

G O A

Student Program

2024-2025

STUDENT COURSE CATALOG



www.globalonlineacademy.org

The mission of Global Online Academy (GOA) is to reimagine learning to enable students to thrive in a globally networked society.

GOA provides a positive, interactive, and intellectually rigorous environment for students to learn. We offer courses that connect students to topics they care about, and the opportunity to learn alongside a global network of peers as passionate and curious as they are.

We have identified the following six core competencies – the specific set of skills and habits of learning – that our students develop in practical, hands-on ways, no matter which GOA course they take:

1. **Collaborate** with people who don't share your location.
2. **Communicate and empathize** with people who have perspectives different from your own.
3. **Curate and create** content relevant to real-world issues.
4. **Reflect** on and take responsibility for your learning and that of others.
5. **Organize** your time and tasks to learn independently.
6. **Leverage** digital tools to support and show your learning.

To build these skills, GOA courses are:

Globally connected

Even though our courses are online, students get to know their teachers and classmates by using technology to build relationships. Our small classes have students from many different schools, led by expert teachers. Students log in multiple times a week to engage in discussions, collaborate on projects, and share ideas.

Challenging

GOA courses are designed to be as intellectually rigorous as any course at a home school. GOA courses are mostly asynchronous: students do not show up on certain days at certain times. Instead, teachers publish a calendar of activities, and within that framework, students work on their own schedules, gaining critical independent learning skills along the way. Students have a videoconference experience approximately every 10 days, more frequently in our intensive summer courses.

Relevant

We want students to pursue their passions. Our courses offer practical, hands-on experience in how these ideas can be applied to the world outside of school. Students have a voice and a choice in the work they do and the ideas they explore.

Pursue a Learning Pathway

Students seeking to demonstrate depth of interest and expertise in a field of study can pursue one of GOA's eight pathways to earn a Pathway Certification.

When a student earns a Pathway Certification, the certification is highlighted on their GOA transcript, which provides additional context and description of a student's GOA experience. The GOA-issued transcript includes a list of courses the student has taken and the competencies mastered in those courses as well as Pathway Certification earned. Schools will continue to record grades from GOA courses on the school's transcript as well.

In order to earn a Pathway Certification, students must take three (or more) courses from a particular pathway. GOA's eight pathways are:

- ↑> **ART, MEDIA & DESIGN**
- ↑> **COMPUTER SCIENCE & ENGINEERING**
- ↑> **BUSINESS, ECONOMICS & FINANCE**
- ↑> **GLOBAL STUDIES**
- ↑> **HEALTH SCIENCES**
- ↑> **JUSTICE, ETHICS & HUMAN RIGHTS**
- ↑> **MATHEMATICS & QUANTITATIVE REASONING**
- ↑> **PSYCHOLOGY & NEUROSCIENCE**

Please note: Not all courses are included in a pathway and some courses are cross-listed in more than one pathway. All courses eligible for Pathway certification must be completed through GOA.

Earn a Global Learning Certification

Students who take three (or more) GOA courses spread across multiple learning pathways will earn a Global Learning Certification. This certification is highlighted on the student's GOA transcript and includes a list of courses the student has taken and the competencies mastered in those courses. All semester, yearlong, and summer courses will count toward a Global Learning Certification.



ART, MEDIA & DESIGN	
COURSE TITLE	TERMS
Architecture	Semester 1, Semester 2, Summer
Arts Entrepreneurship	Semester 2
Computer Science II: Game Design & Development	Semester 2, Summer
Creative Nonfiction Writing	Semester 1, Summer
Digital Photography	Semester 2, Summer
Fiction Writing	Semester 2, Summer
Filmmaking	Semester 1
Graphic Design	Semester 1, Semester 2

COMPUTER SCIENCE & ENGINEERING	
COURSE TITLE	TERMS
Computer Science I: Computational Thinking	Semester 1, Semester 2, Summer
Computer Science II: Analyzing Data with Python	Semester 2, Summer
Computer Science II: Game Design & Development	Semester 2, Summer
Computer Science II: Java	Semester 2, Summer
Cybersecurity	Semester 1, Semester 2, Summer
Introduction to Artificial Intelligence	Semester 1, Semester 2, Summer
Introduction to Blockchain & Cryptocurrency	Semester 2
Problem Solving with Engineering & Design	Semester 1, Semester 2, Summer

BUSINESS, ECONOMICS & FINANCE	
COURSE TITLE	TERMS
Arts Entrepreneurship	Semester 2
Business Problem Solving	Semester 1, Semester 2, Summer
Capitalism: Past, Present & Future	Semester 2
Entrepreneurship in a Global Context	Semester 1, Semester 2
Introduction to Blockchain & Cryptocurrency	Semester 2
Introduction to Branding & Marketing	Semester 1, Semester 2, Summer
Investing I	Semester 1, Semester 2, Summer
Investing II	Semester 2
Macroeconomics	Semester 1, Semester 2
Microeconomics	Semester 1, Summer
Personal Finance	Semester 1, Semester 2, Summer

GLOBAL STUDIES

COURSE TITLE	TERMS
Applying Philosophy to Global Issue	Semester 1
Arabic Language Through Culture I-III	Yearlong
Capitalism: Past, Present & Future	Semester 2
Climate Action & Sustainability	Semester 1
Discourse Across Difference (NEW!)	Semester 2
Entrepreneurship in a Global Context	Semester 1, Semester 2
Genocide & Human Rights	Semester 1, Summer
Global Health	Semester 1
International Relations	Semester 1, Semester 2, Summer
Japanese Language Through Culture I-III	Yearlong

HEALTH SCIENCES

COURSE TITLE	TERMS
Bioethics	Semester 1, Semester 2
Global Health	Semester 1
Health & Fitness	Semester 1, Summer
Medical Problem Solving I	Semester 1, Semester 2, Summer
Medical Problem Solving II	Semester 1, Semester 2
Introduction to Organic Chemistry I	Semester 1
Introduction to Organic Chemistry II	Semester 2

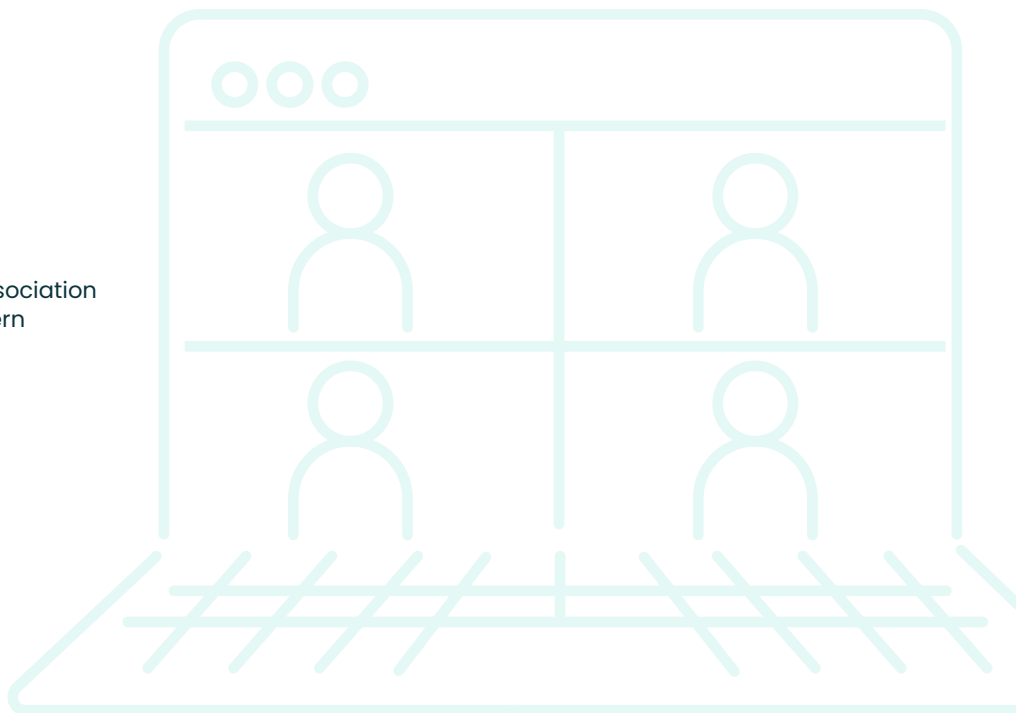
JUSTICE, ETHICS & HUMAN RIGHTS

COURSE TITLE	TERMS
Applying Philosophy to Global Issues	Semester 1
Bioethics	Semester 1, Semester 2
Gender & Society	Semester 2
Genocide & Human Rights	Semester 1, Summer
Discourse Across Difference (NEW!)	Semester 2
Introduction to Legal Thinking	Semester 1, Semester 2, Summer
Prisons & Criminal Justice Systems	Semester 1, Semester 2
Race & Society	Semester 1
Religion & Society	Semester 2

MATHEMATICS & QUANTITATIVE REASONING	
COURSE TITLE	TERMS
Data Visualization	Semester 1
Game Theory	Semester 1, Semester 2
Linear Algebra	Semester 1, Semester 2
Multivariable Calculus	Yearlong
Number Theory	Semester 1
Problem Solving with Engineering & Design	Semester 1, Semester 2, Summer

PSYCHOLOGY & NEUROSCIENCE	
COURSE TITLE	TERMS
Abnormal Psychology	Semester 1, Semester 2, Summer
Developmental Psychology	Semester 1, Semester 2
Introduction to Psychology	Semester 1, Semester 2, Summer
Neuropsychology	Semester 1, Semester 2
Positive Psychology	Semester 1
Social Psychology	Semester 1, Semester 2

GOA is accredited by the New England Association of Schools and Colleges and by the Western Association of Schools and Colleges.



NCAA & UC Course Approvals

UC Approval

GOA's standing as a WASC accredited institution means that our entire catalog is UC approved

NCAA

The below GOA courses are NCAA-approved for 2024-2025. New courses may be added as approvals come in.

- Abnormal Psychology
- Applying Philosophy to Modern Global Issues
- Arabic Language Through Culture I-III
- Capitalism: Past, Present & Future
- Climate Action & Sustainability
- Computer Science I: Computational Thinking
- Computer Science II: Analyzing Data with Python
- Computer Science II: Game Design & Development
- Computer Science II: Java
- Creative Nonfiction Writing
- Data Visualization
- Developmental Psychology
- Entrepreneurship in a Global Context
- Fiction Writing
- Game Theory
- Gender & Society
- Genocide & Human Rights
- Geometry
- Global Health
- Discourse Across Difference
- Introduction to Legal Thinking
- Introduction to Organic Chemistry I-II
- Introduction to Psychology
- Japanese Language Through Culture I-III
- Linear Algebra
- Macroeconomics
- Medical Problem Solving I
- Medical Problem Solving II
- Microeconomics
- Multivariable Calculus
- Neuropsychology
- Number Theory
- Positive Psychology
- Precalculus
- Prisons & Criminal Justice Systems
- Problem Solving with Engineering & Design
- Race & Society
- Religion & Society

Abnormal Psychology

This course provides students with a general introduction to the field of abnormal psychology from a western perspective while exploring the cultural assumptions within the field. Students examine the biopsychosocial aspects of what society considers abnormal while developing an understanding of the stigma often associated with psychological disorders.

Through book study, videos, article reviews, and discussions, students consider how our increasingly global world influences mental health in diverse settings. In learning about the different areas of western abnormal psychology, students study the symptoms, diagnoses, and responses to several specific disorders such as anxiety, depression, eating disorders, or schizophrenia.

Students develop an understanding of how challenging it can be to define “normal” as they begin to empathize with those struggling with mental distress. Throughout the course, students are encouraged to attend to their own mental well-being. The course culminates in an independent project where students showcase their learning with the goal of making an impact in their local communities.

 **Psychology & Neuroscience**

Academic English Accelerator

This program helps English language learners in grades 9–12 improve their academic English. The program adapts to meet students’ needs and goals but is intended for students nearing English proficiency. Students bring work from their courses to language coaching sessions with the instructor. There, they improve their written and oral communication. They submit drafts of writing assignments and record rehearsals of presentations. They also set goals and receive feedback and coaching on their English expression.

When students enroll, GOA requests student scores on any standardized English language proficiency assessment. This determines if the program is the right fit for the student. Most students in this program score at least B1 or B2 on the Common European Framework, or 4 on the WIDA scale. The AEA is not an English grammar course or an introductory academic English course, so in order to benefit from the AEA, students need a level of English proficiency that matches or exceeds the suggested standardized test scores. AEA students are often attending or planning to attend high schools or universities where English is the main medium of instruction.

Students may enroll in the Academic English Accelerator during the Summer, Semester 1, Semester 2, or any combination of the three. Students enrolled in the Academic English Accelerator must also be enrolled in one of the following GOA courses simultaneously: Medical Problem Solving I, Investing I, or Introduction to Psychology. This program is not graded.

ALGEBRA I

This intensive seven-week summer course is engineered to fast-track your journey through the foundational Algebra I curriculum, and to lay a strong foundation for a successful transition from middle school into high-school Algebra. Students in this course will master key algebraic concepts such as linear equations and systems of linear equations. In addition, students will be exposed to inequalities, functions, and polynomials (including quadratics). Students will be guided through solving equations, understanding the properties of numbers, and grasping the intricacies of mathematical relationships. Special emphasis is placed on mastering basic operations with polynomials, understanding the coordinate plane, and tackling word problems that translate into algebraic equations.

To ensure you’re set up for higher-level math, we’ll also lay the groundwork for Algebra II topics, such as quadratic equations and systems of equations. Alongside the subject matter, the course aims to cultivate analytical reasoning and problem-solving skills, crucial for your future studies in STEM.

Given the accelerated pace, be prepared to put in 15–20 hours a week. This course condenses a year’s worth of material into a seven-week sprint, so buckle up!

At the end of the course, the Algebra I teachers will make a recommendation to a student’s home institution as to whether the student has mastered the key competencies of Algebra I.

This course is offered in the summer only.

Prerequisite: Pre-Algebra or its equivalent

Applying Philosophy to Global Issues

This is an applied philosophy course that connects pressing contemporary issues with broad-range philosophical ideas and controversies, drawn from multiple traditions and many centuries. Students use ideas from influential philosophers to examine how thinkers have applied reason successfully, and unsuccessfully, to many social and political issues across the world.

In addition to introducing students to the work of philosophers as diverse as Socrates, Confucius, and Immanuel Kant, this course also aims to be richly interdisciplinary, incorporating models and methods from diverse fields including history, journalism, literary criticism, and media studies. Students learn to develop their own philosophy and then apply it to the ideological debates that surround efforts to improve their local and global communities.

 **Global Studies; Justice, Ethics & Human Rights**

Arabic Language Through Culture I

This course (or its equivalent) is a prerequisite to Arabic II and III at GOA. In addition to bringing Arabic popular culture to life, this course introduces students to the Arabic writing system in 12 weeks to communicate in spontaneous spoken conversations on everyday topics, including personal

introductions, families, food, lifestyle, preferences, celebrations, history, art, music, social media, and environment.

This yearlong course focuses on Modern Standard Arabic (MSA) and some of the spoken dialects of the Levant, Egypt, and North Africa. With an emphasis on Arabic culture, students learn commonly used expressions and phrases to develop their skills in listening, reading, writing, forming grammatically correct structured sentences, and most importantly, conversation. This is accomplished through synchronous and asynchronous assignments, face-to-face conversation sessions with the instructor and a group of peers, instructional videos, discussions about culture, and collaborations on group projects with students from around the globe.

Since Arabic is becoming one of the most functional languages in the world, especially in the areas of commerce, business, and trade, students participating in this course can avail themselves of the opportunity to learn the language in a highly stimulating and rich cultural context.

 **Global Studies**

Arabic Language Through Culture II

This course (or its equivalent) is a prerequisite to Arabic III at GOA. Arabic II students have taken one year of Arabic Language Through Culture or have demonstrated novice proficiency where they are able to communicate in spontaneous spoken conversations on familiar topics, including food, weather, and hobbies, using a variety of practiced or memorized words, phrases, simple sentences, and questions.

Students review the first three units of the book *Al-Kitaab* as well as most of the Arabic foundations that they took in the previous year, starting with the alphabet and ending with how to write a sentence and even a paragraph. Students also work on other skills such as reading and speaking through using different real-life situations that they would need to use Arabic in, most importantly the conversation.

They also work on building students' vocabulary bank in many topics such as introducing themselves, ordering food, describing the weather, and talking about clothes. Moreover, they discuss travel and trips, their country, health, and plans and goals for the future. And finally, they talk about how to tell a story.

This yearlong course focuses on Modern Standard Arabic (MSA) and some of the spoken dialects of the Levant and Egypt. With an emphasis on Arabic culture, and engaging with group work with their peers from around the globe. They have the opportunity to finish units 4-8 from *Al-Kitaab* and to learn the language in highly interactive activities and cultural contexts.

Prerequisite: Arabic Language Through Culture I or permission from the instructor

 **Global Studies**

Arabic Language Through Culture III

Students in Arabic III have demonstrated intermediate interpersonal proficiency in Arabic (MSA or a dialect) through two years in Arabic Language Through Culture or other coursework, and have demonstrated an ability to

work online independently and reliably with instructors and peers in Arabic Language Through Culture or another GOA class.

Students in Arabic III have opportunities to work on the intermediate high levels and the advanced level to communicate in spontaneous spoken conversations on everyday topics on a higher level. This course focuses mainly on units 8-13 from *Al-Kitaab*. They study Modern Standard Arabic (MSA) and some of the spoken dialects of the Levant and Egypt, most importantly conversation. They are also able to design their own venue, talk about the food and nutrition, the weather, and the climate, and discuss stories in the past and present.

This is accomplished through synchronous and asynchronous assignments, conversation sessions with the instructor and a group of peers, instructional videos, discussions about culture, and collaborations on group projects with students from around the globe. In reading, listening, speaking, and writing, students curate, share, and practice materials may include TV commercials, news, movies, children's stories, online websites, and Arabic songs and music. Finally, they learn the language in highly interactive activities and cultural contexts.

Prerequisite: Arabic Language Through Culture I and II or permission from the instructor

 **Global Studies**

Architecture

In this course, students build an understanding of and apply skills in various aspects of architectural design. While gaining key insights into the roles of architectural analysis, materials, 3D design, and spatial awareness, students develop proficiency in architectural visual communication.

The course begins by learning the basic elements of architectural design to help analyze and understand architectural solutions. Through digital and physical media, students develop an understanding of the impact building materials have on design. At each stage of the course, students interact with peers from around the globe, learning and sharing how changes in materials, technology, and construction techniques lead to the evolution of contemporary architectural style and visual culture.

The course culminates with a final project in which each aspiring architect has the opportunity to work toward a personal presentation for the GOA Catalyst Exhibition. Students, through a variety of outcomes, present an architectural intervention that they have proposed as a solution to an identified need, one emanating from or focused within their own community. Throughout the course, students refer to the design process and use techniques to track, reflect, and evidence their understanding of architecture.

 **Art, Media & Design**

Arts Entrepreneurship

In this course, aspiring visual artists, designers, filmmakers, musicians, and other creatives learn how to find success in the dynamic fields of their choosing. Students learn about arts careers and organizations by attending virtual events and interviewing art practitioners, entrepreneurs, and administrators.

Beyond exploring trajectories for improving their crafts, students build skills in networking and personal branding while examining case studies of a variety of artistic ventures — some highly successful and some with teachable flaws. Using real-world examples of professional and emerging creatives and arts organizations, students gain a better understanding of the passion and dedication it takes to have a successful creative career.

↑→ **Art, Media & Design; Business, Economics & Finance**

Bioethics

Ethics is the study of what one should do as an individual and as a member of society. Bioethics refers to the subset of this field that focuses on medicine, public health, and the life sciences. In this course, students explore contemporary, pressing issues in bioethics, including the “right to die,” policies around vaccination and organ transplantation, competence to consent to care, human experimentation and animal research, and genetic technologies.

Through reading, writing, research, and discussion, students explore the fundamental concepts and questions in bioethics, deepen their understanding of biological concepts, strengthen their critical-reasoning skills, and learn to engage in respectful dialogue with people whose views may differ from their own. The course culminates with a student-driven exploration into a particular bioethical issue, recognizing the unique role that bioethics plays within the field of ethics.

↑→ **Justice, Ethics & Human Rights; Health Sciences**

Business Problem Solving

How could climate change disrupt your production and supply chains or impact your consumer markets? Will tariffs help or hurt your business? How embedded is social media in your marketing plan? Is your company vulnerable to cybercrime? What 21st-century skills are you cultivating in your leadership team?

Students in this course tackle real-world problems facing businesses large and small in today’s fast-changing global marketplace where radical reinvention is on the minds of many business leaders. Students work collaboratively and independently on case studies, exploring business issues through varied lenses including operations, marketing, human capital, finance and risk management as well as sustainability. As they are introduced to the concepts and practices of business, students identify, analyze, and propose solutions to business problems, engaging in research of traditional and emerging industries, from established multinationals to startups.

↑→ **Business, Economics & Finance**

Capitalism: Past, Present & Future

In some circles, capitalism has been blamed for most of society’s ills. In others, it has been credited with the grandest achievements in human history. In this course, students examine advocates from both circles, looking closely at the components of capitalism — and other systems of economic and social control — to decide what they think. As students build their own philosophies around capitalism, they work collaboratively and independently on case studies, exploring examples of capitalism around the world and in the world around us.

Throughout the course, students immerse themselves in the history of various forms of capitalism, learning the specific components of capitalism. Students investigate how capitalism has impacted social, political, and economic systems around the world.

The final project requires students to pull from historical and modern case studies to present a coherent portfolio of their thinking. Students also create a proposal for articulating shifts as we look to the future of capitalism.

↑→ **Business, Economics & Finance; Global Studies**

Climate Action & Sustainability

The course explores the critical issues of climate change and its profound impacts through the lenses of equity and sustainability. In an ever-changing world, we’ll delve into the interconnected challenges of climate justice, agriculture, wildfires, renewable energy sources, sea level rise, and the consequences of invasive species. Students will engage in comprehensive studies to interrogate the causes and effects of climate change, investigate public policy debates, and, most importantly, examine how these issues affect the diverse populations of our planet through hands-on activities. The course culminates with GOA’s Catalyst Exhibition, as students share projects to spark change in local communities through well-informed activism.

Note: This course is a reimagined, redesigned, retitled version of the course that was called Climate Change & Global Inequality through the 2023–2024 school year. Students who have already taken Climate Change & Global Inequality should consider choosing a different course.

↑→ **Global Studies**

NEW! College Essay Workshop

This is a two-week workshop designed to help rising 12th-grade students get a head start on the college application process. During the first week of the workshop, students will attend synchronous video conferences and work sessions designed to get them from ideation, to an outline and ultimately to a draft. The second week of the workshop will be centered around small-group feedback sessions during which students and teachers will work to improve initial drafts. Students will walk away from this two-week workshop with a strong working draft of an essay that they can continue to refine for their college applications.

Note: Unlike other GOA courses, this workshop is ungraded and non-credit-bearing. Dates will be announced on the GOA website.

Computer Science I: Computational Thinking

This course (or its equivalent) is a prerequisite to all Computer Science II classes at GOA. Computational thinking centers on solving problems, designing systems, and understanding human behavior. It has applications not only in computer science but also myriad other fields of study. This introductory-level course focuses on thinking like a computer scientist, especially understanding how computer scientists define and solve problems.

Students begin the course by developing an understanding of what computer science is, how it can be used by people who are not programmers, and why it’s a useful skill for all people to cultivate. Within this context, students are exposed to the power and limits of computational thinking.

Students are introduced to entry-level programming constructs that help them apply their knowledge of computational thinking in practical ways. They learn how to read code and pseudocode as well as begin to develop strategies for debugging programs. By developing computational thinking and programming skills, students will have the core knowledge to define and solve problems in future computer science courses.

While this course would be beneficial for any student without formal training as a programmer or computer scientist, it is intended for those with no programming experience.

↑→ Computer Science & Engineering

Note: During Semester 2 2024–2025, GOA will offer a section of this course that has been designed and staffed specifically for students in grades 6–8. We will have sections of this course specifically for Middle School students. On the registration page, students and Site Directors should look for the offering that is specific to their age group.

Computer Science II: Analyzing Data with Python

In this course, students utilize the Python programming language to read, analyze, and visualize data. The course emphasizes using real-world datasets, which are often large, messy, and inconsistent. Because of the powerful data structures and clear syntax of Python, it is one of the most widely used programming languages in scientific computing.

Students explore the multitude of practical applications of Python in fields like biology, engineering, and statistics.

Prerequisite: Computer Science I: Computational Thinking or its equivalent

↑→ Computer Science & Engineering

Computer Science II: Game Design & Development

In this course, students design and develop games through hands-on practice. Comprised of a series of “game jams,” the course asks students to solve problems and create content, developing the design and technical skills necessary to build their own games.

The first month of the course is dedicated to understanding game design through game designer Jesse Schell’s “lenses”: different ways of looking at the same problem and answering questions that provide direction and refinement of a game’s theme and structure. During this time, students also learn how to use Unity, a professional game development tool, and become familiar with the methodologies of constructing a game using such assets as graphics, sounds, and effects, and controlling events and behavior within the game using the C# programming language.

Throughout the remainder of the course, students work in teams to brainstorm and develop new games in response to a theme or challenge. Students develop their skills in communication, project and time management, and creative problem-solving while focusing on different aspects of asset creation, design, and coding.

Prerequisite: Computer Science I: Computational Thinking or its equivalent

↑→ Art, Media & Design; Computer Science & Engineering

Computer Science II: Java

This course teaches students how to write programs in the Java programming language. Java is the backbone of many web applications, especially eCommerce and government sites. It is also the foundational code of the Android operating system and many tools of the financial sector.

Students learn the major syntactical elements of the Java language through object-oriented design. The emphasis in the course is on creating intelligent systems through the fundamentals of Computer Science. Students write working programs through short lab assignments and more extended projects that incorporate graphics and animation.

Prerequisite: Computer Science I: Computational Thinking or its equivalent

↑→ Computer Science & Engineering

Creative Nonfiction Writing

Tell your own stories and the stories of the world around you! This course centers on the art of shaping real experiences into powerful narratives while growing foundational writing skills. Participants read, examine, and write diverse works of creative nonfiction including personal narratives, podcasts, opinion editorials, profile pieces, and more.

Emphasizing process over product, this writing workshop provides opportunities to create in new ways. Students practice essential craft elements (e.g., voice, style, structure) while reflecting on stories from their own lives, communities, and interests. They also build a personalized library of inspiring mentor texts, consider opportunities for publication, and develop sustainable writing habits.

Both in real-time video chats and online discussion spaces, students support one another intentionally. Feedback is an essential component of this course, and students gain experience in the workshop model, actively participating in a thriving, global writing community. Creative nonfiction has never been as popular as it is today; participants experience its relevance in their own lives as they collaboratively explore this dynamic genre.

↑→ Art, Media & Design

Cybersecurity

Cybercriminals leverage technology and human behavior to attack our online security. This course explores the fundamentals of, and vulnerabilities in, the design of: Computers (computer components, connectivity); Networks (design, Domain Name Services, and TCP/IP, hubs, switches, and routers); and The internet (DNS, HTTP, routing protocols, and access control for internet devices).

From understanding the intricacies of data protection and networking principles to exploring the physical architecture of networks, ciphers, and encryption techniques, the course is meticulously designed to equip students with a holistic understanding of the cybersecurity landscape. Delve into the human element of cyber attacks, navigate the world of machines, dissect malware anatomy, and grapple with the delicate balance between privacy and tracking. Gain expertise in encryption, data recovery, and enterprise security, culminating in an exploration of emerging trends. This course ensures students emerge with the knowledge and skills necessary to safeguard against evolving cyber threats in our interconnected digital age.

There is no computer science prerequisite for this course, though students with some background will certainly find avenues to flex their knowledge.

↑ Computer Science & Engineering

Data Visualization

Through today's fog of overwhelming data, visualizations provide meaning. This course trains students to collect, organize, interpret, and communicate massive amounts of information. Students wrangle data into spreadsheets, learning the basic ways professionals translate information into comprehensible formats. They explore charts, distinguishing between effective and misleading visualizations. Employing principles from information graphics, graphic design, visual art, and cognitive science, students create their own stunning and informative visualizations using Datawrapper, Tableau Public, and/or Python. From spreadsheets to graphics, students in this course practice the crucial skills of using data to decide, inform, and convince.

There is no computer science, math, or statistics prerequisite for this course, though students with backgrounds in those areas will certainly find avenues to flex their knowledge in this course.

↑ Mathematics & Quantitative Reasoning

Developmental Psychology

Over a few short years, most human beings grow from infants who are not even able to hold up their heads to become walking, talking, thinking people who are able to communicate using language, to understand complexities, to solve problems, and to engage in moral reasoning. This course is an introduction to the fascinating study of human growth and development focusing on the significant changes that occur physically, emotionally, cognitively, and socially from birth through adolescence.

Students consider the big questions of heredity versus environment, stability versus change, and continuity versus discrete stages of change as they investigate language acquisition, sensorimotor development, thinking and learning, and personality and emotions. Through readings, observations, case studies, and application activities, students examine development from the perspectives of major theorists in the field from both Western and non-Western traditions.

↑ Psychology & Neuroscience

Digital Photography

In an era where everyone has become a photographer obsessed with documenting most aspects of life, we swim in a sea of images posted on Instagram, Facebook, Snapchat, Pinterest, and other digital media. To that end, why is learning how to use a digital camera important and what does taking a powerful and persuasive photo with a 35mm digital single lens reflex (DSLR) camera require?

Digital Photography explores this question in a variety of ways, beginning with the technical aspects of using and taking advantage of a powerful camera and then moving to a host of creative questions and opportunities. Technical topics such as aperture, shutter, white balance, and resolution get ample coverage in the first half of the course, yet each is pursued with the goal of enabling students to leverage the possibilities that come with manual image

capture. Once confident about technical basics, students apply their skills when pursuing creative questions such as how to understand and use light, how to consider composition, and how to take compelling portraits.

Throughout the course, students tackle projects that enable sharing their local and diverse settings, ideally creating global perspectives through doing so. Additionally, students interact with each other often through critique sessions and collaborative exploration of the work of many noteworthy professional photographers whose images serve to inspire and suggest the diverse ways that photography tells visual stories.

Prerequisite: Students must have daily access to a DSLR camera.

↑ Art, Media & Design

NEW! Discourse Across Difference

Our increasingly interconnected, globally networked society presents us with complex social, political, and ethical dilemmas. This course equips students with strategies for engaging such issues through constructive dialogue focused on building understanding across differences. Through structured conversations, debate, rhetorical analysis, and guided reflection, students will gain skills for having difficult yet thoughtful dialogues. They will learn how to carefully evaluate multiple perspectives, make evidence-based claims, ask insightful questions, take others' viewpoints into account, and seek common ground. Specific topics examined may include technology's impact on privacy, environmental sustainability, social justice reform, and other current events that are sure to emerge! By practicing perspective-taking, identifying shared goals, and finding compromise, students will be able to have productive conversations even when they disagree. The course aims to foster civil discourse, strengthen critical thinking abilities, and build understanding across diverse perspectives. Students will emerge better prepared for responsible civic participation and prepared to thrive in a globally networked society.

↑ Justice, Ethics & Human Rights; Global Studies

Entrepreneurship in a Global Context

How does an entrepreneur think? What skills must entrepreneurs possess to remain competitive and relevant? What are some of the strategies that entrepreneurs apply to solve problems? In this experiential course, students develop an understanding of entrepreneurship in today's global market; employ innovation, design, and creative solutions for building a viable business model; and learn to develop, refine, and pitch a new startup.

Units of study include business model canvas, customer development vs. design thinking, value proposition, customer segments, iterations and pivots, brand strategy and channels, and funding sources. Students use the business model canvas as a roadmap to building and developing their own team startup, a process that requires hypothesis testing, customer research conducted in hometown markets, product design, product iterations, and entrepreneur interviews.

An online startup pitch by the student team to an entrepreneurial advisory committee is the culminating assessment. Additional student work includes research,

journaling, interviews, peer collaboration, and a case study involving real-world consulting work for a current business.

↑ Business, Economics & Finance; Global Studies

Fiction Writing

This course connects students interested in creative writing (primarily short fiction) and provides a space for supportive and constructive feedback. Students gain experience in the workshop model, learning how to effectively critique and discuss one another's writing in an online environment. In addition to developing skills as readers within a workshop setting, students strive to develop their own writing identities through a variety of exercises.

The course capitalizes on the geographic diversity of the students by eliciting stories that shed light on both the commonalities and differences of life experiences in different locations. Additionally, students read and discuss the work of authors from around the globe.

Students' essential responsibilities are twofold: to engage in the class as readers and writers and to focus on their development as readers and writers. Both require participation in discussions of various formats within the course's online community, as well as dedicated time outside of class reading and providing feedback on one another's work as well as writing original pieces for the workshop.

↑ Art, Media & Design

Filmmaking

This course is for students interested in developing their skills as filmmakers and creative problem-solvers. It is also a forum for screening the work of their peers and providing constructive feedback for revisions and future projects, while helping develop critical-thinking skills.

The course works from a set of specific exercises based on self-directed research and culminates in a series of short experimental films that challenge students on both a technical and creative level. Throughout, the course increasingly focuses on helping students express their personal outlooks and develop unique styles as filmmakers. Students review and reference short films online and discuss how they might find inspiration and apply what they find to their own works.

Prerequisite: Students must have access to an HD video camera, tripod or other stabilizing equipment, and editing software such as iMovie, Premiere Pro, etc.

↑ Art, Media & Design

Game Theory

In this course, students explore a branch of mathematics known as game theory, which uses mathematical models to inform decision making. There are many applications to everyday dilemmas and conflicts, many of which can be treated as mathematical games.

Students consider significant global events from fields like diplomacy, political science, anthropology, philosophy, economics, and popular culture. They examine models of world conflicts and scheduling of professional athletic contests. Specific topics include two-person zero-sum games, two-person non-zero-sum games, sequential games, multiplayer games, linear optimization, and voting theory.

↑ Mathematics & Quantitative Reasoning

Gender & Society

This course uses the concept of gender to examine a range of topics and disciplines that include feminism, gay and lesbian studies, women's studies, popular culture, and politics. Throughout the course, students examine the intersection of gender with other social identifiers: class, race, sexual orientation, culture, and ethnicity. Students read about, write about, and discuss gender issues as they simultaneously reflect on the ways that gender has manifested in and influenced their lives.

↑ Justice, Ethics & Human Rights

Genocide & Human Rights

Students in this course study several of the major 20th-century genocides (Armenian, the Holocaust, Cambodian, and Rwandan), analyze the role of the international community in responding to and preventing further genocide (with particular attention to the Nuremberg tribunals), and examine current human rights crises around the world.

Students read primary and secondary sources, participate in both synchronous and asynchronous discussions with classmates, write brief papers, read short novels, watch documentaries, and develop a human rights report card website about a nation of their choice.

↑ Global Studies; Justice, Ethics & Human Rights

Geometry

This intensive summer course is designed to provide an accelerated path through the traditional high school geometry curriculum. Focusing on Euclidean geometry, students examine topics relating to parallel lines, similar and congruent triangles, quadrilaterals, polygons, and circles.

Students can expect to analyze lengths, areas, and volumes of two- and three-dimensional figures and explore transformations and other manipulations. Particular attention is paid to introductory trigonometry with right triangles and the study of circles (radians, sectors, arc length, etc). In addition, the development of a mature, logical thought process will begin through a formal introduction to arguments, deductions, theorems, and proofs.

Because this course covers topics that are typically presented in a yearlong course, students should expect to dedicate 15–20 hours per week during the intensive seven-week summer session. This course is offered in the summer only.

Prerequisite: A strong background in Algebra I or its equivalent

Global Health

What makes people sick? What social and political factors lead to the health disparities we see both within our own communities and on a global scale? What are the biggest challenges in global health and how might they be met? Using an interdisciplinary approach to address these questions, this course improves students' health literacy through an examination of the most significant public health challenges facing today's global population.

Topics addressed include the biology of infectious disease, the statistics and quantitative measures associated with health issues, the social determinants of health, and the

role of organizations (public and private) in shaping the landscape of global health policy. Throughout the course, students use illness as a lens through which to critically examine such social issues as poverty, gender, and race.

Student work includes analytical writing, research and curating sources around particular topics, readings and discussions exploring a variety of sources, and online presentations created both on their own and with peers.

↑ → **Global Studies; Health Sciences**

Graphic Design

What makes a message persuasive and compelling? What helps audiences and viewers sort and make sense of information? This course explores the relationship between information and influence from a graphic design perspective. Using an integrated case study and design-based approach, this course aims to deepen students' design, visual, and information literacies.

Students are empowered to design and prototype passion-driven communication projects. Topics include principles of design and visual communication, infographics, digital search skills, networks and social media, persuasion and storytelling with multimedia, and social activism on the internet. Student work includes individual and collaborative group projects, graphic design, content curation, analytical and creative writing, peer review and critiques, and online presentations.

↑ → **Art, Media & Design**

Health & Fitness

In this course, students take a comprehensive look at multiple factors that influence our bodies over a lifetime to maintain an active and healthy lifestyle. Students gain physical literacy by identifying, applying, analyzing, and evaluating components of fitness, exercise (FITT) principles, principles of training, phases of movement, and athletic performance.

Students set personal improvement goals for both fitness and movement skills utilizing baseline testing and performance analysis. Each week students complete a variety of physical exercises to target specific areas of fitness and movement to assist in achieving their goals. Reflection and feedback will inform students regarding their improvement.

The course culminates in a student-led project where students explore, synthesize, and implement an exercise- or sport-specific topic that directly impacts their lives. Topics of exploration include but are not limited to: nutrition in sport, exercise psychology or mental health in sport, sport exploration for the lifetime, exercise science or sport-specific performance and biomechanics, careers in sport, and community-based improvement design and implementation.

↑ → **Health Sciences**

International Relations

Are China and the U.S. on a collision course for war? Can the Israelis and Palestinians find a two-state solution in the holy land? Will North Korea launch a nuclear weapon? Can India and Pakistan share the subcontinent in peace?

These questions dominate global headlines and our daily news feeds.

In this course, students go beyond soundbites and menacing headlines to explore the context, causes, and consequences of the most pressing global issues of our time. Through case studies, students explore the dynamics of international relations and the complex interplay of war and peace, conflict and cooperation, and security and human rights. Working with classmates from around the world, students also identify and model ways to prevent, mediate, and resolve some of the most pressing global conflicts.

Note: Beginning in the Summer 2024, GOA will offer pilot sections of International Relations that will leverage AI tools to support students taking the course in a variety of languages other than English. If you want to be in a multilingual section of this course, whether to participate in a more fully global community as an English-speaker, or to lean into studying International Relations in your native language, sign up for "International Relations (Multilingual)" on the registration page.

↑ → **Global Studies**

Introduction to Artificial Intelligence

Aspects of artificial intelligence permeate our lives and the algorithms power your favorite apps. How much do you really know about how AI works or how it is changing the world around us?

This course explores the history of research into artificial general intelligence and the subsequent focus on the subfields of narrow AI: neural networks, machine learning and expert systems, deep learning, natural language processing, and machine vision and facial recognition. Students also learn how AI training datasets cause bias and focus on the ethics and principles of responsible AI: fairness, transparency and explainability, human-centeredness, and privacy and security.

↑ → **Computer Science & Engineering**

Introduction to Blockchain & Cryptocurrency

Much attention has been brought to the cryptocurrency space by the meteoric rise in the valuation of Bitcoin and other cryptocurrencies. More recently, meme tokens have also grabbed the spotlight. When thinking about cryptocurrency, there is much more to consider than just market capitalization or coins named after canines.

Introduction to Blockchain & Cryptocurrency is an entry-level course for anyone excited by the space. This course explores how we arrived at the place we are now, and what the current and possible applications of crypto are. Students explore how markets in crypto operate, where they've received practical application, and where the space may head in the future through the lenses of creators, consumers, and governments. In addition, students take a deeper look at blockchain, the underlying technology that powers cryptocurrencies, and its many, far-reaching implications for the future of government, business, the arts, and more.

Each lens represents a different way to view the complex and interrelated causes and outcomes of the changing crypto landscape. Using a variety of technologies and

activities, students work individually and with peers to evaluate each lens. Students then analyze and explore how these technologies may shape and disrupt the future not only of the crypto space but of many current and future industries.

↑→ **Computer Science & Engineering; Business, Economics & Finance**

Introduction to Branding & Marketing

In our increasingly digitized world, we are bombarded by ads every day and presented with an immeasurable amount of content across all media platforms. It has become increasingly difficult for brands to break through the noise and capture the attention of their intended audience. In this course, students learn what it takes to build an effective brand that can authentically connect with consumers and create long-term brand equity.

The course starts with introducing what a brand is and goes on to explore how different branding elements, such as visual identity, advertising strategy, and content marketing, as well as the intangible elements of the customer journey, come together to create a unique brand experience.

By applying marketing theories, interviewing experts, and analyzing modern case studies, students develop and strengthen their competencies as brand strategists. Students also examine how responding to important ethical, social, and environmental issues can impact the brand's success. The course culminates in a final project where students collaborate to design an impactful brand campaign for a mission-driven company, organization, or initiative.

↑→ **Business, Economics & Finance**

Introduction to Legal Thinking

Inspired by GOA's popular Medical Problem Solving series, this course uses a case-based approach to give students a practical look into the professional lives of lawyers and legal thinking. By studying and debating a series of real legal cases, students sharpen their ability to think like lawyers who research, write, and speak persuasively.

The course focuses on problems that lawyers encounter in daily practice, and on the rules of professional conduct case law. In addition to practicing writing legal briefs, advising fictional clients, and preparing opening and closing statements for trial, students approach such questions as the law and equity, the concept of justice, jurisprudence, and legal ethics.

↑→ **Justice, Ethics & Human Rights**

Introduction to Organic Chemistry I

This course is a prerequisite for Introduction to Organic Chemistry II at GOA. The purpose of the course is to teach organic chemistry content and to prepare students for organic chemistry at the collegiate level. This course dives into mechanisms and reaction types that make up all living things on this planet, carbon chemistry.

From a content perspective, this course introduces the magnificent world of complex molecules, their properties, reactions, and applications. Understanding the properties, and appreciating the incredible organic world we live in, is the key to understanding how to address some of the most challenging problems that we face today and in the future.

This course also helps students build their problem-solving and pattern-recognition skills so that when students take organic chemistry at the collegiate level they will be prepared to “speak” the language. At the collegiate level, introductory organic chemistry is oftentimes a challenging course for many students entering pre-health programs of study or science majors getting their prereqs taken care of.

Organic Chemistry I focuses on the “language of organic chemistry.” Students learn to predict electron movement for organic reactions. They focus on molecular structure (i.e. bond angles, shapes, polarity, and resonance), basic nomenclature, and prediction of electron movement.

This course is the first in a two-part series. Organic Chemistry I is offered in Semester 1 and Organic Chemistry II is offered in Semester 2. While it is possible to take only this first course, we recommend signing up for both semester courses.

↑→ **Health Sciences**

Introduction to Organic Chemistry II

In this course, students continue to explore the incredible world of carbon chemistry. Students add to their language skills as well as learn about additional functional groups and classes of organic molecules. They build on our understanding of reaction types and how to predict what can be made from certain precursors.

The purpose of Introduction Organic Chemistry II is to foster an appreciation for the incredible organic world we live in. Students develop an understanding of how we can use this knowledge of the structure of molecules to address some of the most challenging problems that we face today and in the future. Some example questions that students may explore:

- What are some things that need to be considered when creating materials that can cause lasting issues for the health of aquatic and human life upon disposal?
- How can we manufacture new materials that can have applications to improve and extend life through medical technologies?
- How can we create better, more sustainable, energy sources that lead us away from our fossil fuel dependency?
- What characteristics will new synthetic materials need so that they don't need to be replaced as often (to create less waste etc.)?

Students continue to hone their understanding of nomenclature, work with reaction types with a focus on polymerization and material science, and receive an introduction to spectroscopy. Introduction to Organic Chemistry II focuses on the important building and structures of organic molecules. Students learn to appreciate the interconnection and complexity of the organic world.

Prerequisite: Introduction to Organic Chemistry I

↑→ **Health Sciences**

Introduction to Psychology

What does it mean to think like a psychologist? In Introduction to Psychology, students explore three central psychological perspectives — the behavioral, the cognitive, and the sociocultural — in order to develop a multifaceted understanding of what thinking like a psychologist encompasses. The additional question of “How do psychologists put what they know into practice?” informs study of the research methods in psychology, the ethics surrounding them, and the application of those methods to practice.

During the first five units of the course, students gather essential information that they apply during a group project on the unique characteristics of adolescent psychology. Students similarly envision a case study on depression, which enables application of understandings from the first five units. The course concludes with a unit on positive psychology, which features current positive psychology research on living mentally healthy lives.

Throughout the course, students collaborate on a variety of activities and assessments, which often enable learning about each other’s unique perspectives, while building their research and critical-thinking skills in service of understanding the complex field of psychology.

Optional: Students in this course can simultaneously enroll in the ungraded Academic English Accelerator in order to get additional support with their English in the context of their work in this course.

↑ Psychology & Neuroscience

Investing I

This course is a prerequisite to Investing II at GOA. In this course, students simulate the work of investors by working with the tools, theories, and decision-making practices that define smart investment. Students explore concepts in finance and apply them to investment decisions in three primary contexts: portfolio management, venture capital, and social investing.

After an introduction to theories about valuation and risk management, students simulate scenarios in which they must make decisions to grow an investment portfolio. They manage investments in stocks, bonds, and options to learn a range of strategies for increasing the value of their portfolios. In the second unit, students take the perspective of venture capital investors, analyzing startup companies and predicting their value before they become public. In the third unit, students examine case studies of investment funds that apply the tools of finance to power social change.

Throughout the course, students learn from experts who have experience in identifying value and managing risk in global markets. They develop their own ideas about methods for weighing financial risks and benefits and leave this course not just with a simulated portfolio of investments, but the skills necessary to manage portfolios in the future.

Optional: Students in this course can simultaneously enroll in the ungraded Academic English Accelerator in order to get additional support with their English in the context of their work in this course.

↑ Business, Economics & Finance

Investing II

In this course, students expand their knowledge of practices that define smart investment. They explore concepts in finance and apply them to investment decisions in four primary contexts: fixed-income investments, foreign exchange and crypto, commodities, and real estate. After an introduction to theories about behavioral finance, students simulate scenarios in which they must make decisions to add to their portfolio of equities.

In the first unit, they learn how fixed-income assets like bonds fit into a larger portfolio to hedge risk in their portfolios. In the second unit, students examine forex trading and the cryptocurrency markets, a riskier and more volatile investment vehicle. In the third unit, students examine how commodities can be a part of a larger portfolio, but also how commodity prices might affect the larger economy. Finally, in the fourth unit, students learn about the array of strategies in real estate investing.

Throughout the course, students learn from experts who have experience in identifying value and managing risk in global markets. They develop their own ideas about methods for taking calculated financial risks and build on their understanding from Investing I. They leave this course with a more nuanced view of their overall portfolio and the skills necessary to manage risk in the future.

Prerequisite: Investing I

↑ Business, Economics & Finance

Japanese Language Through Culture I

This course (or its equivalent) is a prerequisite to Japanese II and III at GOA. This full-year course is a unique combination of Japanese culture and language, weaving cultural comparison with the study of basic Japanese language and grammar. While examining various cultural topics such as literature, art, lifestyle, and economy, students learn the basics of the Japanese writing system (Hiragana and Katakana), grammar, and vocabulary.

Through varied synchronous and asynchronous assignments, including hands-on projects and face-to-face communications, students develop their speaking, listening, reading, and writing skills. The cultural study and discussions are conducted in English, with topics alternating every two to three weeks. The ultimate goal of this course is to raise awareness and appreciation of different cultures through learning the basics of the Japanese language. The focus of this course is 60 percent on language and 40 percent on culture.

This course is appropriate for beginner-level students.

↑ Global Studies

Japanese Language Through Culture II

This course (or its equivalent) is a prerequisite to Japanese III at GOA. Through language learning, students in this course share their voices, cultivate global perspectives, and foster an appreciation for self and others. Students further develop the speaking, listening, writing, and reading skills introduced in Japanese Language Through Culture I.

Each unit follows the IPA model (Integrated Performance Assessment), blending three modes of communication: interpretation of authentic material in Japanese, synchronous and asynchronous practice in speaking and

writing, and oral and written presentations. Each unit focuses on one of the following cultural topics: design and expression, ecology, entertainment, East meets West, harmony, and nature. In addition, students have the opportunity to select and pursue topics of their own interest.

Grammar topics cover the essential forms that are typically introduced in the second and third year of a high school Japanese program. By learning the dictionary form, nominalizer, TE form, TA form, NAI form, and noun modifier, students are able to add more complexity to their sentence construction. In doing so, they shift from forming simple sentences to communicating in coherent paragraphs.

As online learners, students are expected to exhibit superb time management and communication skills, as well as take ownership of their learning. While grammar instruction is delivered through asynchronous work and face-to-face meetings, much of the course content is curated and created by students through their research and collaboration. The focus of this course is 60 percent on language and 40 percent on culture.

Prerequisite: Japanese Language Through Culture I or permission from the instructor

↑ **Global Studies**

Japanese Language Through Culture III

Students in Japanese III have mastered most of the conjugation patterns (TE/TA form, dictionary form, and NAI form) that are necessary to speak and write in complex structures.

While advancing their grammatical knowledge, students compare and examine similar functions and their subtle differences. In speaking, students are allowed to speak in an informal/casual style with each other and with the teacher in order to solidify their control of the Plain Form.

Interpersonal communications are done through face-to-face conversation and recorded messages. In reading and listening, students curate, share, and practice grasping the gist of authentic materials. Materials may include TV commercials, news, movies, children's books, online newspapers, and cooking recipes. In Semester 2, students participate in the GOA Catalyst Exhibition.

Prerequisite: Japanese Language Through Culture I and II or permission from the instructor

↑ **Global Studies**

Linear Algebra

In this course, students learn about the algebra of vector spaces and matrices by looking at how images of objects in the plane and space are transformed in computer graphics. Students do some paper-and-pencil calculations early in the course, but the computer software package Geogebra (free) is used to do most calculations after the opening weeks. No prior experience with this software or linear algebra is necessary.

Following the introduction to core concepts and skills, students analyze social networks using linear algebraic techniques. Students learn how to model social networks using matrices as well as discover things about the network with linear algebra as their tool and will consider applications like Facebook and Google.

Prerequisite: Geometry and Algebra 2 or the equivalents

↑ **Mathematics & Quantitative Reasoning**

Macroeconomics

Macroeconomics is the study of economic units as a whole rather than of their individual components. The aggregate unit is usually a national economy and that is the focus of this course. Students learn to better understand how to measure national economic activity with concepts like gross domestic product, unemployment and inflation, and the strengths and weaknesses of these statistics.

Students then study theoretical methods of influencing national economic activity with monetary and fiscal policy and learn about some of the controversy surrounding these policy tools. The advantages and disadvantages of international trade and of methods of setting exchange rates is also introduced. The course includes an individual student investigation of a national economy other than their home country. Students identify their economic findings and present resolutions in their final report.

↑ **Business, Economics & Finance**

Medical Problem Solving I

This course is a prerequisite to Medical Problem Solving II at GOA. In this course, students collaboratively solve medical mystery cases, similar to the approach used in many medical schools. Students enhance their critical-thinking skills as they examine data, draw conclusions, diagnose, and identify appropriate treatment for patients.

Students use problem-solving techniques in order to understand and appreciate relevant medical/biological facts as they confront the principles and practices of medicine. Students explore anatomy and physiology pertaining to medical scenarios and gain an understanding of the disease process, demographics of disease, and pharmacology. Additional learning experiences include studying current issues in health and medicine, interviewing a patient, and creating a new mystery case.

Optional: Students in this course can simultaneously enroll in the ungraded Academic English Accelerator in order to get additional support with their English in the context of their work in this course.

↑ **Health Sciences**

Medical Problem Solving II

Medical Problem Solving II is an extension of the problem-based approach in Medical Problem Solving I. While collaborative examination of medical case studies remain at the center of the course, MPS II approaches medical cases through the perspectives of global medicine, medical ethics, and social justice.

The course examines cases not only from around the world but also in students' local communities. Additionally, the course addresses the challenges patients face because of a lack of access to health care, often a result of systemic discrimination and inequity along with more general variability of health care resources in different parts of the world.

All students in MPS II participate in the Catalyst Exhibition, a GOA-wide conference near the end of the

semester where students from many GOA courses create and publish presentations on course-specific topics. For their projects, students use all of the lenses from the earlier parts of the course to choose and research a local topic of high interest. Further, their topics enable identifying a local medical problem, using local sources, and generating ideas for promoting change.

Prerequisite: Medical Problem Solving I

↑→ **Health Sciences**

Microeconomics

In this course, students learn about how consumers and producers interact to form a market and then how and why the government may intervene in that market. Students deepen their understanding of basic microeconomic theory through class discussion and debate, problem solving, and written reflection.

Students visit a local production site and write a report using the market principles they have learned. Economic ways of thinking about the world help them better understand their roles as consumers and workers, and someday, as voters and producers.

↑→ **Business, Economics & Finance**

Multivariable Calculus

In this course, students learn to differentiate and integrate functions of several variables. They extend the Fundamental Theorem of Calculus to multiple dimensions and the course culminates in Green's, Stokes', and Gauss' Theorems.

The course opens with a unit on vectors, which introduces students to this critical component of advanced calculus. They then move on to study partial derivatives, double and triple integrals, and vector calculus in both two and three dimensions. Students are expected to develop fluency with vector and matrix operations.

Understanding parametric curves as a trajectory described by a position vector is an essential concept, which allows us to break free from one-dimensional calculus and investigate paths, velocities, and other applications of science that exist in three-dimensional space. Students study derivatives in multiple dimensions and use the ideas of the gradient and partial derivatives to explore optimization problems with multiple variables as well as consider constrained optimization problems using Lagrangians.

After studying differentials in multiple dimensions, the course moves to integral calculus. Students use line and surface integrals to calculate physical quantities especially relevant to mechanics, electricity, and magnetism, such as work and flux. They employ volume integrals for calculations of mass and moments of inertia and conclude with the major theorems (Green's, Stokes', Gauss') of the course, applying each to some physical applications that commonly appear in calculus-based physics.

Prerequisite: The equivalent of a college year of single-variable calculus, including integration techniques, such as trigonometric substitution, integration by parts, and partial fractions. Completion of the AP Calculus BC curriculum with a score of 4 or 5 on the AP Exam would be considered adequate preparation.

↑→ **Mathematics & Quantitative Reasoning**

Neuropsychology

Neuropsychology is the exploration of the neurological basis of behavior. Within this course, students learn about basic brain anatomy and function as well as cognitive and behavioral disorders from a neurobiological perspective. They do an in-depth analysis of neural communication with an emphasis on how environmental factors such as smartphones affect nervous system function, their own behaviors, and the behaviors of those around them.

Students also have the opportunity to choose topics in neuropsychology to explore independently including Alzheimer's disease, addiction, neuroplasticity, and CTE and share their understanding with their peers in a variety of formats. The course concludes with a study of both contemporary and historic neuropsychological case studies and their applications to everyday life.

↑→ **Psychology & Neuroscience**

Number Theory

Once thought of as the purest but least applicable part of mathematics, number theory is now by far the most commonly applied: every one of the millions of secure internet transmissions occurring each second is encrypted using ideas from number theory.

This course covers the fundamentals of this classical, elegant, yet supremely relevant subject. It provides a foundation for further study of number theory, but even more, it develops the skills of mathematical reasoning and proof in a concrete and intuitive way and is necessary preparation for any future course in upper-level college mathematics or theoretical computer science.

Students progressively develop the tools needed to understand the RSA algorithm, the most common encryption scheme used worldwide. Along the way, they invent some encryption schemes of their own and discover how to play games using number theory. Students also get a taste of the history of the subject, which involves the most famous mathematicians from antiquity to the present day, and see parts of the story of Fermat's Last Theorem, a 350-year-old statement that was fully proven only 20 years ago.

While most calculations are simple enough to do by hand, students sometimes use the computer to see how the fundamental ideas can be applied to the huge numbers needed for modern applications.

Prerequisite: A strong background in Precalculus and above as well as a desire to do rigorous mathematics and proofs

↑→ **Mathematics & Quantitative Reasoning**

Personal Finance

In this course, students learn financial responsibility and social consciousness. They examine a wide array of topics including personal budgeting, credit cards and credit scores, career and earning potential, insurance, real estate, financial investment, retirement savings, charitable giving, taxes, and other items related to personal finance.

Students apply their understanding of these topics by simulating real-life financial circumstances and weighing

the costs and benefits of their decisions. Throughout the course, students have the opportunity to learn from individuals with varying perspectives and expertise in numerous fields. By reflecting on their roles in the broader economy as both producers and consumers, students begin to consider how they can positively impact the world around them through their financial decisions.

↑ Business, Economics & Finance

Positive Psychology

What is a meaningful, happy, and fulfilling life? The focus of psychology has long been the study of human suffering, diagnosis, and pathology, but in recent years, however, positive psychologists have explored what's missing from the mental health equation, taking up research on topics such as love, creativity, humor, and mindfulness.

In this course, students dive into what positive psychology research tells us about the formula for a meaningful life, the ingredients of fulfilling relationships, and changes that occur in the brain when inspired by music, visual art, physical activity, and more. They also seek out and lean on knowledge from positive psychology research and experts, such as Martin Seligman's well-being theory, Mihaly Csikszentmihalyi's idea of flow, and Angela Lee Duckworth's concept of grit. In exploring such theories and concepts, students imagine and create real-world measurements using themselves and willing peers and family members as research subjects.

As part of the learning studio format of the course, students also imagine, research, design, and create projects that they share with a larger community. Throughout the development of these projects, students collaborate with each other and seek ways to make their work experiential and hands-on. Students leave the class with not only some answers to the question of what makes life meaningful, happy, and fulfilling, but also the inspiration to continue responding to this question for many years to come.

↑ Psychology & Neuroscience

Precalculus

In this intensive summer course, students deepen and apply their understanding of mathematics in order to be prepared for higher-level courses. The emphasis is on understanding functions, including transformations, domain/range, and visual representations. In addition, students deepen their understanding of the concept of equivalence through numerical, graphical, and algebraic representations. This includes developing fluency with algebraic manipulation.

Much of the work involves problem solving and the application of previous and current skills to new situations. Projects include opportunities to apply topics such as polynomials, matrices, trigonometry, and sequences and series to real-world scenarios. Students analyze situations, create models, develop solutions to problems, and then reflect on this work. The course culminates in a project that provides students a chance to explore a situation and bring to bear the skills they have learned to analyze it and present their understanding of the situation.

This course is intended for students who are looking to accelerate through a Precalculus course and, as such, concepts and topics are presented quickly allowing for time

to apply the skills to novel situations. This course replicates what is typically a yearlong course, so students should expect to dedicate 15–20 hours per week during the seven-week summer session.

This course is offered in the summer only.

Prerequisite: Algebra 2 or its equivalent

Prisons & Criminal Justice Systems

How do societies balance individual freedoms with security? How do definitions of “crime” and “punishment” shift across jurisdictions and time periods? How do recent protests and discussions about racial biases and systemic racism inform our understanding of criminal law and its applications? Although the United States has been frequently cited as having the highest “mass incarceration” rate, other countries in the world have also been criticized for injustices in their criminal justice systems.

In this course, students become familiar with the legal rules and institutions that determine who goes to prison and for how long. Along the way, students gain a concrete, practical understanding of legal systems while grappling with mass incarceration as a legal, ethical, and practical issue.

To understand current views on crime and criminal punishments and to examine proposed systemic reforms, students immerse themselves in the different forms of rhetoric and media that brought the U.S. and other nations to our present. They read and analyze jury arguments, courtroom motions, news op-eds, judicial decisions, recent cases, and other forms of public persuasion that shape the outcomes of criminal defendants.

The final project requires students to advocate for a major reform to a criminal justice system in a city, state, or country. Having developed research skills, students apply them to build an effective argument that includes a real-world solution.

↑ Justice, Ethics & Human Rights

Problem Solving with Engineering & Design

This course investigates various topics in science, technology, engineering, and mathematics using a series of projects and problems that are both meaningful and relevant to the students' lives. Students develop engineering skills, including design principles, modeling, and presentations, using a variety of computer hardware and software applications to complete assignments and projects.

This is a course that focuses on practical applications of science and mathematics to solve real-world issues. Project-based learning, working in collaborative teams, and designing prototypes are essential components of the course. Throughout the program, students step into the varied roles engineers play in our society, solve problems in their homes and communities, discover new career paths and possibilities, and develop engineering knowledge and skills.

There are no particular math or science prerequisites for this course, just an interest in using STEM to solve problems and a desire to learn!

↑ Computer Science & Engineering: Mathematics & Quantitative Reasoning

Race & Society

What is race? Is it something we're born with? Is it an idea that society imposes on us? An identity we perform? A beneficial privilege? Does our own culture's conception of race mirror those found in other parts of the world? These are just a few of the questions that students in this course explore together as they approach the concept of race as a social construct that shapes and is shaped by societies and cultures in very real ways.

Throughout the course, students learn about the changing relationship between race and society across time and across cultures. Engaging with readings, films, and speakers from a variety of academic fields (history, sociology, anthropology, literature) students explore, research, reflect on, and discuss the complex set of relationships governing race and society.

↑→ **Justice, Ethics & Human Rights**

Religion & Society

Religion is one of the most salient forces in contemporary society but is also one of the most misunderstood. What exactly is religion? How does religious identity inform the ways humans understand themselves and the world around them? How can increased levels of religious literacy help us become more effective civic agents in the world today?

Students in this course conduct several deep dives into specific case studies in order to understand how religious identity intersects with various systems of power, including race, gender, class, sexual orientation, and ethnicity. By engaging with material from a variety of academic fields (history, sociology, anthropology, and psychology), students grapple with the complex ways in which society and religious identity relate to one another.

↑→ **Justice, Ethics & Human Rights**

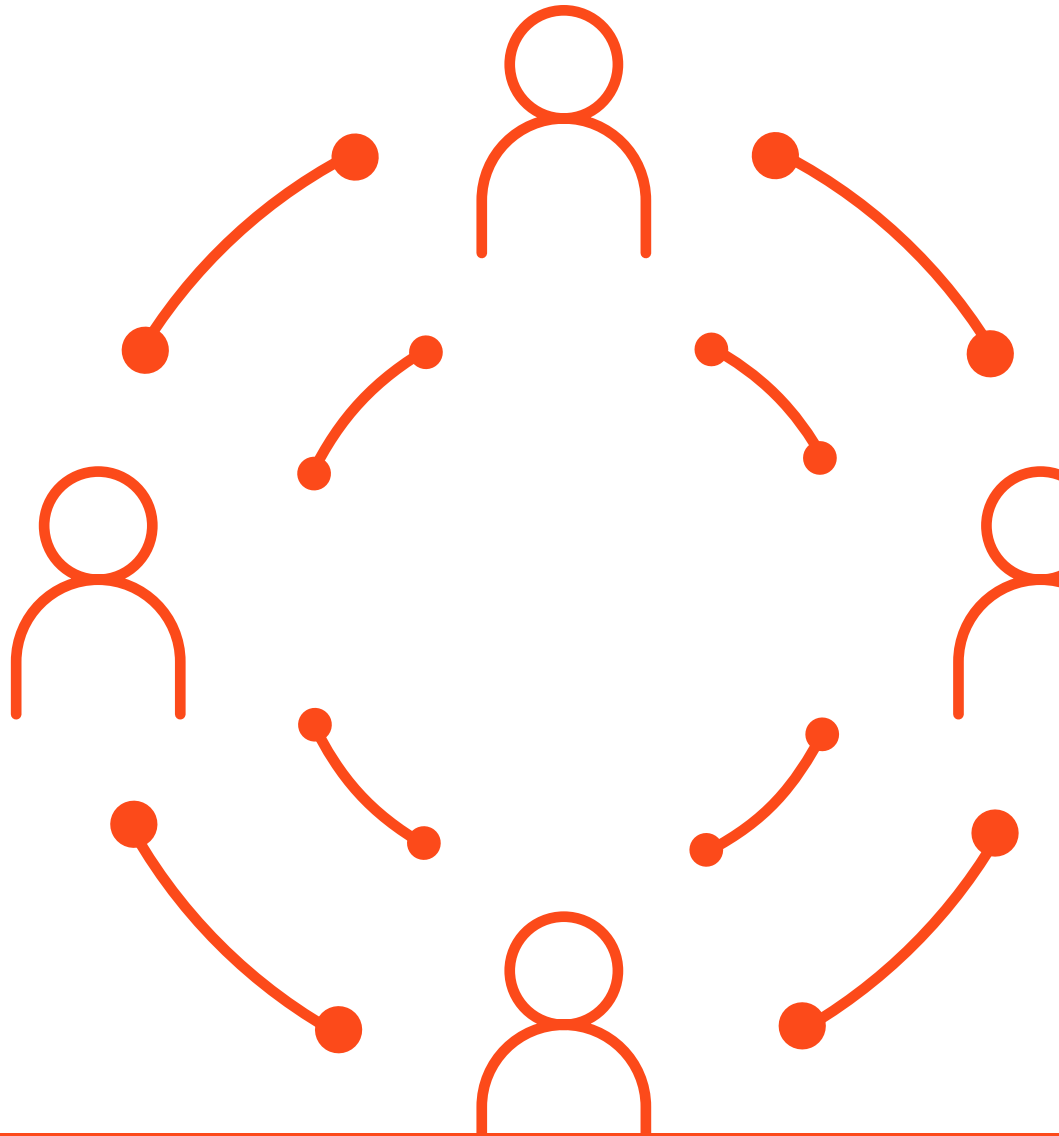
Social Psychology

Are you thinking and acting freely of your own accord, or is what you think, feel, and do a result of influences by the people around you? Social psychology is the scientific study of how and why the actual, imagined, or implied presence of others influences our thoughts, feelings, and behavior. The principles of social psychology help explain everything from why we stop at stop signs when there is no one around to why we buy certain products, why in some situations we help others and in some we don't, and what leads to more dramatic (and catastrophic) events such as mass suicides or extreme prejudice and discrimination.

As students take up these topics and questions, they build and engage in a community of inquiry, aimed primarily at learning how to analyze human behavior through the lens of a social psychologist. Social Psychology invites students to explore, plan, investigate, experiment, and apply concepts of prejudice, persuasion, conformity, altruism, relationships and groups, and the self that bring the "social" to psychology.

The course culminates in a public exhibition of a student-designed investigation of a social psychological topic of their choice. This course uses a competency-based learning approach in which students build GOA core competencies that transcend the discipline and learn how to think like a social psychologist.

↑→ **Psychology & Neuroscience**



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