
- Comfort working in the lab

- Engineering thermodynamics
- Intermediate and advanced mechanism design and fabrication
- Basic CAD & Engineering Drawing
- Engineering drawings and communication
- Design and fabrication using tolerances

## Applied Eng: Biomedical

*Open to Grades: 11th - 12th*

*Prerequisites: Successful completion of 9th grade DT104 and two additional I-Lab electives.*

*Corequisites: None*

*Repeatable: Yes*

You might enjoy this class if ...

- You're interested in more complex engineering design problems, like wearable sensors or surgical robots
- You want the freedom to work on open-ended design and fabrication projects that will expand your skills
- You're curious about the difference between engineering homework assignments and real-world engineering projects

Helpful prior experience ...

- Comfort working in the I Lab
- Basic electronics and coding with microbit or arduino

During this class, we will cover the following topics and skills:

- Engineering Project planning
- Engineering testing and design
- Intermediate design and fabrication
- Intermediate controls and microcontroller programming

## **Creature Comforts**

*Term: Spring Only*

*Open to Grades: 10th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

You might enjoy this class if ...

- You like cute animals and you want to make them happy
- You are interested in the I-Lab and learning more about Design Thinking
- You want to push yourself to try new things and design for a new type of user
- Again, you like cute animals and want to make them happy

Helpful prior experience ...

- None, open to all curious folks!
- Basic understanding of the Design Thinking process

During this class, we will cover the following topics and skills:

- How to go through the design process without the ability to interview the user
- Design Thinking, prototyping, and iteration
- How to use the CNC router and design for it
- Basic 3D Modeling (CAD) skills and flatpack design

## **Design Engineering for Social Good**

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: Design with Impact (DT104)*

*Corequisites: None*

*Repeatable: No*

You might enjoy this course if:

- You're motivated to apply your design and engineering skills to social and environmental problems in the real world
- You want experience working with external stakeholders during the design process
- You're committed to building the future you want to see!

Helpful prior experience:

- Design with Impact or some shop experience
- Working with a community-based organization, volunteering or for an internship
- Working on your own, self-directed passion project

During this class, we will cover the following topics:

- Systems thinking to analyze intractable social issues
- Best practices for stakeholder communications, outreach, and interviewing
- The full design cycle: ideation, prototyping, iteration, implementation
- Engineering skills, such as programming, CAD, or Arduino, to implement your project of choice

## **Design With Impact**

*Term: Yearlong*

*Open to Grades: 9th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Design Thinking, Systems Thinking, Data Science, Computer Science and Design Engineering are all key aspects of the 9th grade experience at Nueva. Design With Impact integrates these five critical curricular threads into a single course that follows students throughout the year. A key aspect of the class is to break down the perceived stovepipe between these five topics and build the creative courage of students to craft solutions to compelling challenges using one or all of them. Software, hardware and post-it notes can all be leveraged to address not only the challenge of launching a paper airplane across the room but also in addressing societal challenges around social justice and equity.

## **Film and Stage Costume Making**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

You might enjoy this class if ...

- You are interested in how costumes are designed or made for movies, TV, cosplay, or stage productions
- You are interested in learning to sew
- You are interested in working with new costuming and cosplay materials

Helpful prior experience ...

- None! We will teach you everything you need.

During this class, we will cover the following topics and skills:

- Costume design
- Costume layout and fabrication
- Working with fabrics, foams, plastics, and other wearable materials

## Film & Stage Prop Making

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

You might enjoy this class if ...

- You are interested in how props are designed or made for movies, TV, cosplay, or stage productions
- You are interested in learning to build and paint with props
- You are interested in working with new prop making and cosplay materials

Helpful prior experience ...

- None! We will teach you everything you need.

During this class, we will cover the following topics and skills:

- prop design
- Prop layout and fabrication
- Painting, finishing, and weathering props
- Working with fabrics, foams, plastics, and other wearable materials

## Intro Fabrication: Metal

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

You might enjoy this class if ...

- You want to make sparks and learn some new tools
- You are interested in welding and metal forming
- You want to learn new problem solving, measuring, and layout skills

Helpful prior experience ...

- None, open to all curious folks!
- If you have some experience with welding that is helpful but you will still be challenged!

During this class, we will cover the following topics and skills:

- MIG welding steel and preparing your metal
- Layout tools and methods for measuring
- Metal forming using breaks, benders, and heat

## Intro Fabrication: Wood

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

You might enjoy this class if ...

- You want to make sawdust and learn some new tools
- You are interested in woodworking and wood finishing
- You want to learn new problem solving, measuring, and layout skills

Helpful prior experience ...

- None! We will teach you everything you need to know

During this class, we will cover the following topics and skills:

- Complex inlaid designs using Marquetry
- Layout tools and methods for measuring
- Woodworking using saws, routers, and sanders

## Intro to CAD

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

You might enjoy this class if ...

- You want to take full advantage of the I-Lab and tools like the 3D printers and laser cutters
- You enjoy puzzles and figuring out efficient ways of building objects
- You want to start designing in 3D space

Helpful prior experience ...

- None, open to all curious folks!

During this class, we will cover the following topics and skills:

- 2D Sketching using dimensions, constraints, and parameters
- Modeling 3D shapes using basic and advanced tools
- Construction of assemblies using joints and 'in-model-building' methods
- Movable assemblies using joints and motion links

## Intro to Mech Engineering

*Term: Fall Only*

*Open to Grades: 10th - 12th*

*Prerequisites: Physics (PHYS101)*

*Corequisites: None*

*Repeatable: No*

You might enjoy this class if ...

- You want to know how to build structures and mechanisms that can lift huge amounts of weight
- You are interested in learning about how to use cool engineering materials to
- You enjoy designing and building spacecraft or machines like real engineers do

Helpful prior experience ...

- Comfort working in the I lab

During this class, we will cover the following topics and skills:

- Understanding of mechanical movements and the theory behind them
- Designing and building structures or mechanical devices
- How to design and build with various engineering materials

## Intro to Mechatronics

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

You might enjoy this class if ...

- You enjoy building physical projects that can sense and interact with the environment, such as with motion, sound, lights, etc
- You are curious about how to create projects that combine electronics, mechanical parts, and coding
- You want a significant amount of time (almost half of the semester) to work on a project of your choosing. Past projects have included interactive toys, wearables, cosplay accessories, etc.

Helpful prior experience ...

- None! We will teach you everything you need to know.
- If you do have some prior experience with text-based programming, this may make it quicker for you to understand the code examples we use, but it is definitely not necessary.

During this class, we will cover the following topics and skills:

- “Sense-think-act” paradigm: how to identify the three main parts of most mechatronics systems and then apply them in your own projects
- Basic electrical circuit theory and electronics skills: how to build circuits using breadboards, how to make measurements using multimeters, how to solder
- Arduino microcontrollers: how to use this platform to “connect” input and output circuits using code
- Project planning: how to break down a large project into smaller subsystems, how to construct “proof of concept” prototypes



# Product Design

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: None*

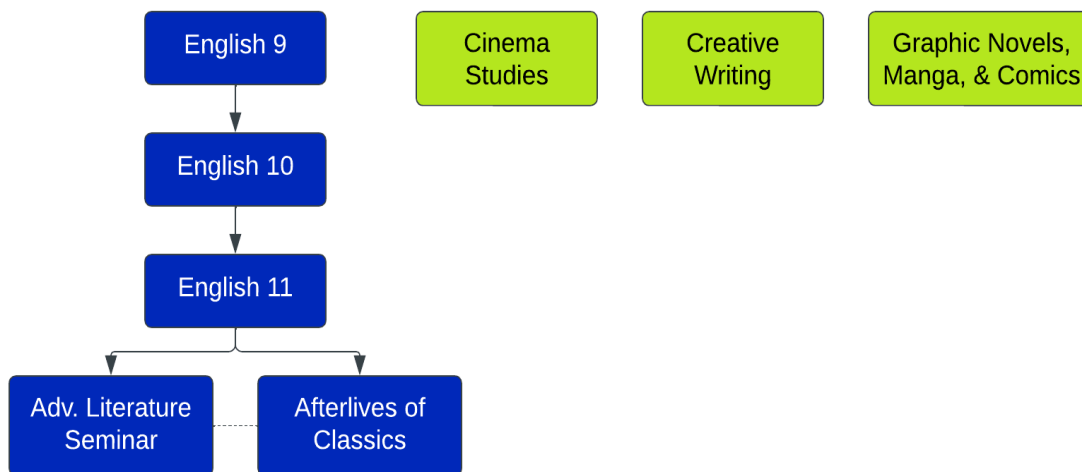
*Corequisites: None*

*Repeatable: No*

From the kitchen sink to the newest self-driving car, product designers are making deliberate decisions that will affect not only our interactions with manufactured objects, but our feelings towards them as well. This course will give students the opportunity to grapple with the same dilemmas as modern designers by working as a background liaison between company and consumer to make a product that is thoughtful, seamless, and poignant. The first semester of the class will be structured to allow a full work cycle on 2 or 3 large projects, while the second semester will be entirely dedicated to a single focus. Projects may include wearable technology, furniture design, homewares, and educational toys. In order to maximize the use of the I-Lab and shop during class time, preparation work will mostly be done outside of class. Students will be required to maintain a physical or digital design journal and present their design process to the class.

# English

**Graduation Requirements:** English 9, English 10, English 11, Adv. Literature Seminar, and Afterlives of Classics



## Adv. Literature Seminar

*Term: Fall Only*

*Open to Grades: 11th - 12th*

*Prerequisites: English 11 (ENG301)*

*Corequisites: English 11 (ENG301)*

*Repeatable: Yes*

Advanced Literature Seminar is a half-year course for seniors that consists of an in-depth study of a particular topic in English and American literature. Rather than a traditional survey approach, this course drills down intensely into specific literary genres, national genres, movements, and interdisciplinary approaches to literary study. Throughout the course, students will be exposed both to depth and breadth as they investigate these special topics while also seeking to make connections between texts. Special emphasis will be placed upon working with literary criticism--thus leading to original research in the discipline--and upon the production of creative scholarship, including journalistic reviews of novels and films, oral presentations, data visualizations, pastiche, and video responses. This course will prepare students for university-level study in literary and cultural studies even as it draws on material and concepts covered in previous English courses.

Note: English Seminars may be taken by 11th-grade students as an English elective.

## Afterlives of Classics

*Term: Spring Only*

*Open to Grades: 11th - 12th*

*Prerequisites: English 11 (ENG301)*

*Corequisites: English 11 (ENG301)*

*Repeatable: Yes*

"Afterlives of the Classics" begins with a careful, in-depth reading of a classic literary text to discuss its enduring popularity, its social and historical context, and theoretical reception through the ages. The semester then explores how the text has influenced literature and culture over the centuries, and in geographic, political, and historical zones that are different from its original context. For example, in a seminar centered on Shakespeare's *Othello*, we might ask: How does Shakespeare continue to speak to the pressing issues of our time, including race, gender violence, and exclusionary politics ("othering," so to speak)? Or, how does Shakespeare's representation of racial otherness speak to our current understanding of race, especially in light of the Black Lives Matter movement? A seminar on Tolstoy's *Anna Karenina*, meanwhile, might explore the novel's focus on women's subjectivity and desire in light of 20th- and 21st-century struggles around gender relations, and we might ask ourselves how a 19th-century Russian text continues to shape our understanding of love and marriage. The semester will conclude with students writing and producing an original live adaptation of their classic text that is set in a new time and place. The course is designed to build on literary analytical skills developed in English 9, 10, and 11. Assessments will include close readings of individual scenes, essay-length responses to scholarly articles on the play, character studies, and Hollywood-pitch style proposals for possible adaptations.

Note: English Seminars may be taken by 11th-grade students as an English elective

## Cinema Studies

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Not to be confused with a class where students would focus on making movies, this course is about studying movies. With an eye towards cinema appreciation, criticism, and analysis, this class focuses on the art of understanding and "reading" film. We will spend time watching and analyzing portions of nearly 100 films (and some in their entirety). On occasion, there will be an opportunity to experiment with media creation as well, and students will create projects that utilize various cinematic techniques that we discuss together in class. Texts include short weekly readings and chapters from various filmmakers, theorists, critics, and academics, as well as the films that we will engage in.

## Creative Writing

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

This course will serve as a foundational approach to the creative writing workshop, a space where students experiment with and explore their own voice while investigating a multitude of genres (fiction, nonfiction, poetry, playwriting, and hybrid texts). Not only will students have the opportunity to write, read, analyze, and respond to their classmates' writing in a workshop setting, they will study various authors' stylistic choices, literary devices, and literary elements. Students will also learn how to provide constructive feedback to their peers by engaging in class discussions and submitting written comments.

## English 9

*Term: Yearlong*

*Open to Grades: 9th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

In English 9, students learn to analyze literary texts and construct arguments as they develop their skills as readers, writers, collaborators, and critical thinkers. In order to accomplish these goals, we will read a variety of texts and genres, including novels, short stories, poetry, plays, and essays, that explore key values, philosophies, and aesthetics of Western culture. The fall semester is devoted to literature of antiquity and its modern echoes, and the spring semester examines literature on the topic of power and creation. Reading texts across an historical spectrum will prompt students to consider how texts adopt, adapt and deviate from recurring types of characters, plot devices, and settings. We will ask how these stories imagine what it means to be human, how concepts of good and evil inform our humanity, and how the stories we tell represent various identities and cultures. Additionally, we will examine how each text engages myths and archetypes, and what these elements might say about the author's contemporary influences. Over the course of the year, we will write analytically and creatively, using an intensive process of imagination, creation, and revision. Texts may include *The Odyssey*, *Frankenstein*, *Macbeth*, and a variety of shorter poems and stories.

## English 10

*Term: Yearlong*

*Open to Grades: 10th*

*Prerequisites: English 9 (ENG101)*

*Corequisites: None*

*Repeatable: No*

Our goal in tenth-grade English is to expand and deepen skills in reading, writing, critical thinking, and collaborative dialogue. Through encounters with a variety of literary texts, students will develop more sophisticated ways to analyze literary works and their devices; use writing mechanics, structure, and style to articulate ideas in various modes of writing; and communicate ideas to others. Another goal of English 10 is to examine and understand relations of culture, identity, and power by focusing on literature produced outside the West.

## English 11

*Term: Yearlong*

*Open to Grades: 11th*

*Prerequisites: English 10 (ENG201)*

*Corequisites: None*

*Repeatable: No*

The particular focus in this course is the rich and varied history of American literature, from precolonial writings to the 21st century. Throughout the year, we will have the opportunity to examine and reflect on the complex interplay between literature (and other cultural forms) and the historical and political forces that shape it. The course is designed to also integrate with History 11, American History, so students will be able to make deep interdisciplinary connections in course discussions and essays. The overarching question for the course is “What stories do we tell ourselves as Americans, and why?”

Readings of diverse texts (in genre, period, author's background, etc.) — from Native American poetry and early

Gothic fiction to modernist novels and postmodern plays — will encourage students to respond to this question through three key lenses (enduring understandings):

1. American identities are shaped by a multitude of voices, cultures, and actions that are often in conflict with each other.
2. American literature is a product of historical dynamics that continue to resonate today in new ways.
3. American literary forms reflect the changing notions and needs of a democratic society.

## Graphic Novels, Manga, and Comics

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

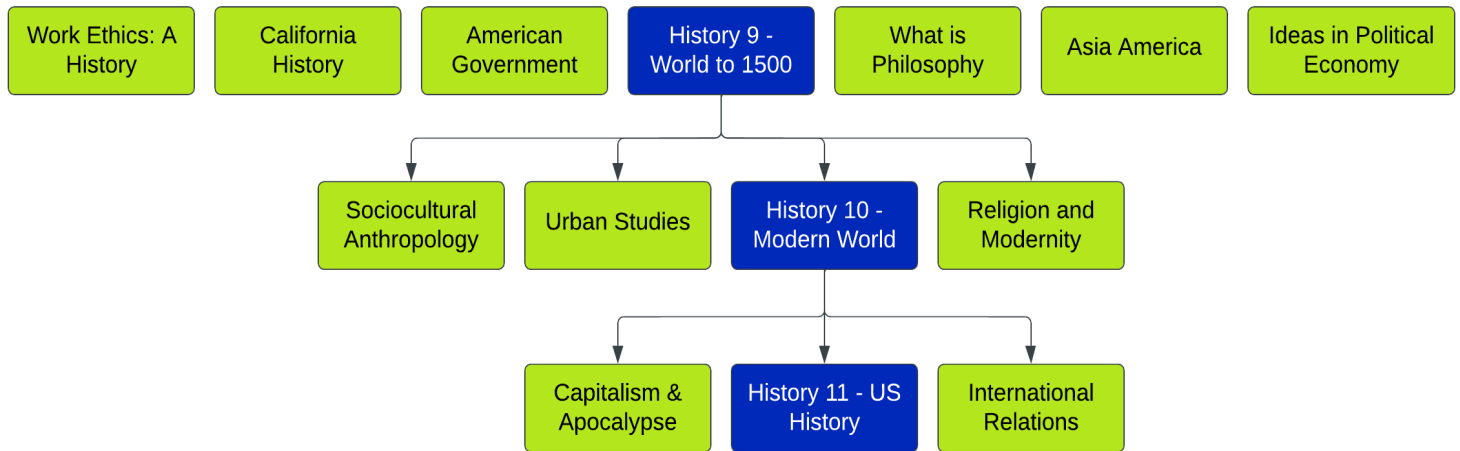
*Repeatable: No*

"How does visual storytelling work? Are comics just Marvel and DC and Naruto, or are ancient Egyptian drawings, Persian miniatures, and even cave drawings, also comics? Can you express yourself in a comic book? Together, we will answer these questions!

Graphic Novels, Manga, and Comics studies the wonderful blending of literature and the art of the comic book. Reading American comics, Graphic novels, and Japanese manga, we will explore the significance of visual storytelling, examine approaches to visual analysis, and discuss their themes and styles. This course covers topics in the disciplines of English, literary theory, art history, creative writing, comparative literature, history, and writing, representing an interdisciplinary approach to knowledge mirrored by the graphic novel's joint ancestry in fine arts and literature. Providing students with the critical skills necessary to read and understand this deceptively complex medium, the course exposes students to a series of works that define and redefine the genre while illustrating a variety of artistic & storytelling approaches to central themes of: politics, sexuality, class, censorship, violence, cultural and ethnic diversity. Readings will include classic and contemporary sequential art as well as selections from graphic narrative theory and comics history. No artistic tendencies, prior knowledge of comics, or second language proficiency are required."

# History

## Graduation Requirements: History 9, History 10, and History 11



---

## American Government

*Term: Fall*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

It's a critical time to examine the functioning (and dysfunction) of American government. We'll start with a fresh analysis of the current distemper – then leap backwards to the 1780s to see what Madison & Co. intended, and how the best of their intentions might be restored. We'll get a close look at legislative, executive, and (especially) judicial processes. Readings from historians, 18th and 21st century political analysts, and court decisions; guest lecturers via Skype; close attention to the presidential election. Trotskyists, democratic socialists, frumpy conservatives, and everything in between -- all welcome!

## Asian America: Perpetual Foreigners & Paper Sons

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Asian Americans have been in the fabric of America since its beginnings, and yet have been considered perpetual foreigners. And yet, despite the variety of laws targeted at Asian immigration, immigrants have found a way to enter, to settle and build, to become American. This course will examine the complexity and diversity of the Asian American immigration experience, the role that Asian Americans have played in fighting for equal protection and recognition as Americans, and the modern challenges of being considered perpetual foreigners and a model minority. While this

course is designed for 9th and 10th graders, upperclassmen will be expected to complete a more advanced research project.

## California History

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

In past years, our class field trip brought interested students to examine the layers of history on Angel Island and Sanchez Adobe, and we may explore the Sierras by horseback and/or backpacking accompanied by instructor as opportunities allow. Throughout the semester, we will be exploring California History by studying pre-contact Indian cultures, tracing waves of westward immigration through the Sierras as well as the impact of railroads, agribusiness, water politics, mid-twentieth century economic developments and the technology revolution that has reshaped the state. Our course will have a decidedly interdisciplinary approach as we examine the works of authors, such as John Steinbeck, John Muir and Rachel Carson, and various film producers to understand major issues through the director's lens. Students will study issues of significance in the development of California, including race relations, gender inequality, environmentalism, and immigration. Students will choose among their own interests to research and participate in teaching their classmates in this seminar style course.

## Capitalism & Apocalypse

*Term: Fall Only*

*Open to Grades: 11th - 12th*

*Prerequisites: History 10 (HIST201)*

*Corequisites: None*

*Repeatable: No*

Around the time of the 2008 economic crisis, there was a popular saying among many humanists that made its way into popular cultural discourse: "It is easier to imagine the end of the world than it is to imagine the end of capitalism." And this was said at a time when people were seriously questioning whether the values and motivations intrinsic to the political economy of capitalism had produced the crisis. Simultaneously, there was a preponderance of films in which the end of the world was envisioned in various forms of social, political, or environmental catastrophe. This class provides an opportunity for students to explore moments of transition in American capitalism, examining efforts to define capitalist reality or imagine alternatives to the status quo. The class will employ a variety of methodologies and readings from history, literature, and media students to think about representations of capitalism in specific historical moments stretching from the antebellum era to the present. Students will also be introduced to a variety of scholarly research and critical literature that has developed in response to these moments, each of which make the case for the importance of cultural representation in thinking through our social and economic values.

## History 9 - World to 1500

*Term: Yearlong*

*Open to Grades: 9th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

This course covers major themes and developments from pre-modern world history. The course starts with a look at the earliest civilizations and ends with an exploration of several cultural conflicts that defined the start of the modern period. Although the course covers a great deal of pre-modern global history, it is not intended as an exhaustive survey of every event or development from this era. Many but not all of the important historical moments from the ancient and medieval periods will be covered.

## History 10 - Modern World

*Term: Yearlong*

*Open to Grades: 10th*

*Prerequisites: History 9 (HIST101)*

*Corequisites: None*

*Repeatable: No*

This course traces the emergence of the modern international system from 1500 to the end of the Cold War, focusing on the four global centers of power and wealth at the beginning of the early modern period: Europe, the Middle East, India, and China. Students will start with an investigation of the emergence of the European balance of power system and compare it to the consolidation of political power in Ming/Qing China, the Ottoman Middle East, and Mughal India, and explore the effects of the military, naval, and commercial revolutions on modern government, international politics, and global trade and wealth generation. The first semester ends with an investigation of how 19th century revolutions and technological changes globalized great power rivalry, increased avenues for state power and wealth through industrialization and imperialism, and created new forms of nationalist and socialist mass politics, setting the world up for the great power conflicts, revolutions, and anti-colonial wars of the 20th century.

The second semester will focus on the massive transformations of the international system in the 20th century, tracing how the centuries-old multipolar world of great powers gave way to the bipolar world of the postwar U.S. and Soviet Union. The semester will start by exploring the causes and impact of the two world wars on the global system and on the emergence of new regimes and nation-states in the light of collapsing empires and decolonization, followed by a study of the international political, economic, ideological, and technological dimensions of the Cold War, and concluding with an investigation of the challenges of regional politics, state consolidation, and economic development among newly independent nation-states in the Cold War period.

## History 11 - US History

*Term: Yearlong*

*Open to Grades: 11th*

*Prerequisites: History 10 (HIST201)*

*Corequisites: None*

*Repeatable: No*

United States History is designed to provide students with a survey of the major forces which have shaped our country and incorporate deeper contemplation into specific eras and historical schools of thought along the way. Students are expected to explain how past events helped shape our modern society, while at the same time gain an appreciation for the complex connections between those events. In doing so, students will engage with three key questions: 1) Are capitalism and democracy complementary or contradictory? 2) Is the American state a vehicle for repression or liberation? 3) Globally, have US actions internationally lived up to or contradicted the ideals of freedom and democracy? Rather than answering these questions conclusively, we use them as an analytical framework in exploring varied case studies. In exploring these questions, students are encouraged to deepen their expertise in areas of their individual interests through varied readings, independent and collaborative research, and subsequently



presenting their various discoveries to one another in class on a regular basis. As such the students are all in the same course, but each is delving into their new areas of expertise while learning from one another's deep dives.

## **International Relations**

*Term: Fall Only*

*Open to Grades: 11th - 12th*

*Prerequisites: History 10 (HIST201)*

*Corequisites: None*

*Repeatable: No*

Why has war been such a dominant force in human history? Is the world simply a chaotic collection of self-interested states, or does an international society exist that might one day eradicate global conflict? Why do some states fail and degenerate into ethnic and sectarian strife? Can economic integration create peace? These are some of the central questions of international relations, a branch of political science. In this course we will study the major theories of this discipline, including key works from the realist, liberal, and constructivist schools of thought, and examine case studies from 1945 to the present day, spanning Russia, Europe, Asia, Africa and the Americas. This course will feature student collaboration within seminar style classes, students must be ready to lean into the responsibility for individual and collective responsibility to present and discuss mature material, including real-time international issues as they arise.

## **Ideas in Political Economy**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

For as long as economists have studied how the economy works, philosophers and revolutionaries have clashed over how it ought to work. Adam Smith described a new system of markets that could empower common people in the eighteenth century. Karl Marx condemned that system for shackling workers to machines in the nineteenth century, and thinkers debate the compatibility of economic growth and environmental sustainability today. Economic theories have always provoked political debates. In this course we will explore those debates in political economy by reading the most influential thinkers on markets, class and power, from the eighteenth to the twenty-first century. This is a class in intellectual history in which we will analyze ideas in their context, and it will allow us to assess for ourselves which theories from the past can help us understand the present. We will dive into historically significant texts and spend time with the authors' arguments to understand and evaluate the evidence, assumptions and convictions that guide them. No background in economics is required to engage with these ideas.

## **Religion and Modernity: Reformation, 1450-1750**

*Term: Spring Only*

*Open to Grades: 10th - 12th*

*Prerequisites: History 9 (HIST101)*

*Corequisites: None*

*Repeatable: No*

In the year 1500, people across Europe were united under one Church that transcended their many languages and directed their prayers to one God. Within two centuries, that unity had collapsed under the weight of fierce debate and cataclysmic war waged over the true nature of that God. In this class we will explore how the Protestant

challenge to the authority of the Catholic Church provoked violent conflict but also radical new ideas about society and profound political transformations that continue to shape our world today. In the absence of the certainty guaranteed by one legitimate church, thinkers during the Reformation studied the natural world and analyzed distant societies to arrive at modern scientific methods. We will read theological and political treatises to understand how principles of religious freedom could follow from religious war, and we will listen for the voices of everyday people to see how the Reformation transformed all levels of society. These investigations will help us analyze and judge the competing interpretations that scholars have offered to explain how the Reformation carried Europe and its empires from the middle ages into the modern era.

## **Sociocultural Anthropology: Culture, Exchange, Technology Studies**

*Term: Fall Only*

*Open to Grades: 10th - 12th*

*Prerequisites: History 9 (HIST101)*

*Corequisites: None*

In this course, students receive an introduction to the development of the field of cultural anthropology over the last 125 years. A social science, anthropology is the study of humans and their culture, emphasizing what anthropologists call “thick description” of cultural practices, such as exchange, inequality, violence, gender, kinship, mobility(ies), environment, and ritual. It is a large and diverse field, with practitioners utilizing methods including archaeology, immersive ethnographic field work, the study of cultural artifacts, the microanalysis of language practices, and/or interviews to create knowledge and develop theories about cultural practices. This course will begin with a focus on the origins of systemic ethnographic fieldwork and rise of anthropology in the academy in the early 20th century. Students will survey the breadth of anthropological inquiry and by the end of the semester will engage with 21st century anthropologists who are trying to transcend the boundaries of traditional ethnographies and are attempting anthropology of larger, complex objects and cultures (climate change, data algorithms, capitalism, food systems, etc.). Students will also get to do a bit of fieldwork themselves, but this is not the focus of the course. This course is suited for students interested in social science that is more closely related to the humanities, history students who are interested in a more systemic and granular approach to the study of culture, and students interested in grappling with cultural critics and theorists.

## **Urban Studies: The Death and Life of Great American Cities**

*Term: Spring Only*

*Open to Grades: 10th - 12th*

*Prerequisites: History 9 (HIST101)*

*Corequisites: None*

In 1800, only 3% of the global population lived in cities. Today, more than half the population – 3.3. billion people – are city dwellers. By 2050, 75% will be urbanites. This rapid rise in urbanization demands new strategies to address our growing needs: resource distribution, affordable housing, public transit, sustainable infrastructure and environmental justice. Using the Bay Area as our classroom, students will critically examine how policy decisions, historical trends, urban design, corporate interests and the natural environment have shaped our urban landscape. As we explore how the modern city functions, students will engage with local institutions, contemplate new strategies and design action plans to improve the built environment in which we all live.

## **What Is Philosophy?: Survey of Thought Across Time & Space**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Why does anything exist? Why can't we turn around in time as we can in space? Is time even real? What is a society, and how should it be organized? Is justice something other than the interests of the powerful? Is democracy better than other political systems? In this course we will consider how philosophers in a variety of contexts from the ancient world to the present have thought about such questions. You will have the chance to think, talk, and write about these matters and other problems of interest to you. This course is intended to be a broad survey of philosophy and will cover topics in metaphysics, epistemology, ethics, aesthetics, and social and political philosophy.

## **Work Ethics: A History**

*Term: Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Studs Terkel introduced his collection of interviews from working people during the 1970s stating that "This book, being about work, is, by its very nature, about violence—to the spirit as well as to the body." Terkel's remarks hint at the relationship we often assume between work and pain. But does work have to "hurt" for it to be valid? How do we measure the value of work? Is labor only work when it's paid? What is the relationship between pain and productivity? Writing at the turn of the 20th century, the sociologist Max Weber described the Protestant work ethic—a celebration of hard work, discipline, and the sacrifice of short term desires for long term gains—as the mindset Europeans cultivated which gave rise to the massive productivity of modern capitalism. But there have been other ethics of work—at the time of the US revolution, many of the nation's elites saw leisure as the key to cultivating true wisdom and that only those with adequate leisure time should be allowed to lead. This class is a history of work ethics with the goal of examining how the human relationship with work has evolved over time and across space. We will look at case studies of agrarian societies, explore the relationship between leisure and work, as well as how ideas of work became intertwined with race and gender. At its core, this course is an effort to understand how ideas become embedded within society, part of the invisible set of assumptions that form what might be considered common sense beliefs of "how things work."

# Interdisciplinary

---

## Environmental Humanities

*Term: Fall Only*

*Open to Grades: 10th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

Environmental Humanities employs humanistic questions about meaning, culture, values, ethics, and responsibilities to address pressing environmental problems as well as helping to bridge traditional divides between the sciences and the humanities. Environmental Humanities is an interdisciplinary class where we look at storytelling and climate change through the study of environmental philosophy, environmental history, ecocriticism, cultural anthropology, and ecosemiotics. Some questions we will look at include: whose voice has been centered in the telling of climate change? Whom have we left out of the conversation? How can we tell a convincing story in the face of climate science denial? And, what are some new mediums to tell an impactful story in the future? The class contains six modules: Language and Narration, Imperialism and Colonialism, Indigenous Knowledge, Nature, Climate Migration, Anthropocene and the Future.

## Free Block

*Term: Fall & Spring*

*Open to Grades: 11th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

## Independent Study

*Term: Fall & Spring*

*Open to Grades: 11th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

Independent study is an opportunity for students to pursue a deep dive into an academic course of study of their choosing. This research block cannot replace an existing course that is taught at Nueva. Rather, it is either an extension of a student's interest that may be inspired by a course (eg, art history, but the student wishes to study Japanese wood block in particular) or a passion which a student wants to explore in academic detail (eg. Russian literature). This course is by application only; please fill in this [form](#) by May 5th, 2023. ICS projects will then be approved by the ICS Coordinator.

## Independent Study: Internship

*Term: Fall & Spring*

*Open to Grades: 11th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

The Independent Study Internship is an opportunity for Nueva juniors and seniors to receive transcript credit for engaging in meaningful, experiential learning with an organization outside of the curricular offerings. Students may elect to take an Independent Study Internship during the fall or spring semester, or both.

The Independent Study Internship credit must be in place of an elective or during a free period. Students may not receive this credit on top of a full course load. In addition to meeting expectations set by a manager, students should plan on meeting with Katie Saylor and other Internship students regularly throughout the semester to check in.

Note: though these internships are often a continuation of a summer experience secured through the Nueva Internship Program, Nueva does not guarantee placement or dedicate resources to connecting students with employers during the school year. Internships secured outside of the Internship Program may also be considered for credit if they meet the requirements below.

Internship Requirements:

- Minimum 4 hours per week of work
- Paid or unpaid
- The position provides learning that is not possible through existing Nueva curricular offerings

Students interested in pursuing an Independent Study Internship should contact Katie Saylor or Thane Richards to discuss the opportunity before the add/drop period expires. If the employer is not an existing partner of the Internship Program, Katie will need confirmation that they understand the credit expectations.

## **Intro to Psychology**

*Term: Fall Only*

*Open to Grades: 10th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Does digital technology change our thinking? Why do art and music affect people differently? Can we predict who a person will be attracted to? How does a person form an identity? Can trauma be inherited? What are the roots of prejudice? Answers to questions like these can be found in the field of psychology. Contemporary psychology posits that the way humans act and think is shaped by the interaction among biological, cognitive, and social-cultural factors. In this elective, students will critically examine research related to certain behaviors; learn several fundamental theories in psychology, such as schema theory and social identity theory; write analytical essays proposing arguments; participate in seminar-style discussions, and create individual and group projects such as podcasts, games, and films on topics of their choice. By the end of the course, students will have a good grounding in the field for future study in psychology, understand the strengths and limitations of studying human behavior, and develop an appreciation for the weird and wonderful ways that humans act and think. Most importantly, students will likely gain new insight into themselves as well.

## **Introduction to Speech and Debate**

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

The course introduces four competitive speech and debate events: Extemporaneous Speaking, Impromptu Speaking, Parliamentary Debate, and Public Forum Debate. Students then choose one speech and one debate event in which they specialize. Public forum debaters will research and write cases on bimonthly and monthly topics issued by the National Speech and Debate Association; parliamentary debaters and extemporaneous speakers will read widely on current events. All students will compete in at least one interscholastic tournament each semester (though many more are offered). This course is the usual prerequisite for competitive tournament debating at Nueva.

## **Japanamerica: Japanese Pop Culture**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

From Godzilla to Pokemon, Japanese pop culture has become an integral part of American pop culture. Indeed, some of the most beloved and iconic American films and TV shows of the past few decades, from Star Wars and "Speed Racer" to The Lion King and "Iron Chef America," have been inspired by or copied from original Japanese source material. Now, American directors are even remaking classic Japanese films such as Godzilla and Ghost in the Shell. One critic has called this process of cultural cross-pollination "Japanamerica." This course examines the changing landscape of "Japanamerica" from the 1950s to the present, exploring the historical, political, economic, and cultural reasons why Japanese pop culture has become so popular in the United States and the rest of the world.

## **Journalism**

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

In this yearlong course, students will read and write a range of newspaper writing styles, including news, feature, opinion-editorial, sports, and culture. We will learn to write for different audiences and purposes, practice revision, and create compelling and meaningful stories that meet standards of accuracy, grammar, style, and journalism ethics. This is a writing and newspaper production course that explores a variety of storytelling techniques, emphasizes the importance of research and interviewing, and teaches layout and editorial design.

## **Leadership for Social Good**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

"This course provides students an opportunity to define, discuss, and debate the principles of leadership and social good. This includes exploring principles of good leadership, implications of bad leadership, and moral and ethical implications of both leadership styles. Utilizing a variety of readings, media, case studies, and guest speakers,

students will investigate the concept of social good and the importance and power of leaders who employ this quality, along with their effects in history and the present. There will also be opportunities for students to visit various leaders and organizations in the Bay Area who are examples of leaders who use their social good to create good in their community.

Our end goal is for students to organize a campaign throughout the semester based on a topic or idea they are passionate about that affects and can benefit the wider community (school or otherwise). The final product will consist of a public presentation in front of a panel consisting of potential investors that, if chosen, will be sponsored for at least one (1) academic school year."

## **Philosophy of Consciousness and Personhood**

*Term: Spring only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

This course is a reading and discussion seminar centered around the questions: "What is consciousness? What makes it difficult to study? Is the mind just the brain? Is consciousness an illusion and what would that mean? Is our personhood and identity dependent on consciousness? How do these philosophical questions affect ethical, medical, technological, and legal issues?" We will read works in philosophy, cognitive and neuroscience, and science fiction, such as works by Churchland, Nagel, Chalmers, and Asimov; we will discuss ideas such as artificial intelligence, animal testing, split-brain patients, and multiple personality disorder. There will be weekly readings, required discussion points, a mid-semester project, and a final essay.

## **Psychology and Memory**

*Term: Spring Only*

*Open to Grades: 11th - 12th*

*Prerequisites: Psychology 101 strongly recommended but not required if student has taken Philosophy of Consciousness (PHIL250), Sensory Neuroscience (BIO320), or has permission of instructor*

*Corequisites: None*

*Repeatable: No*

This psychology elective centers on reconstructive memory theory, and explores the implications of memory's inherent unreliability in many contexts. For each aspect of memory we study, we'll look at the biological, cognitive, social, and cultural factors that contribute to the creation, consolidation, alteration, and loss of memory. But we will also allow the psychological study of memory to mingle with its portrayal in literature and art. For example, we'll examine the causes and consequences of conditions that affect memory, such as Alzheimer's and trauma/PTSD, but also explore how these memory disorders are portrayed in the cultural landscape, including works that imagine the potential we have to implant or delete memories. We'll veer into collective memory and the psychological purpose of commemoration, with students choosing a particular memorial or monument to study with respect to cultural memory. We'll look at the function of nostalgia, an idealized form of memory, which can connect us to our past but also hinder growth, and examine what happens to our mental health when our memories become the grist of rumination. We'll look at the effects of digital technology on memory, studying the implications of offloading our long-term memories to search engines. Overall, this is an examination of all things memory, from the biopsychosocial model of psychology to literature to cultural anthropology. Assessment and classwork will be diverse and project based, with presentations, filmmaking, creative writing, and research as possible outcomes.



## Research in Psychology

*Term: Spring Only*

*Open to Grades: 10th - 12th*

*Prerequisites: Intro to Psychology (PSY101)*

*Corequisites: None*

*Repeatable: Yes*

Can human behavior be quantified? What's the best way to study how and why humans do what they do? In this follow up to Psychology 101, students will continue to examine the biological, cognitive, and sociocultural roots of behavior and mental processes, though this time with two new behavior topics: thinking and decision making, with a focus on Daniel Kahneman's 2-system theory, and child development, with an exploration of Piaget and Vygotsky's theories, a look at brain development frameworks, and in-depth examination of environmental factors that threaten normal development, such as oppression and deprivation. Unlike in Psych 101, however, in this class the students become the researchers, designing and running two complete research studies of their own: one quantitative laboratory experiment and one qualitative study using observation and/or interview methods. They'll learn how to interpret their results and write a journal-style article reporting and explaining their findings. The semester ends with students applying their knowledge and understanding to some real world issue using any project format they wish. And of course, students will continue to gain insight into their own lives and the world around them. We usually take a field trip to Stanford's Bing preschool to gain insight on methods used to study development of young children.

## Translation Studies: Fifty Words for Snow

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: CHIN201, JPN201, SPAN201, or the equivalent*

*Corequisites: None*

*Repeatable: No*

This course is an introduction to the exciting and interdisciplinary field of translation studies, which examines not only how words and texts are translated but also how they function in the production and transformation of national, cultural, and linguistic identities. The title is something of a misnomer: there are not fifty words for snow in Eskaleut or Inuit languages; it depends on how you translate and define the term "snow." In this way, the course encourages students to think critically and comparatively about how translation shapes, if not skews, our understanding of other peoples, languages, and cultures. Beginning with the question "What is translation?" this course covers some foundational theories and problems of translation before turning to case studies of literature in translation (prose and poetry). The course also examines translation as a metaphor in various films, stories, and other texts. At the end of the course, students produce a translation of their own.

## Yearbook Media Production

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

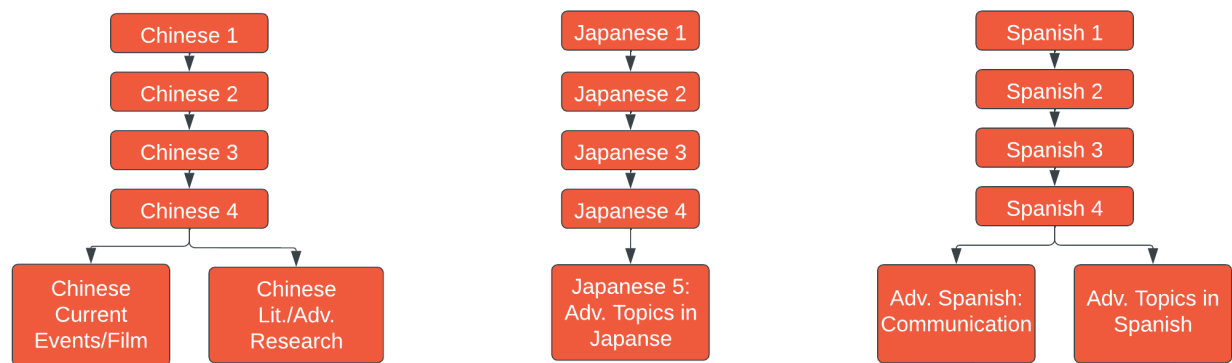
This yearlong course produces Nueva's annual yearbook. Yearbook offers students an exciting opportunity to further their creative interests in writing, design, and photography while acquiring highly transferable skills in journalism, print production, and visual storytelling. Skills covered include digital design (specifically layout, theme development, and the use of Adobe InDesign), journalistic writing (features, captions, and interviews), and digital photography



(composition, shutter rate, depth of field, and Adobe Photoshop). This class will emphasize both collaboration and student leadership, and students are expected to invest fully in the course by meeting all deadlines and actively participating in class and all work sessions. Students are expected to complete assignments on deadline, to fulfill their duties as staff or editors, and to contribute to the overall advancement of the yearbook theme and content.

# Languages

**Graduation Requirements:** 3 *consecutive* years of the same language



## Chinese 1

*Term:* Yearlong  
*Open to Grades:* 9th - 12th  
*Prerequisites:* None  
*Corequisites:* None  
*Repeatable:* No

The Chinese program provides the students opportunities to incorporate communication, collaboration, and technology skills in learning the Chinese language and its rich culture. In Beginning Chinese, students focus on culturally appropriate oral communication in Mandarin while utilizing pinyin, the Chinese phonetic system, to facilitate the sound transcription of the tonal language. Reading, writing, and typing in simplified characters (with references to their traditional counterparts) progress in parallel with oral skills development. Through each thematic unit — starting from self, family, and school and expanding to community and world — students will learn vocabulary, language patterns, dialogues, and culture topics, to create group presentations and to form conversations for real-life scenarios and functions. Foundational information of geography, history, pronunciation, classroom expressions and Chinese characters are introduced and reiterated among all the units.

## Chinese 2

*Term:* Yearlong  
*Open to Grades:* 9th - 12th  
*Prerequisites:* Chinese 1 (CHN101) or equivalent  
*Corequisites:* None  
*Repeatable:* No

The Chinese program provides the students opportunities to incorporate communication, collaboration, and technology skills in learning China’s language and its rich culture. Chinese 2 starts with an expansion of vocabulary and sentence structures built on top of Chinese 1 (or equivalent) content through dialogue creation, reading, listening, and writing. This course will roughly follow Lessons 9–16 on Integrated Chinese Level 1 (Parts 1 and 2) and cover topics including, but not limited to, shopping, transportation, weather, dining, directions, etc. In addition to colloquial Mandarin, students are exposed to more formal written language with stories and songs. While advancing

in reading and creative writing, students in Chinese 2 dive deeper into cultural comparisons and 21st century world citizenship through group projects and comic/drama production.

## Chinese 3

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Chinese 2 (CHN201) or equivalent*

*Corequisites: None*

*Repeatable: No*

The Chinese program provides the students opportunities to incorporate communication, collaboration, and technology skills in learning the Chinese language and its rich culture. The Level 3 Chinese course is composed of themes and units about decision-making and planning. Topics include, but are not limited to, directions, seeing a doctor, dating, living space, sports, and travel. The course will roughly follow Lessons 13–20 in Integrated Chinese Level 1 (Part 2) and loosely Zhēn Bàng! Level 1, Units 4–6. Correlated cultural topics are introduced with each unit for further exploration and comparison. In addition to the new vocabulary and sentence structures introduced in each unit, the students will be further immersed in an authentic environment through Chinese short stories, songs, news segments, TV series, and animated videos.

## Chinese 4

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Chinese 3 (CHN301) or equivalent*

*Corequisites: None*

*Repeatable: No*

The Chinese program provides the students opportunities to incorporate communication, collaboration, and technology skills in learning the Chinese language and its rich culture. The Level 4 Chinese course comprises themes and units about modernization and environmental issues. Correlated cultural topics are introduced with each unit for further exploration and comparison. In addition to regular language units, students will study biographies, news segments, crosstalk, and movies to manage a self-paced, individualized learning progress based on personal interests. Level 4 students will also conduct interviews and periodically publish bilingual newsletters in Chinese and English.

## Chinese 5: Current Events/Film

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: CHN401 or equivalent*

*Corequisites: None*

*Repeatable: No*

Chinese 5 is the fifth-year Chinese program. Its primary focus is to further explore topics related to Chinese history, culture, economic growth, social challenges, and modernization in order to develop a wider and deeper understanding of the Chinese speaking communities and to bridge the differences between the East and the West. Students in Chinese 5 will continue to lead discussions in Mandarin, brainstorming solutions for issues of interests and debating various topics related to current events. This course prepares the students to achieve a proficiency level of Intermediate-high to Advanced-low across interpretive, interpersonal, and presentational communications (based on the ACTFL standards) at the end of the school year.

# Chinese Literature/Advanced Research

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: CHN401 or equivalent*

*Corequisites: None*

*Repeatable: No*

"This advanced course is designed for students aiming to dive deeper into literary analysis and advanced research on topics involving the Chinese diaspora. In the fall semester, the course focuses on close readings of selected literature from different historical and literary periods, especially contemporary. Through close reading and discussion of the text, students are invited to understand the socio-cultural reality in which they were written and its contemporary relevance. This course has a heavy historical and cultural component that will help the student to achieve a higher level of linguistic proficiency and cultural awareness. In the Spring semester, students will conduct in-depth research in the target language and present their research in various forms, such as an academic paper, a panel discussion, etc. Students will be the center of their passion driven research on topics including but not limited to history, geopolitical conflict, cultural phenomenon, social justice, and environmental citizenship in the Chinese diaspora. The focus of this course is for students to become self-sufficient using Chinese as a research tool in the academic context.

This course prepares students to achieve a proficiency level of Advanced-Low to Advanced-Mid across interpretive, interpersonal, and presentational communications (based on the ACTFL standards) at the end of the year of study.

## Japanese 1

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Japanese 1 is a year-long introductory course that develops students' reading, writing, speaking, and listening skills through a systematic introduction and integration of grammar, vocabulary, Kanji, and culture. Using a communicative approach informed by the five C's of foreign language education as defined by the American Council on the Teaching of Foreign Languages (Communication, Cultures, Connections, Comparisons, and Communities), this course enables students to achieve a Novice-Low to Novice-Mid level proficiency in Japanese. In assignments and assessments, equal emphasis is given to the three basic modes of communication: the interpersonal, the interpretive, and the presentational.

## Japanese 2

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Japanese 1 (JPN101) or equivalent*

*Corequisites: None*

*Repeatable: No*

Building on Japanese 1 or the equivalent, Japanese 2 is a yearlong course that develops students' reading, writing, speaking, and listening skills in Japanese through a systematic introduction and integration of grammar, vocabulary, kanji, and culture. Using a communicative approach informed by the five C's of foreign language education as defined by ACTFL (Communication, Cultures, Connections, Comparisons, and Communities), this course enables

students to achieve Novice Mid to Novice High proficiency in Japanese. Assignments and assessments focus on the three basic modes of communication: the interpersonal, the interpretive, and the presentational.

## Japanese 3

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Japanese 2 (JPN201) or equivalent*

*Corequisites: None*

*Repeatable: No*

Building on Japanese 2 or the equivalent, Japanese 3 is a yearlong course that develops students' reading, writing, speaking, and listening skills in Japanese through a systematic introduction and integration of grammar, vocabulary, kanji, and culture. Using a communicative approach informed by the five C's of foreign language education as defined by the American Council on the Teaching of Foreign Languages (Communication, Cultures, Connections, Comparisons, and Communities), this course enables students to achieve Novice High to Intermediate Low proficiency in Japanese. In assignments and assessments, equal emphasis is given to the three basic modes of communication: the interpersonal, the interpretive, and the presentational.

## Japanese 4

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Japanese 3 (JPN301) or equivalent*

*Corequisites: None*

*Repeatable: No*

Building on Japanese 3 or the equivalent, Japanese 4 is a yearlong course that develops students' reading, writing, speaking, and listening skills in Japanese through a systematic introduction and integration of grammar, vocabulary, kanji, and culture. Using a communicative approach informed by the five C's of foreign language education as defined by ACTFL (Communication, Cultures, Connections, Comparisons, and Communities), this course enables students to achieve Intermediate Low to Intermediate Mid proficiency in Japanese. In assignments and assessments, equal emphasis is given to the three basic modes of communication: the interpersonal, the interpretive, and the presentational.

## Adv. Japanese Topics

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Japanese 4 (JPN401) or equivalent*

*Corequisites: None*

*Repeatable: Yes*

Building on Japanese 4 or the equivalent, Advanced Topics in Japanese is a yearlong course that develops students' reading, writing, speaking, and listening skills in Japanese through a topics- based study of grammar, vocabulary, kanji, and culture. Using a communicative approach informed by the five C's of foreign language education as defined by the American Council on the Teaching of Foreign Languages (Communication, Cultures, Connections, Comparisons, and Communities), this course enables students to achieve Intermediate High to Advanced Low proficiency in Japanese. Assignments and assessments emphasize the three basic modes of communication: the interpersonal, the interpretive, and the presentational. For example, students are required to do skits and speeches, to read and analyze authentic materials in Japanese, and to discuss advanced topics in Japanese. Topics change

yearly, depending on student enrollment and interests, but have included: geography, robots and technology, food, religion, pop culture, education, history, literature and poetry, performing arts, environmental issues, the atomic bomb, and urban studies. The course uses a variety of advanced Japanese textbooks and multimedia instructional materials, such as "Genki 2," "Adventures in Japanese," "Tobira," and "Quartet." Students continue their study of kanji using the Kanji Look and Learn workbook. Students can also deepen their language skills and cultural knowledge through an optional trip to Japan during the spring semester. This is a rotating topics course, so it may be taken multiple times for credit.

## Spanish 1

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Spanish 1 is designed to build a foundation in the Spanish language, with a focus on developing students' skills in Interpersonal Communication, Presentational Speaking and Writing, and Interpretive Reading and Listening. Comprehensible and repetitive exposure to high-frequency structures is provided through visuals, physical activities, stories, readings, and conversations about students and their lives, while making space for comparisons and connections with the cultures of Spanish-speaking countries. Students will understand the benefits of learning a second language as well as some of the skills and practices needed for the successful acquisition of Spanish, broadening perspectives about communities both near and far. Students will learn to introduce themselves to regional and social contexts in mind. They will be able to describe their passions and interests and develop an understanding of how people in other cultures spend some of their leisure time. Students will be able to describe themselves and their friends. As they explore cultural traditions related to homes and families from the Spanish-speaking world, students will describe different types of families, roles, and activities in their communities. As the year progresses, students will construct and respond to questions, ask for what they need, and respond to the needs of others. Students also become storytellers, using their newly acquired language to retell and adapt real and imaginary stories.

## Spanish 2

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Spanish 1 or equivalent*

*Corequisites: None*

*Repeatable: No*

The Spanish 2 course is designed for students to continue developing the skills and practices needed for the successful acquisition of the Spanish language, broadening perspectives about communities both near and far. Students continue their study of Spanish by further expanding their knowledge of key vocabulary topics and grammar concepts. They comprehend listening and reading passages more fully and express themselves more meaningfully and with greater spontaneity in both speaking and writing.

## Spanish 3

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Spanish 2 or equivalent*

*Corequisites: None*

*Repeatable: No*

Students in Spanish 3 will review and strengthen their understanding of essential Spanish grammar and build on the foundation of previous courses. They will expand their vocabulary and increase in fluency through frequent conversational practice and presentations, readings, creative projects, and research on cultural topics.

Throughout the year, students should progress through the standards of the American Council on the Teaching of Foreign Languages (ACTFL). They should increase their ability to express needs and wishes, write increasingly cohesive passages, and present clearly and articulately using complex sentences. Their higher-level listening and reading comprehension should allow them to identify main ideas, comment on what they hear, and identify and describe key points in authentic articles.

Through individual and collaborative learning activities, members of the Level 301 class will understand how life experiences shape identity, discuss cultural celebrations in Spanish-speaking countries, consider the relationship between life and the arts, delve into the complex issues of social justice in modern Hispanic society, and describe some environmental issues that pose challenges to society. The class will focus on developing students' skills in Interpersonal Communication, Presentational Speaking and Writing, and Interpretive Reading and Listening. Students will build knowledge of more complex grammatical structures and precise language to expand their possibilities in effective communication. They will review and master the preterit, imperfect, and present perfect tenses while implementing the present subjunctive mood in various contexts. They will review the future and conditional tenses and use them to describe predictions and hopes. Students will also learn to express desires and give instructions using the Imperative.

## **Spanish 4**

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Spanish 3 or equivalent*

*Corequisites: None*

*Repeatable: No*

The Spanish 4 curriculum refines and enhances students' language skills, developing their ability to communicate effectively in oral and written Spanish within a thematic context. Students move toward less structure and more cumulative knowledge and self-initiated responses. Students will broaden their understanding of cultures from Spanish-speaking communities around the world, relating them to their own experiences. The course will focus on six essential themes: global challenges, beauty and aesthetics, families and communities, personal and public identities, contemporary life, and science and technology. Students will explore each theme through written and audio resources, acquire new vocabulary, and practice writing and speaking formally and informally. The course emphasizes the use of language for active communication and is conducted entirely in Spanish.

## **Spanish Communication**

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: Spanish 4 or equivalent*

*Corequisites: None*

*Repeatable: No*

Advanced Spanish Communication is an advanced elective course, conducted in Spanish, designed to help students develop a dynamic range of advanced oral communication skills and strategies and acquire the literacy skills necessary to be effective communicators with native language speakers, and interact closely with native-speaking

communities both in and outside the school community. Students develop the communicative skills and oral expressiveness necessary to engage in a variety of real-life situations, and apply their skills to issues facing Spanish-speaking communities around the world. Through close readings and analysis of colloquial texts and conversations, as well as individual and group practice activities, students develop proficiency in Spanish language mechanics and learn skills necessary to conduct research and interpersonal interviews, deliver an original speech, write on demand, and interact with native speakers with an awareness of structure, organization, mechanics, and word choice in Spanish.

Over the course of the year students will examine and practice various daily interactions present in different Spanish-speaking communities. Over the course of the unit, students will review and analyze original texts and audiovisual resources such as news programs, advertisements, and debates. Through class discussions, personal learning logs, interviews, and oral presentations, students will develop and practice the different linguistic skills they have identified and classified throughout the review of class materials. Additionally, students will create cross-cultural connections between various contemporary language phenomena, including advertising, journalism, sports, and common slang.

## Advanced Topics in Spanish

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: Spanish 4 or equivalent*

*Corequisites: None*

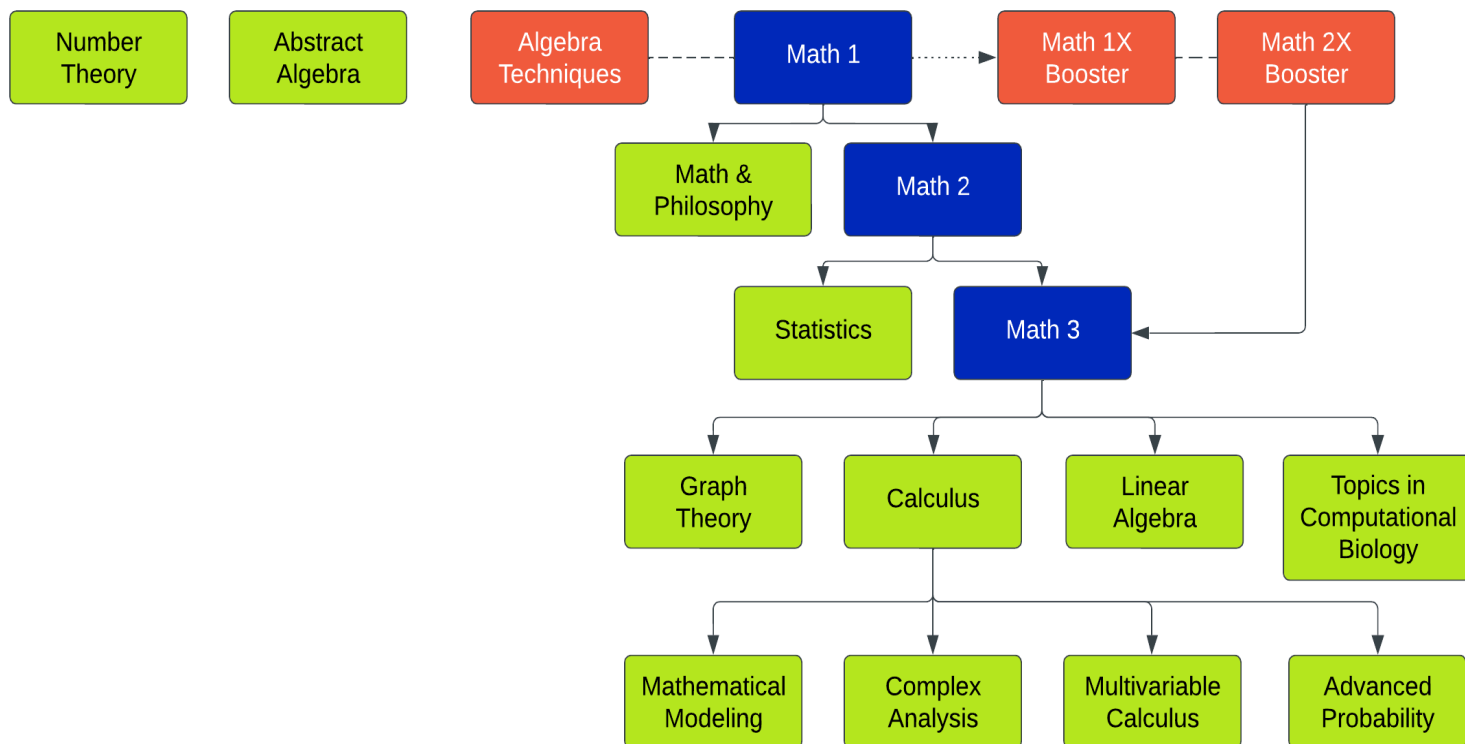
*Repeatable: No*

This course explores contemporary issues in the Spanish-speaking world. Through a variety of readings, film viewings, discussions, interviews, music, and social media, we will engage more closely with the culture, politics, and social and human landscape of the Spanish-speaking communities. Students will continue to build vocabulary, idiomatic expressions, and grammatical control with the goal of developing their interpretive, interpersonal, and presentational skills and progressing through ACTFL’s Advanced proficiency standards. Students will read and analyze texts, give oral and written presentations, and participate in discussions and debates related to the topics of study. A key component of this course will be developing relationships with native speakers to gather a variety of perspectives and opinions.



# Math

**Graduation Requirements:** 3 years and must complete at least Math 3



---

## Abstract Algebra

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

This course is the canonical gateway to advanced mathematics, comprising the study of structures such as groups, fields, and rings. These abstract structures are generalizations of more familiar number systems, and allow mathematicians to devise new “numbers” and “operations” that are applicable in a wide array of disciplines- not to mention fascinating in their own right! Abstract algebra is an excellent venue for learning to write mathematical proofs, and is indispensable in math, theoretical physics, cryptography, and more. This course will require commitment and effort, but has no specific prerequisites. Any student may enroll, regardless of previous mathematical experience, as long as they are prepared to engage earnestly with the challenges presented- and challenges will be presented for all students, even those with some understanding of groups, fields, or vector spaces. We will study groups, subgroups, normal subgroups, quotient groups, order of elements, cosets, orbits, and fields. Students who begin the semester with some familiarity with these notions may explore parallel notions in ring theory, as well as more advanced topics such as the Sylow theorems.

## Advanced Probability

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Calculus*

*Corequisites: None*

*Repeatable: No*

This class will take a calculus-based approach to discrete and continuous random variables, Bernoulli and Poisson processes, probability generating functions, classical distributions (normal, t, binomial, hypergeometric, negative binomial, exponential, Poisson, beta, gamma), moments, joint distributions, multivariate normal distribution, conditional expectation, formalization of the law of large numbers, central limit theorem, the theoretical basis of statistical tests, Markov chains, and branching processes. We will develop intuitive understanding of the processes underlying the notation, with an emphasis on clever, elegant problem-solving. We will use programming and simulation-based investigations to understand distributions, moment calculations, and limit theorems. While this class will be largely theoretical in nature, we will develop the concepts of probability theory with an eye toward seeking truth in understanding natural and social phenomena, from statistical mechanics to identifying racial bias in society.

## Algebra Techniques

*Term: Yearlong*

*Open to Grades: 9th*

*Prerequisites: None*

*Corequisites: MATH 1*

*Repeatable: No*

This course builds students' competency with the fundamentals of algebraic thinking and technique necessary for success across our mathematics and science programs. Students will practice and solidify techniques such as order of operations, simplifying and manipulating algebraic expressions, symbolic manipulation, solving equations and inequalities with linear, absolute value, and quadratic components, and working with exponents and radicals, among other skills. Along the way, students will develop their proficiency in recognizing structure, moving between representations in problem spaces, abstracting from repeated computations to the language of algebra, and moving between process and object views of various mathematical concepts. Throughout the course, there will be an emphasis on connecting this growing algebraic toolkit to geometric spaces as well as applied/contextual problems, with an aim to support students in their Math 1 course, in which they will be dual-enrolled.

## Calculus

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Math 3*

*Corequisites: None*

*Repeatable: No*

Calculus is a rigorous year-long course in single-variable calculus. This course interweaves two approaches: the classical, and the applied. First, it immerses students in rigorous, analytic thinking, through an emphasis on deductive reasoning and careful proofs of deep results. Students are expected to derive formulas and results from basic principles, and to articulate verbally the connections between mathematical ideas. Second, students encounter a wealth of applications in physics, economics, and other sciences, ranging from fluid dynamics to compound interest. In working through these applications, students discover the transformative power of calculus as a

problem-solving tool. The curriculum covers limits, epsilon-delta proofs, differentiation rules, applications of differentiation, differential equations, integration, various integration techniques, the fundamental theorem of calculus, transcendental functions, power series, convergence of sequences and series, and various applications.

## Complex Analysis

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Calculus and ideally one more elective, Lin Alg or MVC*

*Corequisites: None*

*Repeatable: No*

This is an introduction to the theory of analytic functions of one complex variable. Complex analysis is a fascinating field of study from a purely theoretical point of view, as well as a powerful tool for solving a wide array of applied problems. It is related to many mathematical disciplines, including in particular real analysis, differential equations, algebra and topology. The numerous applications include all kinds of wave propagation phenomena such as those occurring in electrodynamics, optics, fluid mechanics and quantum mechanics, diffusion problems such as heat and contaminant diffusion, engineering tasks such as the computation of buoyancy and resistance, and signal processing and communication theory. This is a very challenging course.

## Graph Theory and Applications

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Math 3*

*Corequisites: None*

*Repeatable: No*

This elective introduces students to the problems and techniques of discrete and combinatorial geometry. This area of mathematics is playing an increasingly central role in many application, from network models of opinion formation in the social sciences, to the spread and prevention of diseases in public health, the brain structures that support learning and memory in neuroscience, the search algorithms that empower web-based AI, and even the identification and containment of risks in cyber-security. Along the way, the students will be exposed to elements of linear algebra as well as computer systems that support simulations and data analysis of graphs.

## Linear Algebra

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Math 3*

*Corequisites: None*

*Repeatable: No*

Linear algebra is the branch of mathematics concerning the properties of matrices. Linear algebra has wide ranging applications in abstract algebra, functional analysis and many natural sciences and social sciences; it is particularly malleable to the student's interests, whether they be theoretical, applied, or computational. Our approach this year will give students the opportunity to acquire a number of communication and analysis skills that will benefit them in further math classes. The notions we consider can be subsequently bent to their further goals in a remarkable variety of fields, and we will periodically discuss specific examples of applications. These concepts will include vectors and vector spaces, linear transformations and matrix representations, determinants, linear dependence and independence, subspaces and bases and dimensions, orthogonal bases and projections, Gram-Schmidt

orthogonalization, Cramer's Rule, linear models and least-squares problems, eigenvectors and eigenvalues, and singular value decomposition.

## Math 1

*Term: Yearlong*

*Open to Grades: 9th - 10th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

This course builds students' competency in mathematical reasoning, focusing on generalizing patterns, building strong arguments, and finding multiple approaches to solving problems. Students learn to ask probing questions, reflect on their problem-solving process, and clearly communicate their findings. Students develop mathematical fluency by integrating geometry and algebra through rich introductions to geometric construction, formal proofs and notation, similarity and congruence, right triangle trigonometry, coordinate geometry, and unit circle trigonometry. Students also revisit and expand on their knowledge of forms of linear, quadratic, absolute value and piecewise functions, with an introduction to function transformations and the library of essential parent functions and analysis of key features. The underlying focus for the year is on building the language and foundations of mathematics.

## Math 1A Booster

*Term: Spring Only*

*Open to Grades: 9th*

*Prerequisites: Must have approval from administration AND Math 1 teacher.*

*Corequisites: MATH201A*

*Repeatable: No*

The Math 1A/2A program is a compression of the Math 1 and Math 2 curriculum for students seeking additional challenge. These two courses build students' competence in mathematical reasoning, generalizing patterns, building strong arguments, and finding multiple approaches to solving problems. Students will expand their knowledge of and understanding of the four mathematical strands: functions, geometry, number theory, and probability & statistics. Students who successfully complete this program are eligible for Math 3.

Students who take the MATH101A Booster class must also enroll in the MATH201A Booster class.

**NOT AVAILABLE DURING COURSE REQUEST WINDOW. STUDENTS INTERESTED WILL LEARN MORE IN THE FALL SEMESTER.**

## Math 2

*Term: Yearlong*

*Open to Grades: 9th - 11th*

*Prerequisites: Math 1*

*Corequisites: None*

*Repeatable: No*

Math 2 builds on the content and skills developed in Math 1, including further studies in Geometry (polygon angles and areas, 3D geometry, circle theorems, general triangle trigonometry, unit circle trigonometry review) and introductions to exponential and logarithmic functions, higher degree polynomials and factoring, complex numbers, and mathematical modeling. Throughout the course, students work individually and in groups to derive, make sense

of, and apply what they are learning to solve compelling problems, while continuing to develop their ability to reflect on and communicate their thinking effectively.

## Math 2A Booster

*Term: Spring Only*

*Open to Grades: 9th*

*Prerequisites: Must have approval from administration AND Math 1 teacher.*

*Corequisites: MATH101A*

*Repeatable: No*

The Math 1A/2A program is a compression of the Math 1 and Math 2 curriculum for students seeking additional challenge. These two courses build students' competence in mathematical reasoning, generalizing patterns, building strong arguments, and finding multiple approaches to solving problems. Students will expand their knowledge of and understanding of the four mathematical strands: functions, geometry, number theory, and probability & statistics. Students who successfully complete this program are eligible for Math 3.

Students who take the MATH201A Booster class must also enroll in the MATH101A Booster class.

*NOT AVAILABLE DURING COURSE REQUEST WINDOW. STUDENTS INTERESTED WILL LEARN MORE IN THE FALL SEMESTER.*

## Math 3

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Math 2*

*Corequisites: None*

*Repeatable: No*

Students will spiral deeper into the content developed in Math 1 and Math 2 and prepare for advanced studies in calculus, statistics, number theory, abstract algebra, and other math electives, as well as physics, game theory, economics, and other science/social science electives through thought-provoking problems and projects. As topics from previous courses are deepened, Math 3 content will include function families and their graphs, trigonometric proofs and identities, complex numbers, parametric equations, polar coordinates, and various topics in geometry, including vectors, circles and conics, as well as introduce topics in calculus. Math 3 serves as a culminating course for Nueva's integrated Math curriculum, helping students see mathematics as a cohesive and beautiful system.

## Math and Philosophy for Human Flourishing

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Math 1*

*Corequisites: None*

*Repeatable: No*

This elective explores the fertile interface between philosophy, mathematics and literature, in search of the role it plays in the human condition. Our main quarry is mathematical truth and its ontology. From the economy to ecology, our bodies to the body politic, complexity is the common denominator that, paradoxically, explains what remains stubbornly just outside our comfort zone. What is the meaning of proof, or truth, in the era of polymath blogs and computer-assisted experimental mathematics? We cast light on the contemporary philosophy of mathematics,

certainly with numerous nods to the historical strands it culminates, but with a marked bias for its relevance to the working mathematician in the 21st century.

This is primarily a reading and writing course, with mathematics serving as the context. We will read the musings of mathematicians as they ponder the source of meaning and purpose in their work. We will investigate the core philosophical questions at the foundation of mathematics, from ontology and metaphysics to epistemology, ethics and esthetics. These investigations will always be inspired from concrete mathematical explorations, designed to be accessible to students with diverse mathematical backgrounds. Students will draw on topics familiar to them, starting with the definitions and proofs of Euclidean geometry in Math 1, to make sense of the human experience across the mathematical universe, in search not only of truth and beauty, but also meaning, freedom, belonging and love.

## Mathematical Modeling

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Calculus*

*Corequisites: None*

*Repeatable: No*

Students will be presented with situations from biology, economics, engineering, logistics, management science, politics, and daily life. They will develop creative mathematical approaches to build, test, and refine models, focusing on applying the formal mathematics they already know. Modeling problems will draw on concepts from logistics and operations research, measurement and regression, game theory and decision theory, algorithmic design, and geometric design and inference. This class will be heavily project-based, and students will work in teams to produce models and formal write-ups of their approaches and results.

## Multivariable Calculus

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Calculus*

*Corequisites: None*

*Repeatable: No*

Our study of multivariable calculus will build upon techniques learned in Single-Variable Calculus, extending the realm of applications to problems in two, three, and more dimensions. The course provides a venue for students to combine and extend many of the mathematical techniques that they have learned in previous math courses, and to apply those techniques to problems of greater complexity. Students will generalize their knowledge of differentiation and integration to functions of several variables. In particular, students will learn to work with and visualize two- and three-dimensional functions, vectors, and vector fields. We will study techniques for working in  $n$  dimensions, including parametric equations, polar coordinates, vectors and vector operations, directional derivatives and gradients, multiple integration, line and surface integrals, Taylor's expansion in  $n$  dimensions, and Green's, Stokes' and Gauss' Theorems. Whenever possible, students will work with physical models or computer models to aid in visualization and will solve problems taken from real-world applications. We will also spend time honing formal mathematics skills by studying and performing proofs and presentations.

## Number Theory

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Number theory is a branch of theoretical mathematics with both a wealth of recreational problems and applications in cryptography and computer science. For example, Fermat's Last Theorem and RSA encryption both have their roots in number theory. In our semester long study of numbers we will begin by considering properties of the integers, mainly various aspects of divisibility. We will also investigate other discrete systems such as modular arithmetic and rational numbers. Advanced students may have opportunities to study topics such as the Gaussian integers, quadratic residues and Diophantine equations.

## Statistics

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: Math 2*

*Corequisites: None*

*Repeatable: No*

How do we become critical consumers of data? How do we use data effectively to create an argument that is statistically significant? What must we be cautious of when designing an experiment? This course in statistics first explores how to interpret categorical and quantitative data, including both 1- and 2-variate, and then explores different tests that allow us to make inferences and justify conclusions. In the second semester, we explore study design deeply and technically for degree of association and inference. We also look at sampling techniques as it relates to inference about populations. In addition, we delve into the power of studies before embarking on independent study as per inferential statistics housed within the context of epidemiological and environmental factors.

## Topics in Computational Biology

*Term: Spring Only*

*Open to Grades: 10th - 12th*

*Prerequisites: Math 3*

*Corequisites: Biology*

*Repeatable: No*

This course explores the intersection between biology and mathematics. Students are introduced to the use of mathematical models for exploring biological processes. We investigate a diverse set of biological dynamics, including the genetic code, the relationship between structure and function of proteins, the forces that guide evolution in viruses, bacteria and eukaryotes, population dynamics, competition and cooperation among species, metabolism and catalysis, neural excitation and inhibition, immunological memory, and origins and detection of life. The modeling process plays a central role in this class, offering opportunities to study various mathematical concepts in context, including dynamical systems, Markov chains, random walks and optimization. The class is structured around modules that students explore in independent groups. These modules culminate in artifacts shared through symposia and curated into a final portfolio.



# Performing Arts

**Graduation Requirement:** Performing: two semesters of any two courses *OR* Visual: 2 semesters, Intro & Advanced, in same medium

Jazz  
Ensemble

Steel Drum  
Band

Groove  
Workshop

Intro to  
Music Production

Fall  
Production

Musical  
Theater

Dance

---

## Dance

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

This course is an energetic exploration of dance. Divided into three parts over the course of the semester, students will immerse themselves in three different styles of dance: jazz, ballet and a style chosen by the class (tap, hip hop, contemporary, musical theatre, modern, or any other popular requests from students). We will explore the historical background of each style of dance, watch and learn from performances and notable performers and then learn the technique of each style. This elective is physically active and students will be encouraged to explore creativity with movement. Each class will involve a warm up, a focus on dance technique and learning choreography in each style. We will end the semester in a culmination performance of at least one of our dances. Students will receive PE credit for the full year for taking this elective.

## Fall Production

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

Fall Production is open to all students and will offer the opportunity to rehearse, stage, and present a full-length play. Students are encouraged to contribute in ways beyond just acting, and there will be opportunities available during the rehearsal and production process for people of diverse talents and interests, including tech crew and design teams. We will begin by workshopping two different scripts and students will vote on which play we end up producing and performing. We will then move into academic and dramaturgical work, transitioning to the creative processes of interpretation, blocking, staging and performance as we ready the play to be presented to the wider community. Rehearsals will be held during class time, with two to three after-school sessions per week, culminating in an immersive Tech Week. All performances and technical rehearsals are mandatory. Any class time we have left in the semester after our production will be spent doing theatrical workshops, additional acting scenes, or other opportunities to work on other scripts. Come ready for a dynamic and creative atmosphere, an ensemble bonding experience, and the endorphin rush of bringing a text to life!



## Groove Workshop

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None but some musical experience is encouraged*

*Corequisites: None*

*Repeatable: Yes*

Groove Workshop is a music performance workshop designed to teach students how to form and maintain a band — in other words, how to rock! Areas covered will include analysis of song form and structure, rehearsal methods, chart writing, equipment setup, and performance tips and tricks. A big part of being in a successful band is having the ability to communicate and be open to the ideas of others. Making music is a great way to create bonds and build teamwork. This class gives students that opportunity.

**Goals:** The goals of the elective will be to master the songs we choose to learn, develop proficiency as musicians through playing challenging music, learn to play well as a band, and perform both at Nueva and in the community.

**Homework:** Most of our work in this elective occurs during class time. When we begin a more challenging piece of music, I will ask students to spend some time learning the music at home so we can use the class time learning the song as a whole, rather than teaching students individual parts.

**Assessment:** Primarily, students are assessed through their positive participation during class time and their willingness to practice and work on music. As this is considered an advanced group, students are expected to be proficient at all their individual parts for each song we learn.

## Intro to Music Production

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

Students will learn how to create any type of music that they can dream of, using imagination and the program Ableton Live. Students will learn the fundamental concepts of music production, covering everything from programming electronic compositions using MIDI to recording live instruments and vocals to designing, engineering, and automating their own sounds. Students use musical examples from the industry to understand certain concepts in digital production and learn how to design and produce music using their own sounds and patches. Course assignments include creating musical compositions or designing sounds and patches for future productions using Ableton and are flexible in regard to genre and style (electronic vs. live). The course will model a workshop environment, as we will listen to and discuss student projects as a group. At the end of the course, students produce a final original song at full length.

## Jazz Ensemble

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: Student must play an instrument*

*Corequisites: None*

*Repeatable: Yes*

Jazz Ensemble will study and perform various jazz stylings, including blues, swing, Latin, Brazilian, and calypso. Each style will be explored historically, theoretically, and in performance. Emphasis will be on the basic concepts of each style as well as improvisation. Students will be exposed to “standards,” the classic compositions that are an integral part of any jazz musician’s vocabulary. In addition to performing at the upper school arts culmination on Thursday evening, December 13, we will look for other opportunities to perform at open houses and informal lunch concerts and morning meetings. Grading will be based on attendance and participation in class.

**Goals:** The Jazz Ensemble is designed to increase a student's musical proficiency, rhythmic vocabulary, ability to improvise, knowledge of theory, and understanding of that uniquely American art form — jazz. We will use a variety of rehearsal methods intended to strengthen and expand both conceptual and practical knowledge, and to help students improve their ability to hear intervals, melody, chords, and rhythms. For example, we will learn jazz standards, modern jazz compositions, and musical forms directly related to jazz, like the Brazilian samba and Latin jazz.

**Homework:** Most of our work in this elective occurs during class time. When we begin a more challenging piece of music, I will ask students to spend some time learning the music at home so we can use the class time learning the song as a whole, rather than teaching students individual parts.

**Assessment:** Primarily, students are assessed through their positive participation during class time and their willingness to practice and work on music and improvisation between classes. Additionally, students will be assessed on their willingness to learn the language of improvisation, which includes the study of chord/scale relationships, and how improvising musicians apply those concepts in an ensemble and performance setting.

## **Musical Theater**

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

This elective is open to anyone interesting in performing in the spring musical; it is also open to students with a strong interest in the production end of things (e.g., stage managing, tech, etc.). We will begin by workshoping two different scripts and students will vote on which musical we end up producing and performing. While the class serves as core rehearsal time, it also explores key components of acting, including voice work (breathing, articulation, projection, vocal blending, and musicality), stage movement (choreography, blocking, stage picture, and physicality of character) and characterization (focus and concentration, improvisation, open scene work, subtext, motivation, emotional range). Each student also has the opportunity to be a part of a tech team (costumes, props, assistant directing, sound, set design, etc) to help our show come to life. There will be two after school rehearsals per week for the first part of the semester and moving to three after school rehearsals once we get closer to the show, culminating in an immersive tech week and a performance weekend. Note: students in this elective will receive 2 units of P.E. credit.

## **Steel Drum Band**

*Term: Fall & Spring*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: Yes*

In the fall semester, the steel band will focus on learning compositions by Trinidadian steel drum virtuoso Robert Greenidge. Robert is one of the world's most influential steel drum composers, and while he has been known worldwide as a part of Jimmy Buffett's Coral Reefer band for the past 30 years, he is also a panorama winner in Trinidad's Carnival, arranging for the 120-member Desperadoes Steel Orchestra. In addition to learning the calypso stylings of Robert's music, we will most likely do several Santana tunes as well as music by Sting and Bill Withers. The rhythms of each style present different challenges for each section of the band.

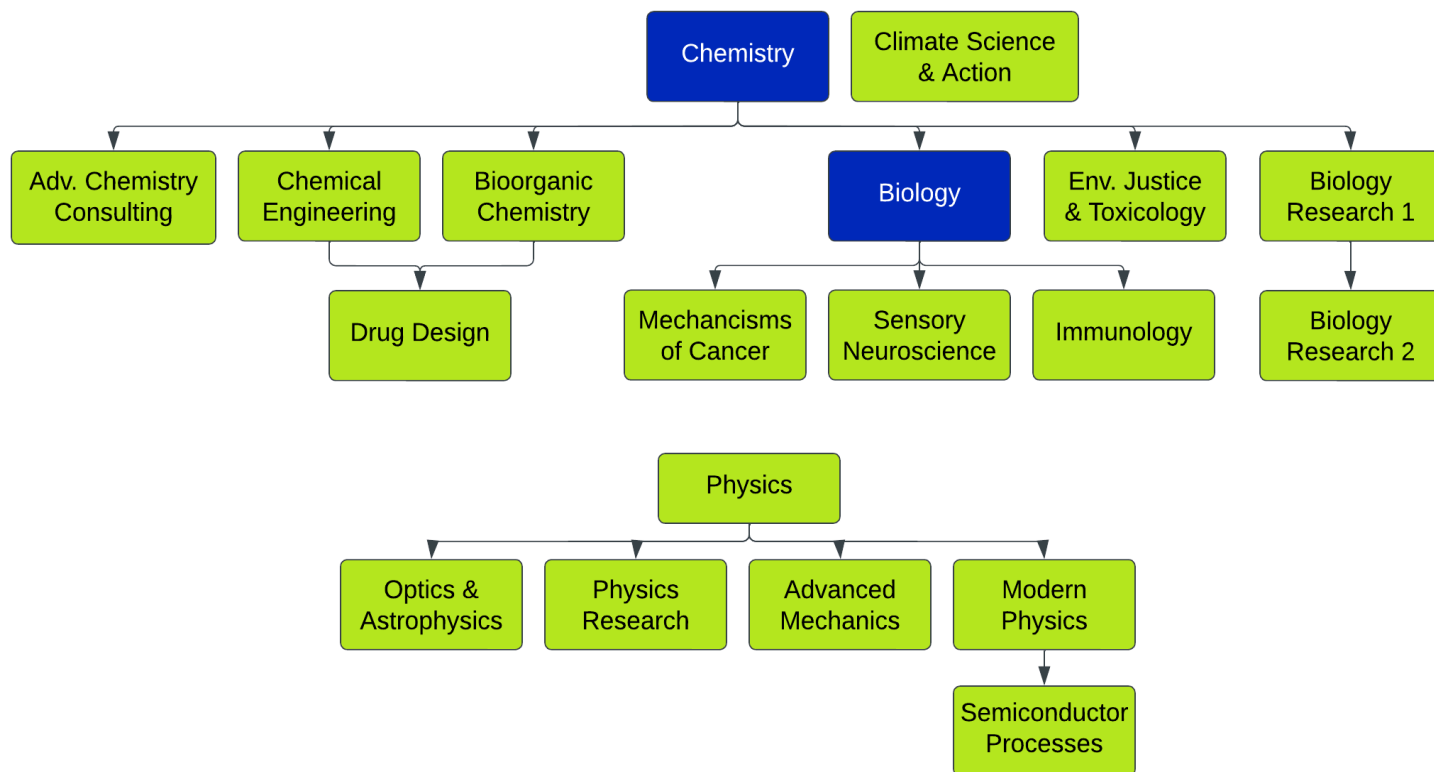
**Goals:** The goal of the class is to develop an advanced steel drum ensemble for the high school that will play complex arrangements in a variety of musical styles. The ensemble will perform at school and in the community throughout the year. We will also perform at the upper school arts culmination in early December.

**Homework:** In addition to the performance aspect, we will research the history of the instrument, its cultural significance, its pioneers, and its greatest composers and performers. Students will do individual research projects on the development of the modern steel band and its musical styles, as well as listening to a variety of music related to the instrument.

**Assessment:** Students will be assessed primarily on their positive participation in rehearsals, willingness to practice parts individually between classes, attendance, and participation in the concert. In addition, students will be evaluated on their willingness to listen to the different genres of music played and to strengthen their music theory skills.

# Science

**Graduation Requirement:** Chemistry, Biology, and 1 year of two semester-long electives or one year-long elective



## Adv. Chemistry Consulting

*Term:* Yearlong

*Open to Grades:* 10th - 12th

*Prerequisites:* Chemistry (CHEM101) and Math 2 (MATH201)

*Corequisites:* None

*Repeatable:* No

Advanced consulting in chemistry is a laboratory-based class that exposes students to a wide range of chemistry and engineering disciplines through a collaborative, project-aligned curriculum featuring open-ended design, mystery, or analysis questions. The course mainly focuses on four chemistry disciplines: physical, inorganic, analytical, and computational chemistry. Students will join a fake company called "Vyrtecks" and work together in groups or as a class to master the course content and habits of mind while addressing real-world problems and prompts related to solar, battery, polymer, laser, and perfume chemistry, as well as chemical and electrical engineering topics, and plastic failure analysis.

The use of real-world prompts will help organize our efforts to learn new chemistry topics, understand the reasons for learning them, and how to learn them, while acting as consultants to address those prompts with laboratory work. The time spent working in the course can be divided into two categories: new chemistry topics and consulting

activities. In percentage format, the year would look approximately like 85% for new chemistry topics (learning, laboratories, designing/building, homework, etc.) and 15% for consulting activities ('company' events, presenting work in class or to panels, field trips, meeting with "clients", etc.). The course provides an opportunity for students interested in post-secondary STEAM academic and career-related activities to experience the workings of a human-centered profession: consulting. Additionally, students will have the chance to visit, observe, and interact with a local consulting firm.

## Advanced Mechanics

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: Physics (PHYS101) & Calculus (MATH401)*

*Corequisites: None*

*Repeatable: No*

This course represents an in-depth study of mechanics, including the mathematical tools of calculus and elements of mechanical engineering. Unlike the treatment in first-year physics, where objects are usually approximated as point masses or having infinite stiffness, here we may consider an object's center of mass, rotational inertia, modulus of elasticity, or other properties. Students solve problems of substantially greater complexity than those encountered in earlier classes. We also aim for students to develop a robust set of scientific practices: methods for asking questions, designing and carrying out experiments, interpreting the results, and communicating their results to others. Students explore physics experimentally whenever practical. When a phenomenon is not tractable to classroom demonstration, digital simulations are employed. Students spend most of their classroom time learning to solve problems, design and perform experiments, and analyze demonstrations of (sometimes unexpected) results.

Topics to be covered during the year include:

- kinematics
- dynamics
- center of mass, impulse, and momentum
- conservation and transformations of energy
- gravity
- rotation and rolling
- oscillations and waves

## Biology

*Term: Yearlong*

*Open to Grades: 10th*

*Prerequisites: Chemistry (CHEM101)*

*Corequisites: None*

*Repeatable: No*

Our goal in Biology 101 is to develop students' understanding of and appreciation for the living world in all its complexity. We approach the study of life through several key lenses, including form and function relationships, variations in size and scale, and change over deep timescales. By the end of the year, we hope students will naturally see these themes as some of the organizing principles in biology. Throughout the year, students perform authentic scientific research and participate in scientific discourse just as any scientist would. Thus, our students are able to develop an understanding of the process of science through direct experience. Students will learn to engage with peer-reviewed scientific articles, design sound experiments through iteration, collect and present data, and communicate scientific information to various audiences.

Essential questions we explore include:

- What is life, what capacities does it entail, and what does it require?
- How has time, from the scale of billions of years down to nanoseconds, shaped life and its processes?
- What are the molecular artifacts of life? How do the structures of these biological molecules dictate their functions?
- Why is life intimately tied to the need for an instructional code that is heritable and changeable?
- How has evolution shaped life on earth? How has it amplified positive traits and minimized negative traits?
- How are the characteristics of an organism shaped by its genetic code and interactions with the environment?
- How do populations of organisms and their environments interact, and how is human activity reshaping ecological relationships?

## Biology Research Teams 1

*Term: Yearlong*

*Open to Grades: 10th - 11th*

*Prerequisites: Chemistry (CHEM101)*

*Corequisites: None*

*Repeatable: No*

Note: if you would like to be considered for enrollment in BRT1, please submit a [brief response to this form](#) gauging your interest and motivation. See below for more details on the course and selection process.

In the Biology Research Teams 1 (BRT1) class, we learn deeply about the scientific process by interrogating its underpinnings and directly participating in experimental biological research. We learn about the history of the scientific process, current philosophical issues surrounding science, how to approach experimental design and data analysis so as to mitigate bias and make sound claims, and how to engage with and learn from the scientific literature. Students can also expect to spend significant periods performing experiments to investigate biological questions using model organisms; during this process, they learn to use modern laboratory techniques and tools, collect and analyze data, and share their findings in writing, figure, and presentation format. This year-long, hands-on introduction to biology research will prepare students for any future research endeavors, but it is a required course for anyone interested in the student-led advanced biology research course, Biology Research Teams 2 (BIO375). In BIO375, students propose novel, long-term research projects to experimentally address significant scientific questions, and they pursue a subset of these projects in small, student-led groups over the course of 1-2 years.

We are introducing a selective mechanism for BRT1 course enrollment to optimize the Biology Research Teams pipeline from BRT1 to BRT2. We are seeking BRT1 students who are passionate about scientific research and motivated to continue from BRT1 into BRT2. A committee of chemistry and biology teachers will assess potential enrollees based on their response to this [form gauging interest and motivation](#). Additionally, the committee will weigh students' demonstrated research and problem-solving skills, along with habits such as self-direction and resilience.

## Biology Research Teams 2

*Term: Yearlong*

*Open to Grades: 11th - 12th*

*Prerequisites: Biology Research Teams 1 (BIO275)*

*Corequisites: None*

*Repeatable: Yes*

In the Biology Research Teams 2 class (formerly XRT Leadership), students propose novel, long-term research projects to experimentally address significant scientific questions, and they pursue a subset of these projects in

small, student-led groups over the course of 1-2 years. These research projects in molecular, cellular, and behavioral biology are significant (we often present them at a scientific conference); they are created, pushed forward, and led by students; they are iterative; and they allow for student leaders to train their peers in a structured process guided by the teachers. The practice reading scientific literature, theoretical understanding of the scientific process, and hands-on experimental training that students received in Biology Research Teams 1 (BIO275) allow teams in BIO375 to collaboratively drive a multi-faceted research project forward during their 1-2 years in the class. Team leads and other team members together determine daily tasks and allocate time and resources accordingly to plan for and achieve long-term research goals. All students practice project management and reverse design skills, while team leads become experts in these areas while also developing their ability to coordinate, mentor, and inspire their team. Students learn to write about, display, and present their data through informal lab meetings and through creating scientific posters and written abstracts to share at a biology research conference. After 1-2 years in BIO375, students will be well-prepared to continue making significant contributions to the scientific community in a university laboratory setting.

## Bioorganic Chemistry

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: Chemistry (CHEM101)*

*Corequisites: Math 3 (MATH301)*

*Repeatable: No*

The objective of this course is to discover organic chemistry, the chemistry of carbon, experimentally. Organic molecules such as petrochemicals, natural products, biomolecules, and pharmaceuticals are an integral part of our daily lives. Selected experiments will present common laboratory practices and techniques of organic chemistry, such as chromatography and distillation, and illustrate the chemistry of a wide range of functional groups. Other experiments will allow students to synthesize specific compounds — some of which are found in nature or are of commercial importance — or to explore reactions that are fundamental to organic synthesis: nucleophilic substitution, nucleophilic addition, electrophilic addition, esterification, and oxidation. Additional experiments will emphasize discovery-based approaches, which allow students to develop their own protocols for addressing a particular question experimentally, as they might do in a research laboratory.

The course in general aims for students to develop a robust set of scientific practices in conjunction with content knowledge: methods for asking questions, designing and carrying out experiments, interpreting results, communicating their results to others, and practicing analytical and reasoning skills based on observations. Topics to be covered during the year include:

- chemical bonding and molecular structure
- hydrocarbons
- kinetics and energy of a reaction
- stereochemistry
- functional groups in organic chemistry
- reaction mechanisms
- chemistry of proteins and enzymes
- independent project

## Chemical Engineering

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: Chemistry (CHEM101)*



*Corequisites: Math 3 (MATH301)*

*Repeatable: No*

Chemical engineers are multi-disciplinarians who apply principles of chemistry, physics, biology and engineering to solve a range of practical real-life problems from the large-scale production of pharmaceuticals to the development of novel renewable energies or the design of new biomaterials to name just a few. In this course, some aspects of Chemical Engineering, such as applications to renewable energies, will be investigated with mini research projects including many elements of design thinking such as experimentation on a small scale, process analysis, followed by iteration and redesign.

The general goals of this class are to foster reasoning and analytical skills mostly in the context of physical chemistry and analytical chemistry through hands-on activities. Students will gather qualitative or quantitative data from experimental situations, understand and accurately represent data when needed and use the data to evaluate predictions, support structure determination and propose plans of action. Projects will be supported by mini-lectures to provide a base of content.

## **Chemistry**

*Term: Yearlong*

*Open to Grades: 9th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Nueva's ninth-grade science provides a unified introduction to the principles that describe the natural world at its most fundamental level. The course aims to improve students' understanding of the world around us, and make their thinking more rigorous, by introducing principles of chemistry and applying those concepts in hands-on ways to real-world examples. We also aim for students to develop a robust set of scientific practices: methods for asking questions, designing and carrying out experiments, interpreting the results, and communicating their conclusions to others.

Topics studied this year include:

- gas properties
- atomic nature of matter
- bonding in materials
- chemical reactions
- stoichiometry
- acids and bases

## **Climate Science & Action**

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

Climate Science & Action is a semester-long course designed to be an EC (Environmental Citizenship) elective whose primary goal is to empower our students with the interdisciplinary knowledge and resources to take on climate



change in their communities and beyond. After exploring the underlying theory, students will learn about the current impacts of climate change. They will also investigate climate/environmental justice and climate legislation at different levels of government before we shift our focus to how students can enact change now and locally.

Students will use multiple resources to learn, investigate and analyze climate change and to inform climate action including the En-Roads Climate Change Simulation Game where students will be able to see how their real-time decisions will impact global emissions. We also plan to invite some guest speakers including students and professionals working in the broader fields of climate science and activism. Possible projects could include a policy memo/brief to local, state, and national lawmakers, panel discussions/debates around controversial topics like geoengineering, and educational materials (e.g., reports, presentations, videos/podcasts) that students could use to teach younger students and to support Nueva's mission II.

## Drug Design

*Term: Yearlong*

*Open to Grades: 11th - 12th*

*Prerequisites: Chemical Engineering or Bioorganic Chemistry*

*Corequisites: None*

*Repeatable: No*

This lab-based introductory medicinal chemistry class emphasizes the application of biological, chemical, and pharmacological concepts in the investigation of drug discovery. Medicinal chemistry has been defined as the "science that deals with the discovery and design of new therapeutic chemicals and their development into useful medicines" (Silverman, 1992). The aim of the class is to introduce students to the basic principles of medicinal chemistry and how they are applied to the design of new therapeutics. The emphasis of this course is that therapeutically relevant small molecules are chemical entities whose biological properties are dependent on chemical structure and physicochemical properties. Therefore, modifications of physicochemical properties are likely to influence the biological behavior of the small molecule. At the end of the course, the student will have a greater awareness of "drug-like" properties in a chemical structure (lipophilicity, H-bonding potential, toxicity potential) and approaches to modify some of the pharmacological properties of compounds. Throughout the class, students will gain confidence in studying a scientific discipline and acquire an appreciation for the field of medicinal chemistry. Some topics to be covered during the year include:

- spectroscopy
- intro to anatomy and physiology
- structure-activity relationship: antibacterials
- relationship between structure and ADME

## Environmental Justice & Toxicology

*Term: Fall*

*Open to Grades: 10th - 12th*

*Prerequisites: Chemistry (CHEM101)*

*Corequisites: None*

*Repeatable: No*

What are the roots of environmental injustice, and how do they impact health outcomes on a warming and industrializing planet? The semester-long Environmental Justice & Toxicology course is designed to equip students with the knowledge and tools necessary to address environmental health and justice issues within their communities and the wider world. Students will uncover the disproportionate impact of environmental hazards on various populations, exploring the intersection of environmental science, policy, and ethics. Starting with a historical overview

of the broader civil rights and environmental movements, students will learn about the seminal events and legislation that contributed to the rise of the modern environmental justice movement. This overview will be paired with introductions to environmental health and toxicology that will enable students to assess how environmental factors like air quality and chemical exposures affect human health and well-being. With this background in hand, students will turn their attention to current and emerging issues in environmental/climate justice and food security and investigate them through the lens of fostering greater equity and sustainability. The course will draw from a range of resources, including books, podcasts, studies, and simulations. Guest lectures may feature local community activists, academic researchers, and policy analysts. Projects may range from developing community action plans to creating educational campaigns aimed at raising awareness and prompting action on environmental health issues. Students will emerge from this course not only with a profound understanding of the links between the environment, public health, and justice but also with the conviction and skills to advocate for a healthier, more equitable world.

## **Immunology**

*Term: Fall & Spring*

*Open to Grades: 11th - 12th*

*Prerequisites: Biology (BIO101)*

*Corequisites: None*

*Repeatable: No*

Every day, the cells of your immune system target and destroy pathogens. The immune system is highly specialized to resist constant assault from the outside world, but the tools at its disposal often cause harm to the body itself. The cells of the immune system must navigate this fine line in a complex ballet of molecular call and response, constantly signaling and readjusting to create a coordinated response to infection. Our course will investigate the underlying function of the immune system through a case study approach, analyzing real-life cases of how the immune system can both fight and cause disease. We will model the stages of innate immune response following a nasty case of road rash, design a novel vaccine that takes advantage of the adaptive immune response's ability to remember its targets for decades, and analyze the medical records of a leukemia patient to understand how the body gives rise to the cells of the immune system. Finally, our course will end with student-led journal clubs in which you can dive deeper into a topic of your choice. With a heavy focus on data analysis and modeling, this class is an opportunity to ask and answer questions about how our own bodies function.

## **Mechanisms of Cancer**

*Term: Fall Only*

*Open to Grades: 11th - 12th*

*Prerequisites: Biology (BIO101)*

*Corequisites: None*

*Repeatable: No*

Together, the many thousands of genes in the human genome create a self-assembling system called the human being. All of the cells in this system use those genes in different ways, becoming constrained in terms of where they exist, how long they exist, what they consume, and what they produce. The human genome, however, has vulnerabilities. Changes to the genetic code—mutations—can cause cells within the human body to redefine their previous location, lifespan, and activities. A cell like this can grow and divide without typical boundaries, creating a cancerous tumor. In this class, we will work to understand the mechanisms, also called pathways, that control cell growth and division under normal circumstances, and that are hijacked when certain cancerous mutations occur. We will also explore the molecular basis for many cancer treatments. Although we will spend much of our time taking a scientific approach to cancer, we will also examine cancer and its related problems through other lenses and sources, such as personal narratives, the history of cancer, healthcare economics, and health disparities. Through

creative and analytical projects, students will develop their scientific paper-reading and communication skills, deepen their understanding of molecular and cellular biology, and analyze complex societal problems through multiple frameworks.

## Modern Physics

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: Physics (PHYS101)*

*Corequisites: None*

*Repeatable: No*

This course builds on the first-year introduction to physics and generally covers developments from the late 19th century through the present day. Transitioning from the relatively intuitive principles of classical physics, students explore the more conceptually profound and challenging ideas demanded by 20th and 21st century science. Students will study phenomena experimentally whenever practical. When a phenomenon is not tractable to classroom demonstration, digital simulations are employed. Students explore new content primarily through teacher-created screencasts and readings, with some Socratic lecture and classroom discussion. Students spend most of their classroom time learning to solve problems, design and perform experiments, and analyze demonstrations of (sometimes unexpected) results.

Topics to be covered during the year include:

- electromagnetism
- relativity
- nuclear physics
- quantum physics
- standard model of particle physics

## Optics & Astrophysics

*Term: Yearlong*

*Open to Grades: 10th - 12th*

*Prerequisites: Physics (PHYS101)*

*Corequisites: None*

*Repeatable: No*

In this year-long class, students will explore principles of optics in some detail. Students will study, construct, and characterize imaging systems (cameras) as well as the dispersive systems used for spectroscopy, paying particular attention to aberrations and other limitations on system-level performance. The application of such systems in ground and space-based observatories will lead to a study of astronomy and astrophysics. Observational data will be accessed through one or more methods, potentially including publicly available datasets, remotely operated telescopes for hire, or other techniques.

## Physics

*Term: Yearlong*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: Math 2 (MATH201)*

*Repeatable: No*

This course aims to improve students' understanding of the world around us, and make their thinking more rigorous, by introducing principles of physical sciences and applying those concepts to real-world examples. We also aim for students to develop a robust set of scientific practices: methods for asking questions, designing and carrying out experiments, interpreting the results, and communicating their results to others. The course emphasizes important principles such as Newton's laws and includes more specific phenomena as necessary to illuminate those principles. Students explore physics experimentally whenever practical. When a phenomenon is not tractable to classroom demonstration, digital simulations are employed. Students explore new content primarily through teacher-created screencasts and readings, with some Socratic lecture and classroom discussion. Students spend most of their classroom time learning to solve problems, design and perform experiments, and analyze demonstrations of (sometimes unexpected) results.

## Physics Research

*Term: Fall Only*

*Open to Grades: 10th - 12th*

*Prerequisites: Physics (PHYS101) and Consent of Instructor*

*Corequisites: None*

*Repeatable: Yes*

This fall-semester (only) course provides an opportunity for students to delve deeply into physics research by exploring topics curated for the U.S.A. Young Physicists Tournament. These interesting topics are chosen to be challenging but accessible at the advanced high school level, and usually require a combination of theoretical, numerical / modeling, and experimental investigation. Topics may include phenomena in optics, classical mechanics, fluids, gravitation, and electricity & magnetism. Examples of tasks that students have performed in past years include writing code to simulate the trajectory of an object subject to aerodynamic and gravitational forces, building an apparatus to generate and photograph rainbows formed from different liquids, or exploring the behavior of pristine and damaged tuning forks. Extensive quantitative data collection and analysis is emphasized. Students are strongly advised to read a [fuller description](#) of the class and its relationship to the USAYPT found in the Google Doc version of the course catalog. PHYS101 is a required prerequisite, and additional advanced classes in physics and math are desirable. Consent of Instructor is also required. Students should express their interest to Mark Hurwitz ([mhurwitz@nuevaschool.org](mailto:mhurwitz@nuevaschool.org)) in person or via email at least one week before course selections are due.

## Semiconductor Processes

*Term: Spring Only*

*Open to Grades: 10th - 12th*

*Prerequisites: Modern Physics (PHYS250) Fall Semester*

*Corequisites: None*

*Repeatable: Yes*

How do they make the chips that make your computer work? Students will explore the processes, metrology, terminology, concepts, and equipment commonly used in the manufacture of integrated semiconductors. Students will explore more deeply in individual process or metrology steps and will have the chance to delve into integrated circuit design or special topics of their own choosing. Labs include photolithography and profilometry. Taking advantage of our proximity to silicon valley, we include guest speakers from the semiconductor industry and a field trip to a manufacturing facility. Concepts include how to control processes that cannot be seen and optimization of yield.

# Sensory Neuroscience

*Term: Spring Only*

*Open to Grades: 11th - 12th*

*Prerequisites: Biology (BIO101)*

*Corequisites: None*

*Repeatable: No*

How do we perceive the world around us? Somehow, our brains interpret physical phenomena like light, sound waves, molecules, and temperature in order to produce our current sense of what's happening around us and in our bodies. In this class, we will explore sensory systems down to the molecular level, coming to understand how physical stimuli can be translated into a language that our brains can "read" and generate meaning from. Through this exploration, students will also learn fundamental concepts in neuroscience, such as how neurons communicate with one another. The unique experiences of people with sensory issues will help us consider the holistic nature of our perceptions, while the sensory "superpowers" of other organisms (think infrared sight and magnetic sense) will illuminate how evolution has shaped our sense of the world. Students will learn through various sources and modalities, including extracting information from scientific research articles and translating it for specific audiences. They will also apply their scientific knowledge to answer a novel question or solve a problem of their own choosing in a culminating project, with options for experimental design, technology design, or science fiction story-writing. By the end of the course, students will be thinking deeply about the brain from molecular to systemic levels, and applying their skills to creative projects involving sensory augmentation and other cutting-edge topics in sensory neuroscience.

# Science Teaching Fellow

*Term: Fall & Spring*

*Open to Grades: 11th - 12th*

*Prerequisites: Course Teaching Fellow: successful completion of desired course*

*Lab Teaching Fellow: successful completion of at least one course in I-Lab or Science*

*Teacher approval: [Students must complete this T.F. Form.](#)*

*Please note that a teacher has the option to decline a teaching fellow, and therefore, it is suggested that students speak with potential supervising teachers before signing up.*

*NOTE: Students can only be a fellow for one class in one semester for the school year.*

*Corequisites: None*

*Repeatable: No*

There are two types of Teaching Fellows: course and lab.

The course T.F. provides assistance for a specific course in a variety of ways, ranging from making copies to taking attendance to providing in-class support via tutoring or leading small group discussions and more.

The lab T.F. works with a supervising teacher/staff on managing a particular lab space, whether that is the I-Lab or a Science lab. Such projects may include tracking inventory to cleaning and preparing supplies to space maintenance and more.

Expectations and responsibilities will be discussed and agreed upon with the supervising teacher. The student will have a class period in their daily schedule where they assist a teacher 2-3 times a week during the scheduled class slot. Students should also expect to meet with the supervising teacher outside of class in preparation for class.

Finally, students who take on this role are expected to maintain respect and professionalism when working with their supervising teacher and with the students in the classroom.

This is a non-graded course and students will receive credit (CR) upon successful completion. Students will complete a self-reflection evaluation at the mid-semester and end of semester. Students will schedule a meeting with their supervising teacher to discuss the self-reflection.

The following courses in Science ARE NOT ELIGIBLE for T.Fs: BIO320, BIO380, BIO375

# Social Emotional Learning (SEL)

**Graduation Requirement:** SEL101 & DT104, SEL201, SEL301, and Senior Block or Ethics & Good Life



---

## Social Emotional Learning 9

*Term: Yearlong*

*Open to Grades: 9th*

*Prerequisites: None*

*Corequisites: None*

*Repeatable: No*

The Social-Emotional Learning class is a part of Nueva’s Social-Emotional Learning (SEL) program, running from Pre-K-12. The SEL program is intended to develop students’ capacity for self-reflection, self-regulation, empathy, critical decision-making, and positive social acuity through a skill-based curriculum. Skills we seek to develop include emotional regulation, self-management and awareness, communication, conflict resolution, goal-setting, and many more.

In the Fall semester of 9th grade, SEL is intended to be a social-emotional “on-ramp” to the Upper School experience. We begin with discussions about what makes strong communities, healthy communities or “good” communities, and think about the various roles people can play in a community. From there, we tackle some of the most common 9th-grade woes: imposter syndrome, perfectionism, and anxieties around success. We do activities that ask students to think about how they define “success”, and what they hope for or value. This sets the stage for our Executive Functioning unit, framing the unit around students’ definition of success and thus making goal-achievement more relevant to them.

We circle back to themes of community with a unit on “The Internet” focused on digital citizenship, tracking our own digital footprints, and analyzing the structures of different social media platforms to think through their costs, potential benefits, and ways of working psychologically on young people. Finally, we host a guest educator to teach a four week unit on Sex Ed, in which we discuss the culture and language we use around sex, birth control, STDs, and STD prevention.



## Social Emotional Learning 10

*Term: Yearlong*

*Open to Grades: 10th*

*Prerequisites: Social Emotional Learning 9*

*Corequisites: None*

*Repeatable: No*

Social-Emotional Learning is a core upper school course that continues the focus on social-emotional learning, an integral part of teaching and learning at Nueva throughout all grade levels. Drawing on content from a variety of disciplines and theories (mindfulness, psychology, counseling, identity development, wellness, social science), the course is grounded in scientific research on best practices. Science of Mind provides tools, skills, and information geared toward relevant issues facing adolescents and aims to develop balanced, resilient, well-rounded and compassionate people who will have a positive impact on the world. Tenth-grade Social-Emotional Learning enables students to critically and compassionately engage in their communities. The class is conceived of as a “brave space,” where students learn to engage deeply with one another through dialogue, perspective-taking, listening, and trust-building. The course ultimately aims to foster students’ ability and willingness to engage with others around complex issues and with oneself in an effort to create the kind of community and 21st century democracy we all seek.

## Social Emotional Learning 11

*Term: Yearlong*

*Open to Grades: 11th*

*Prerequisites: Social Emotional Learning 10*

*Corequisites: None*

*Repeatable: No*

Social-Emotional Learning is a core class designed to deepen empathy, build connections and empower students to make positive choices regarding their health, well-being and relationships. Drawing from a variety of disciplines and theories, (mindfulness, psychology, neuroscience, identity development, wellness, and the social sciences) the course is grounded in scientific research and best practices. SOM aims to provide the tools, skills, and information that adolescents need to mature into well-balanced, resilient, compassionate people who will have a positive impact on the world.

The focus of Social-Emotional Learning in grade 11 is for students to engage more critically in the process of decision-making, and to be aware of the multiple variables that affect their decision-making. Diving into interdisciplinary considerations of what influences us--our emotions, reason, perception, language, context, etc.--students start building an understanding of their own decision-making models, and asking how it serves them and how to tailor it to particular scenarios.

## Senior Block

*Term: Yearlong*

*Open to Grades: 12th*

*Prerequisites: None*

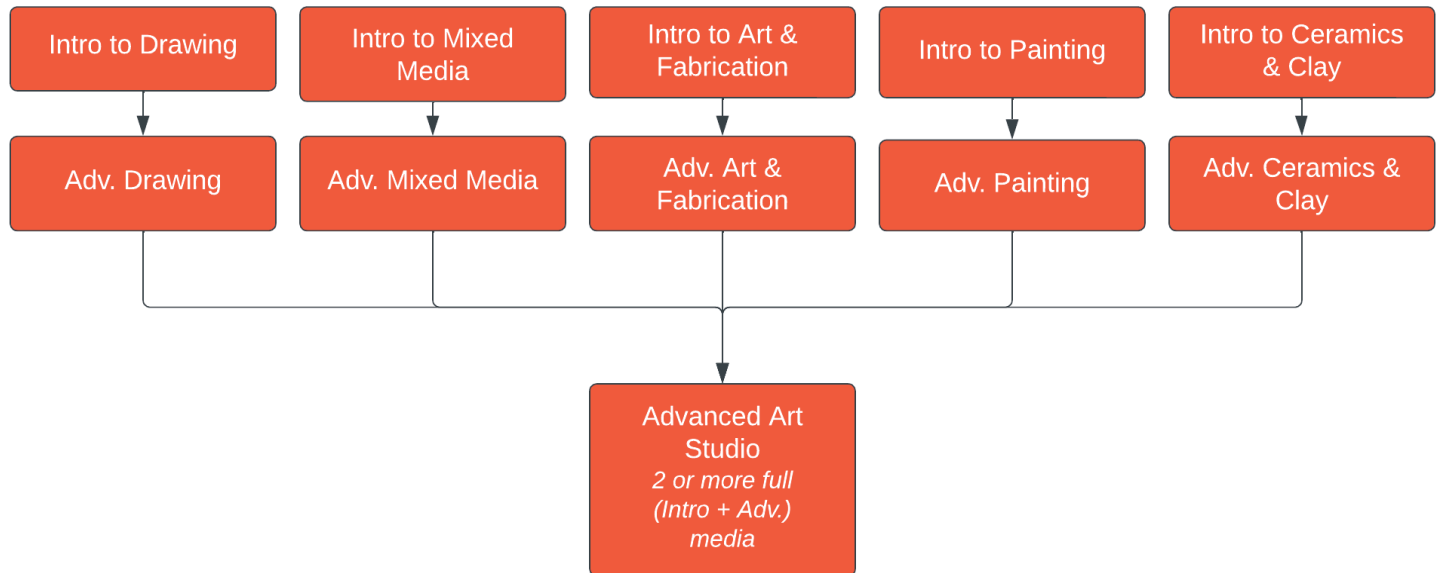
*Corequisites: None*

*Repeatable: No*



# Visual Arts

**Graduation Requirement:** Performing: two semesters of any two courses *OR* Visual: 2 semesters, Intro & Advanced, in same medium



---

## Intro Art & Fabrication

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

This semester-long course combines the fields of visual art and fabrication. Students in this course work in a variety of media to create projects that demonstrate understanding and consideration of craftsmanship and the elements and principles of visual art. These elements and principles include, but are not limited to, space, form, balance, light, and contrast. Students gain firsthand knowledge and experience with construction by using a variety of hand tools, power tools, and materials, such as the hand drill, chop saw, band saw, belt and orbital sanders, wire, foam, wood, and sheet metal. Emphasis is placed on appropriate use of tools and safety. Students create work that can range from representational to abstract; it might be inspired by historical or contemporary artists and art movements. Through readings, slide presentations, and visiting artists, students consider the context in which they are creating art. Throughout their process, creative problem-solving and intentional decision-making will play a significant role in their ability to consider their ideas through visual means. Students participate in critiques as a means to develop critical thinking skills and to further understand the meaning in their work.

## Intro to Clay Sculpture

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

Intro to Sculpture is a studio class that explores ways of thinking three-dimensionally, with clay as the primary medium. It serves the needs of beginners and experienced students of art. In addition to sculpture techniques, the elements of the three-dimensional art and design will be studied as they apply to the projects at hand. Students work in both subtractive and additive manners, incorporating basic aesthetic concepts such as line, texture, composition, balance, mass, space, rhythm, tension, movement, light, and density. Students explore the relationship between form and content in materials through hand-building techniques in clay. Projects investigate representation (people and things), abstraction, and architecturally inspired design/installation. Students are encouraged to think about the conceptual possibilities of sculpture and expressing a personal point of view.

Students participate in a culminating upper school gallery showing, presentations, and critiques. Homework includes some reading, writing, and sketchbook assignments.

## **Intro to Drawing**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

Drawing considers our perception, observation, and knowing of the world around us. It is a method of recording and expression in a visual language all its own. This studio course focuses on technical skill as well as mark-making as a form of creative exploration. Students will examine their interests and ideas through visual representation, working both technically and intuitively. Though class time will include lessons and discussions, students will typically be working on projects using a variety of drawing media, including (but not limited to) graphite, charcoal, and colored pencil. Studio time encourages a quiet focus and provides the necessary hours to build and refine the connection between the hand and eye. We will explore historically significant and contemporary artists, along with concepts in visual and critical studies. Students are strongly encouraged to participate in a culminating art show at the end of the semester.

## **Intro to Mixed Media**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

Mixed Media is a studio course that explores a range of 2-D processes including (but not limited to) drawing, painting, collage, and digital media. Throughout the semester, students will utilize different surfaces and materials in both traditional and alternative methods. Working with representation and abstraction, students will be encouraged to experiment within the framework and assignments of the class. Course content will address our daily visual experiences, whether through the screens on our devices or actual objects. More specifically, we will examine texture and dimension as illusion on a flat surface through the act of art making. We will consider these modes of seeing through juxtaposing and combining digital and other 2-D media. This class seeks to develop the student's sense of visual literacy and personal art practice. Mixed Media 1 is designed to build technical skill and foster independent and creative thought that is both strategic and spontaneous. Students are strongly encouraged to participate in a culminating art show at the end of the semester.

## **Intro to Painting**

*Term: Fall Only*

*Open to Grades: 9th - 12th*

*Prerequisites: None*

*Corequisites: None*

Intro to Painting is a studio class that teaches students about working with paint and exploring a range of applications. The course covers color, light, space, and the handling of paint (gouache and acrylic) in addition to exploring the beauty of forms and color. Students will be painting people, places, and things while simultaneously exploring ideas about abstraction, representation, and expression. Students are encouraged to reflect on their own lives, experiences, interests, and hobbies as inspiration for their work while building their painting skills. Aside from studio work, there will be critiques, sketchbook homework, some reading, and writing. The ultimate goal is for each student to develop an individual visual vocabulary and to transform an assignment into a quest that demonstrates curiosity, commitment, and craft.

## **Adv. Art & Fabrication**

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Intro to Art and Fabrication (FA120)*

*Corequisites: None*

Advanced Art and Fabrication will build on skills introduced in the first semester of Art and Fabrication. Students in this course work in a variety of media to create projects that demonstrate understanding and consideration of craftsmanship and the elements and principles of visual art. These elements and principles include, but are not limited to, space, form, balance, texture, and contrast. Students gain firsthand knowledge and experience with construction by using a variety of hand tools, power tools, and materials, such as the hand drill, chop saw, band saw, belt and orbital sanders, wire, foam, wood, and sheet metal. Emphasis is placed on appropriate use of tools and safety. Students create work that can range from representational to abstract; it might be inspired by historical or contemporary artists and art movements. Through readings, slide presentations, and visiting artists, students consider the context in which they are creating art. Throughout their process, creative problem-solving and intentional decision-making will play a significant role in their ability to consider their ideas through visual means. Students participate in critiques as a means to develop critical thinking skills and to further understand the meaning in their work.

Some students who take this course have more experience with artistic expression than with mechanical fabrication. This course aims to empower these students by giving them the fundamental shop skills they need to create physical objects. By gaining competence and confidence in the use of hand and power tools, these artists will be transformed into maker-artists, capable of constructing robust, 3-D art from their already formidable imaginations. Others enrolled in Art and Fabrication 1, on the other hand, are more talented in the areas of engineering and power tool usage than in generating, developing, and realizing artistic visions. This course aims to empower these students by introducing them to artistic and creative processes and by giving them ample opportunity to practice visual creation. Just as understanding proper, safe usage of shop spaces provides the tools for physical creation, so will understanding the elements and principles of design provide the tools for visual expression. All students, regardless of former capabilities, will grow their knowledge of and skills in both art and fabrication by the application of each in the context of the other. Students are strongly encouraged to participate in a culminating art show at the end of the semester.

## **Adv. Clay Sculpture**

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Intro to Sculpture (FA140)*

*Corequisites: None*

Advanced Sculpture is a studio class that builds on the foundations of the Introduction to Sculpture class. Students continue to explore making sculpture with a range of clay bodies as the primary medium and ways of thinking three-dimensionally. This class serves the needs of beginners and experienced students for art. In addition to sculpture techniques, the elements of the three-dimensional art and design will be studied as they apply to the projects at hand. Students work in both subtractive and additive manners, incorporating basic aesthetic concepts such as line, texture, composition, balance, form, mass, space, rhythm, tension, movement, light, and density. Students explore the relationship between form and content in materials through hand building techniques in clay. Projects investigate representation (people and things), abstraction, and architecturally inspired design/installation. Students are encouraged to think about the conceptual possibilities of sculpture and expressing a personal point of view.

## **Adv. Drawing**

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Intro to Drawing (FA110)*

*Corequisites: None*

Advanced Drawing builds on drawing skills introduced in the first semester of Drawing. This studio course focuses on technical skill as well as mark-making as a form of creative exploration. Students will examine their interests and ideas through visual representation, working both technically and intuitively. Though class time will include lessons and discussions, students will typically be working on projects using a variety of drawing media, including (but not limited to) graphite, charcoal, and colored pencil. Studio time encourages a quiet focus and provides the necessary hours to build and refine the connection between the hand and eye. We will explore historically significant and contemporary artists, along with concepts in visual and critical studies. We will learn techniques such as, but not limited to one, two, and three-point perspective, as well as experimenting with the alternative stylus.

## **Adv. Mixed Media**

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Intro to Mixed Media (FA115) or Intro to Printmaking (FA135)*

*Corequisites: None*

Mixed Media is a studio course that explores a range of 2-D processes including (but not limited to) drawing, painting, collage, and digital media. Throughout the semester, students will utilize different surfaces and materials in both traditional and alternative methods. Working with representation and abstraction, students will be encouraged to experiment within the framework and assignments of the class. Course content will address our daily visual experiences, whether through the screens on our devices or actual objects. More specifically, we will examine texture and dimension as illusion on a flat surface through the act of art making. We will consider these modes of seeing through juxtaposing and combining digital and other 2-D media. This class seeks to develop the student's sense of visual literacy and personal art practice. Mixed Media 1 is designed to build technical skill and foster independent and creative thought that is both strategic and spontaneous. Students are strongly encouraged to participate in a culminating art show at the end of the semester. Students who have previously taken FA135, Intro to Printmaking, can also take this class to fulfill their Art requirement.

## **Adv. Painting**

*Term: Spring Only*

*Open to Grades: 9th - 12th*

*Prerequisites: Intro to Painting (FA130)*

*Corequisites: None*

Advanced Painting is a studio class that builds on the Introduction to Painting curriculum and is a continuation in working with paint and exploring a range of applications. The course covers color, light, space and the handling of paint (acrylic and oil\*) in addition to exploring the beauty of forms and color. Projects in class range from painting people, places and things while simultaneously exploring ideas about abstraction, representation and expression. Students are encouraged to reflect on their own lives, experiences, interests and hobbies as inspiration for their work while building their painting skills. Aside from studio work, there will be critiques, sketchbook homework, some reading, and writing

## **Adv. Studio Art**

*Term: Yearlong*

*Open to Grades: 11th - 12th*

*Prerequisites: Any 2 full visual art courses (intro & advanced)*

*Corequisites: None*

Advanced Studio Art is a class for students who want to continue making art and are interested in building a portfolio. Students in this upper division class will have taken an art class before and will drive their own exploration and art making. Students will have the opportunity to work in a community of other students who are committed to making and discussing art. Over the course of the semester, students will choose artistic research interests and make work based on those interests. This studio class will be focused on critique of student work in addition to making work; discussions and readings will provide a frame for the critiques. An emphasis will also be placed on larger portfolio goals, and students will work toward achieving a cohesive portfolio with depth in addition to breadth. Students will work across mediums, according to their interest and portfolio needs. Advanced Studio Art students will be expected to participate in the arts culmination at the end of the semester.

## **Fine Arts Teaching Fellow**

*Term: Fall & Spring*

*Open to Grades: 11th - 12th*

*Prerequisites: Course Teaching Fellow: successful completion of desired course*

*Teacher approval: Students must complete this [T.F. Form](#).*

*Please note that a teacher has the option to decline a teaching fellow, and therefore, it is suggested that students speak with potential supervising teachers before signing up.*

*NOTE: Students can only be a fellow for one class in one semester for the school year.*

*Corequisites: None*

**The Fine Arts Teaching Fellow is only available for Clay Sculpture.**

There are two types of Teaching Fellows: course and lab.

The course T.F. provides assistance for a specific course in a variety of ways, ranging from making copies to taking attendance to providing in-class support via tutoring or leading small group discussions and more.

The lab T.F. works with a supervising teacher/staff on managing a particular lab space, whether that is the I-Lab or a Science lab. Such projects may include tracking inventory to cleaning and preparing supplies to space maintenance and more.

Expectations and responsibilities will be discussed and agreed upon with the supervising teacher. The student will have a class period in their daily schedule where they assist a teacher 2-3 times a week during the scheduled class slot. Students should also expect to meet with the supervising teacher outside of class in preparation for class. Finally, students who take on this role are expected to maintain respect and professionalism when working with their supervising teacher and with the students in the classroom.

This is a non-graded course and students will receive credit (CR) upon successful completion. Students will complete a self-reflection evaluation at the mid-semester and end of semester. Students will schedule a meeting with their supervising teacher to discuss the self-reflection.