



GERMANTOWN FRIENDS SCHOOL

2021-22

UPPER SCHOOL

COURSE

CATALOG

2021-22 UPPER SCHOOL

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# Course Selection Process

## **NOTE TO STUDENTS AND PARENTS**

The course selection process for the 2021-22 school year begins here. Within these pages, you will find your course and program options as well as detailed information about requirements and prerequisites. As you plan, we urge you to seek the counsel of advisors and teachers.

Please do be sure to read this catalog carefully – we always have a range of exciting offerings, some returning and some brand new. We hope you enjoy planning your journey at GFS!

## **CONSIDERING COLLEGE ADMISSIONS AS YOU PLAN**

GFS course requirements allow students the flexibility to pursue their intellectual passions. As they plan, students should keep in mind that most competitive colleges expect to see four years of study in English, History/Social Sciences, Math, Science, and Modern Language.

## **FOUR-YEAR COURSE PLANNING GRID**

The planning grid on page 8 will assist you with drafting various models for your course of study from grades 9 through 12. As you sketch out a multi-year plan, noting your required and elective courses, you will see the ways in which the curriculum might unfold for you. It is crucial to repeat this process annually to make sure you are meeting all requirements for graduation.

## **REQUIREMENTS AND A COURSE LOAD NOTE**

Ninth, tenth, and eleventh graders are required to take five major courses; twelfth graders may elect four or five majors. A student who wishes to take six major courses in any grade (an academic overload) must have the approval of the Upper School Division Director.

## **PREREQUISITES AND DEPARTMENTAL APPROVAL**

Please note that certain courses have prerequisites or, for a variety of reasons, require departmental approval. That information is listed on the departmental pages in this course catalog.

## **COURSE SELECTION TIMELINE**

- Beginning in late January, students seek course selection advice from parents, teachers, and advisors. On occasions Department Heads and Deans are also consulted. Juniors can be well served by consulting with College Counseling as well.
- Online course registration will open on Monday, February 8th, and close on Friday, February 19. Students register for courses through their Veracross Student Portal. Parents also approve course requests through the Veracross Parent Portal. Parents and students will receive a confirmation in June indicating scheduled courses.
- Add/Drop Period: At the beginning of the school year, students will have two rotations to add or drop a course to their schedule. All adds and drops must be approved by the Grade Dean.



# Graduation Requirements

To graduate from GFS, students must complete satisfactory work in 19 major courses and meet all departmental major and minor course requirements. All students must participate in January Term, fulfill the Athletics requirement, and complete a Junior Project. See departmental course descriptions for more details. All exceptions to these requirements must be approved by the Academic Standards Committee.

## REQUIRED MAJOR COURSEWORK

**English (4 years)**

**History (3 years)**

- Comparative Cultures (9th Grade)
- African-American History (10th Grade)
- U.S. History (11th or 12th Grade)

**Language (through Level 3)** Completion to level three of one classical or modern language. Typically the first level of coursework is completed by the end of Middle School (Note: 7th and 8th grade 1a and 1b study count as Level 1).

**Mathematics (3 years)** Information about course sequence options appears in the Mathematics Department section.

**Science (3 years)** Of the courses selected, one science must be physical and one biological.

## OTHER GRADUATION REQUIREMENTS

**Junior Project:** An independent, out-of-school project that takes place during the month of January of junior year.

**January Term:** Students complete January Terms in grades 9, 10, and 12. Please note that in 2020-2021 May Term was held and satisfies the January Term Requirement for that year.

### ALTERNATIVES TO REQUIREMENTS

**Academic:** Parents should request by email to Upper School Division Director and Upper School administrative assistant.

**Athletics:** Parents should apply using [the form located on the website](#).

## REQUIRED MINOR COURSEWORK

### ARTS MINORS REQUIREMENTS

Please note: Our expanded Arts Requirements became effective in the 2020-21 school year.

#### Class of 2024 and all subsequent classes

- Art (1 year Foundation)
- Music (1 year or the equivalent of 2 semesters)
- Theatre (1 year Ninth Grade Theatre)

#### Classes of 2022 and 2023

- Music (1 year or the equivalent of 2 semesters)
- Art or Theatre (1 year or the equivalent of 2 semesters)

### HEALTH (3 SEMESTERS)

- 10th grade: Health Education 10 (1 semester)
- 12th grade: Life Issues (coordinated with Advisory)

### ATHLETICS AND PHYSICAL EDUCATION

Athletics and PE are distinct but complementary departments. Across all four years of Upper School, students participate in a movement-based activity in PE and/or Athletics, with requirements detailed below:

- 9th grade: One semester PE 9 Foundations; two seasons Athletics.
- 10th grade: Three seasons: one season of Athletics; choice of Athletics or PE for other two seasons.
- 11th grade: Three seasons, choice of Athletics or PE each season.
- 12th grade: Two seasons, choice of Athletics or PE



# Quick Reference Terms

## Required Course

A department-specific course required for graduation.

## Elective Course

A department-specific course not required for graduation.

## Prerequisite

A course one must take before taking another course.

## Co-requisite

A course one must take along with another course.

## Major Course

A “major” typically meets five times in an 8-day cycle and counts as one of the 19 major courses mandated for graduation. There are two kinds of major courses

- **Required Major:** A major course taken to fulfill a department-specific major course requirement.
- **Elective Major:** A major course that is not required but that can count as one of the 19 majors required.

## Minor Course

A “minor” meets between two and four times in an 8-day cycle.

## Art, Music, or Theatre Major

A configuration of minor courses that can, with the permission of the relevant Department Head, form a music, theater, or art major course that counts as one of the major courses for graduation. See department pages for a detailed description.

## Overload

When a student takes six major courses rather than the standard five (done only with the permission of the Upper School Division Director).

## Advisor

Advisors serve as primary academic counselors, advocates, and facilitators for students within their advisory group as they seek to learn and grow within the Upper School curriculum.

## Grade Dean

Grade Deans lead the grade-level team of advisors and teachers, providing additional support, clerking grade-level meetings, overseeing grade-level programming, and supporting student/family concerns as needed in consultation with the Upper School Division Director.



# Program Highlights and Notes

## PROGRAM HIGHLIGHTS

### Directed Independent Study

A “DIS” is an independent major or minor course requested by a student that involves a teacher-student study partnership.

### Global Online Academy

A small consortium of independent schools that offers online course opportunities open to GFS juniors, and seniors. Sophomores may register with the approval of the Upper School Division Director.

### January Term

A month-long opportunity to explore new courses of study. Classes are innovative, hands-on course offerings composed of mixed-grade groups of 9th, 10th and 12th graders. Courses are taken on a Credit/No Credit basis.

### Junior Project

The required independent project all juniors undertake off-campus in the month of January of their junior year.

### Junior-Senior Seminars

Major elective courses offered each school year in innovative subjects that are often interdisciplinary in nature. These courses change year to year.

## REGISTRATION NOTES

### Minor Classes

Please rank your minor course selections as instructed at the time of course sign-up.

### Athletics and Physical Education

For all three seasons, please select a sport or rank your PE elective choices during course sign up.

### Overload/A Sixth Major

Taking five major classes in a given school year fulfills our challenging standard requirement for major coursework. Taking more than five major courses is considered an “overload;” students considering a sixth course should keep in mind the additional work involved. Please note that the “overload” course cannot be a required course, and it is possible that an overload course cannot be scheduled. Any student who wishes to take six majors must receive approval from the Upper School Division Director.

### Double Language in Ninth Grade

There are three options for students wishing to take two languages to advanced levels.

Dropping Science in 9th-grade and fulfilling the Science requirement in subsequent years.

Adding a second language by carrying six majors as an academic overload (with permission from the Upper School Director—please see above).

Requesting exemption from Comparative Cultures with permission from the Upper School Division Director and fulfilling the History requirement in subsequent years.

### Junior-Senior Seminars

Please indicate a second and third choice when selecting a Junior-Senior Seminar.

### History Electives

Juniors and seniors electing semester-long courses must make selections for both semesters and rank their preferences.



## Departmental Approval Required

The following options are subject to departmental approval from the appropriate Department Head. After signing up for the course, if the student does not receive approval, he or she will be notified by the Department Head or Grade Dean and will be given the opportunity to amend his or her course selections.

### ART

Students creating an Art Major  
Students electing Senior Studio (portfolio also required)

### CLASSICS

Students dropping a classical language

### MATHEMATICS

Please see the Mathematics course descriptions for departmental approval requirements  
Students moving into or out of an accelerated or advanced course  
Students dropping math in their senior year  
Students new to GFS must take a math assessment; course placement must have departmental approval

### MODERN LANGUAGES

Students dropping a modern language

### MUSIC

Students creating a Music Major  
Admission to Choir is audition-based

### ATHLETICS + PHYSICAL EDUCATION

Students proposing an alternative to Athletics/PE requirements should apply using the online form located on the PE department page of the website, before the start of the season

### SCIENCE

Students electing Biology: Advanced, Physics: Advanced, Chemistry: Advanced, or Principles of Engineering: Advanced

### THEATRE

Students creating a Theatre Major

### DIRECTED INDEPENDENT STUDY (DIS)

Students registering for a DIS Major must submit a formal proposal by early May that has the approval of the Director of Independent Studies and the Academic Standards Committee

### GLOBAL ONLINE ACADEMY (GOA)

Students electing to take a GOA course require approval from the GFS site director. Sophomores will need to register with the approval of the Upper School Division Director

### EXCEPTIONS/ALTERNATIVES TO REQUIREMENTS

Any request for alternatives to our standard program not resolved with departments can be directed to the Upper School Division Director



## Thematic Strands Across the Curriculum

The Upper School curriculum features a number of curricular themes spanning multiple departments. These lists highlight connections between courses that may not sit within the same department.

### SOCIAL JUSTICE AND INCLUSION

African American History  
Climate Change and Global Inequality (GOA)  
Environmental Science  
Genocide and Human Rights  
Introductory Programming: Girls Who Code  
Music and Cultures  
Prison and Criminal Justice System (GOA)  
Public Health and Modern Society  
Queer Culture: Past, Present & Future  
Race and Society (GOA)  
Social Justice Dialogue  
The Underground Railroad: Telling the Story

### SCIENCE, ENGINEERING & PROGRAMMING

Architecture (GOA)  
Computer Science Programming Capstone  
Developmental Psychology (GOA);  
Social Psychology (GOA)  
Environmental Science  
Human Anatomy and Physiology  
Medical Problem Solving (GOA)  
Mobile Application Development I and II  
Principles of Engineering  
Psychology: Introduction to Psychology (GOA);  
Abnormal Psychology (GOA)  
Research Methods in Neuroscience  
Robotics

### MATHEMATICS

Accelerated Statistics      Linear Algebra (GOA)  
Application in Statistics      Multivariable Calculus (GOA)  
Differential Calculus      Number Theory (GOA)  
Game Theory (GOA)      Topics in Advanced  
Integral Calculus and Series      Mathematics

### DIGITAL MAKING & DESIGN

Digital Art  
Digital Design I and II  
Digital Music and Recording  
Electronics Design Workshop  
Filmmaking: Light, Sound, and Production Design;  
Film Editing and Post-Production  
Machine Studio  
Mixed-Media Animation  
Photography  
Web Design and Development

### INTERDISCIPLINARY

African American Studies  
Art History: The Individual and Society  
Comic Studies  
Digital Humanities  
History of Science: Origins of Modern Science &  
Biology from Darwin to DNA  
Macroeconomics (GOA)  
Microeconomics (GOA)  
Playwriting Workshop  
Positive Psychology (GOA)  
Queer Culture: Past, Present, and Future  
Shakespeare Studio  
The Underground Railroad: Telling the Story

### MEDIA

Comic Studies  
Digital Humanities  
Filmmaking  
Introduction to Journalism  
Magazine Journalism

# FOUR-YEAR COURSE PLANNING GRID

	9th GRADE	10th GRADE
MAJORS	5 REQUIRED	5 REQUIRED
<b>English</b> 4 years	Representations of Identity	Poetry of Language
<b>History</b> 3 years	Comparative Cultures	African American Studies
<b>Language</b> Through Level 3		
<b>Mathematics</b> 3 years		
<b>Science</b> 3 years		
<b>Jr/Sr Seminar</b>	N/A	N/A
MINORS		
<b>Advisory</b>	Advisory 9	Advisory 10
<b>Art</b> 1 year		
<b>Computer Science + Digital Media</b>		
<b>Theatre</b>	9th Grade Theatre	
<b>Health</b> 1 semester	N/A	Health Education (1 semester)
<b>Music</b> 1 year		
<b>GOA, DIS &amp; Other</b>	(English) Style Fundamentals	
ATHLETICS & PHYSICAL EDUCATION		
	<b>FULL YEAR</b> • One semester • PE 9 Foundations • Two seasons of Athletics	<b>FULL YEAR</b> • One season Athletics • Choice of Athletics or PE for other two seasons
	<b>F</b>	<b>F</b>
	<b>W</b>	<b>W</b>
	<b>S</b>	<b>S</b>



In thinking about course choices, you may want to sketch out a plan of study incorporating graduation requirements and electives. Five majors are required of all students in grades 9-11 and either four or five may be taken in 12th grade.

	11th GRADE	12th GRADE
MAJORS	5 REQUIRED	4 OR 5 REQUIRED
<b>English</b> 4 years	Literature and Composition Part I: Advanced	Literature and Composition Part II: Advanced
<b>History</b> 3 years	US History: Advanced, must be taken in 11th or 12th grade	
<b>Language</b> Through Level 3		
<b>Mathematics</b> 3 years		
<b>Science</b> 3 years		
<b>Jr/Sr Seminar</b>		
MINORS		
<b>Advisory</b>	Navigation	Life Issues (Coordinated with Health)
<b>Art</b> 1 year		
<b>Computer Science + Digital Media</b>		
<b>Theatre</b>		
<b>Health</b> 1 semester	N/A	Life Issues (Coordinated with Health)
<b>Music</b> 1 year		
<b>GOA, DIS &amp; Other</b>		
ATHLETICS & PHYSICAL EDUCATION		
	<b>FULL YEAR</b> • Three seasons, choice of Athletics or PE	<b>TWO SEASONS</b> • Choice of Athletics or PE
	<b>F</b>	<b>F</b>
	<b>W</b>	<b>W</b>
	<b>S</b>	<b>S</b>

# DEPARTMENTAL COURSE OFFERINGS GRID

COURSE TITLE	GRADE				TIMES PER CYCLE	INFORMATION
	9	10	11	12		
<b>ART</b>						
Foundation	•	•	•	•	3	required minor
Color & Design		•	•	•	4	minor elective; prerequisite: Foundation
Drawing & Painting		•	•	•	4	minor elective; prerequisite: Foundation
Creative Furniture Making		•	•	•	3	minor elective; prerequisite: Foundation
Sculpture		•	•	•	4	minor elective; prerequisite: Foundation
Digital Art		•	•	•	4	minor elective; prerequisite: Foundation
Photography I			•	•	3+	minor elective; prerequisite: Foundation
Photo II: The Journey Continues				•	3+	minor elective; prerequisite: Photo I
Senior Studio: Advanced				•	5	major elective; prerequisite: Foundation+
Mixed Media Animation		•	•	•	3	minor elective; prerequisite: Foundation
Art History: The Individual and Society		•	•	•	3	minor elective; prerequisite: Foundation
Art Major*		•	•	•		Art History + studio course or two studio courses
<b>CLASSICAL LANGUAGES</b>						
Ancient Greek I	•	•	•	•	5	major elective
Ancient Greek II	•	•	•	•	5	major elective; prerequisite: Greek I
Ancient Greek III		•	•	•	5	major elective; prerequisite: Greek II
Ancient Greek IV: Advanced			•	•	5	major elective; prerequisite: Greek III
Ancient Greek V: Advanced				•	5	major elective; prerequisite: Greek IV
Latin I	•	•	•		5	major elective
Latin II	•	•	•	•	5	major elective; prerequisite: Latin I or Latin IB
Latin III (History)		•	•	•	5	major elective; prerequisite: Latin II
Latin III (Poetry)		•	•	•	5	major elective; prerequisite: Latin II
Latin IV: Advanced		•	•	•	5	major elective; prerequisite: Latin III (History or Poetry)
Latin V: Advanced			•	•	5	major elective; prerequisite: Latin IV
<b>COMPUTER SCIENCE + DIGITAL MEDIA</b>						
Robotics	•	•	•	•	3	minor elective (one semester)
Computer Science for Beginners <b>NEW</b>	•	•	•	•		minor elective, one semester
CS I: Introductory Programming	•	•	•	•	2	minor elective
Introductory Programming: Girls Who Code	•	•	•	•	2	minor elective
CS II: Object-Oriented Programming		•	•	•	3	minor elective; prerequisite: CS I, or Department Head approval

\*Requires departmental approval / +May use hook period / See course description for full information

COURSE TITLE	GRADE				TIMES PER CYCLE	INFORMATION
	9	10	11	12		
CS III: Algorithms and Computer Organization			•	•	3	minor elective; prerequisite: CS II, or Department Head approval
Electronics Design Workshop		•	•	•	3	minor elective; prerequisite: CS I or Robotics, or Department Head approval
Computer Science Programming Capstone*			•	•	3	minor elective; prerequisite: CS III or Department Head approval
Digital Design I	•	•	•	•	3	minor elective
Web Design & Development I	•	•	•	•	3	minor elective or permission of instructor
Web Design & Development II		•	•	•	3	minor elective; prerequisite: Web Design & Development I
Digital Humanities Advanced			•	•	5	major elective
Mobile Application Development I		•	•	•	3	minor elective
Machine Studio	•	•	•	•	3	minor elective
<b>ENGLISH</b>						
Representations of Identity	•				5	required major
Style Fundamentals	•				1	required minor (one semester)
Poetry of Language		•			5	required major
Literature and Composition Part I: Advanced			•		5	required major
Literature and Composition Part II: Advanced				•	5	required major
Poetry Workshop		•	•	•	3	minor elective
Introduction to Journalism <b>NEW</b>	•	•	•		1	minor elective
Magazine Journalism		•	•	•	3	minor elective
<b>HEALTH EDUCATION</b>						
Health Education 10		•			3	required minor (one semester)
Life Issues				•	1	required minor (coordinated with Advisory)
Queer Culture: Past, Present and Future <b>NEW</b>	•	•	•	•	3	minor elective
Public Health and Modern Society <b>NEW</b>	•	•	•	•	3	minor elective
<b>HISTORY</b>						
Comparative Cultures	•				5	required major
African American History <b>NEW</b>		•				required major
United States History: Advanced			•	•	5	
<b>HISTORY ELECTIVES</b>			•	•	5	major elective
<b>Fall Semester Electives:</b> <ul style="list-style-type: none"> <li>• African American Studies</li> <li>• U.S. Government and Civics: Advanced</li> <li>• War and Peace: The Modern Middle East: Advanced</li> <li>• History of Science: Origins of Modern Science</li> </ul>						
<b>Spring Semester Electives:</b> <ul style="list-style-type: none"> <li>• Modern U.S. Political Ideologies and Issues: Advanced</li> <li>• Genocide and Human Rights: Advanced</li> <li>• Europe: World War II and Beyond</li> <li>• History of Science: Biology from Darwin to DNA</li> </ul>						

\*Requires departmental approval / +May use hook period / See course description for full information

COURSE TITLE	GRADE				TIMES PER CYCLE	INFORMATION
	9	10	11	12		
<b>JUNIOR-SENIOR SEMINARS</b>						
Comic Studies: The Sequence and Synergy of Text and Image <b>NEW</b>			•	•	5	major elective
Research Methods in Neuroscience <b>NEW</b>			•	•	5	major elective
Underground Railroad: Telling the Story <b>NEW</b>			•	•	5	major elective
<b>ADDITIONAL OFFERINGS</b>						
Social Justice Dialogue	•	•	•	•	2	minor elective
Peer Writing Advisor Training Part 2: Theory into Practice			•	•	2	minor elective; prerequisite: Peer Writing Advisor Training (Essentially English course)
<b>MATHEMATICS</b>						
Please see Mathematics section for course sequencing options, prerequisites, and departmental approval requirements.						
<b>MODERN LANGUAGES</b>						
French I	•	•	•		5+	major elective
French II	•	•	•	•	5+	major elective; prerequisite: French I
French III		•	•	•	5	major elective; prerequisite: French II
French IV: Advanced			•	•	5	major elective; prerequisite: French III
French V: Advanced			•	•	5	major elective; prerequisite: French IV
Mandarin I	•	•	•		5	major elective
Mandarin II and III*	•	•	•	•	5	major elective; prerequisite: Mandarin I or II
Mandarin IV and V*: Advanced	•	•	•	•	5	major elective; prerequisite: Mandarin III or IV
Spanish I	•	•	•		5+	major elective
Spanish II	•	•	•	•	5+	major elective; prerequisite: Spanish I
Spanish III		•	•	•	5	major elective; prerequisite: Spanish II
Spanish IV: Advanced		•	•	•	5	major elective; prerequisite: Spanish III
Spanish V: Advanced			•	•	5	major elective; prerequisite: Spanish IV
<b>MUSIC</b>						
<b>FALL</b>						
Fundamentals of Piano	•	•	•	•	2	minor elective (one semester)
Critical Listening in Music	•	•	•	•	2	minor elective (one semester)
History and Impact of Hip-Hop	•	•	•	•	2	minor elective (one semester)
Music and Cultures	•	•	•	•	2	minor elective (one semester)
Musical Instrument Building	•	•	•	•	3	minor elective (one semester)
<b>SPRING</b>						
9th Grade Musical	•				2+	minor elective (one semester)

\*Requires departmental approval / +May use hook period / See course description for full information

COURSE TITLE	GRADE				TIMES PER CYCLE	INFORMATION
	9	10	11	12		
Critical Listening in Music	•	•	•	•	2	minor elective (one semester)
Songwriting	•	•	•	•	2	minor elective (one semester)
<b>YEARLONG</b>						
Chamber Ensembles	•	•	•	•	2	minor elective; co-requisite: private lessons
Choir*		•	•	•	3+	(Sunday rehearsals) minor elective; co-requisite: Chorus
Chorus	•	•	•	•	2	minor elective
Conducting	•	•	•	•	2	minor elective
Digital Music Recording & Production	•	•	•	•	2	minor elective
Instrumental Improvisation	•	•	•	•	2	minor elective
Jazz Ensembles	•	•	•	•	2	minor elective; co-requisite: private lessons
Masterworks in Music	•	•	•	•	2	minor elective
Music Composition I: Advanced			•	•	4	minor elective; prerequisite: Music Theory II or departmental approval
Music Composition II: Advanced			•	•	5	minor elective; prerequisite: departmental approval
Music Major*	•	•	•	•	5	1 or more academic + 1 or more performance electives equaling 5 class periods
Music Theory I	•	•	•	•	4	minor elective
Music Theory II: Advanced		•	•	•	4	minor elective; prerequisite: Music Theory I or dept. approval
Musical Theatre		•	•	•	3	minor elective
Orchestra	•	•	•	•	3+	minor elective; co-requisite: private lessons
Sight Singing & Ear Training	•	•	•	•	2	minor elective
World Percussion Ensemble	•	•	•	•	2	minor elective
<b>PHYSICAL EDUCATION</b>						
Please see PE section for more information about requirements and electives.						
PE 9 Foundations	•				3	required minor (one semester)
<b>YEARLONG</b>						
GFS Fitness Club—After School		•	•	•	2/wk	minor elective
Personal Fitness		•	•	•	3	minor elective
Vinyasa Yoga		•	•	•	2	minor elective; Thursdays, 3:30–4:30 p.m.
<b>FALL</b>						
Archery		•	•	•	2	minor elective
Badminton/Net Games		•	•	•	2	minor elective
Golf		•	•	•	2+	minor elective

\*Requires departmental approval / +May use hook period / See course description for full information

COURSE TITLE	GRADE				TIMES PER CYCLE	INFORMATION
	9	10	11	12		
Movement for Theatre		•	•	•	2	minor elective (one semester); can be taken for Theatre or PE credit
<b>WINTER</b>						
Table Tennis/Urban Adventures		•	•	•	2+	minor elective
Volleyball/Table Tennis		•	•	•	2	minor elective
Winter in the Wissahickon/Urban Adventures		•	•	•	2+	minor elective
<b>SPRING</b>						
Advanced Archery		•	•	•	2	minor elective; prerequisite: Archery or permission of instructor
Modern Dance		•	•	•	2	minor elective (one semester); can be taken for Theatre or PE credit
Ultimate Frisbee/Disc Golf		•	•	•	2+	minor elective
Wissahickon Hiking		•	•	•	2+	minor elective
<b>SCIENCE</b>						
Physics (physical)	•	•			5+	major elective
Chemistry (physical)		•	•		5+	major elective
Biology (biological)			•	•	5+	required major; prerequisite: Chemistry or departmental approval
Principles of Engineering (physical) Advanced			•	•	5+	major elective; prerequisite Chemistry, Physics and departmental approval
Advanced Chemistry (physical)*			•	•	5+	major elective; prerequisite: Chemistry
Advanced Biology (biological)*				•	5+	major elective; prerequisite: satisfactory completion of Chemistry and Biology
Advanced Physics (physical)*				•	5+	major elective; prerequisite: completion or concurrent enrollment in Calculus or Integral Calculus
Environmental Science			•	•	5+	major elective; prerequisite: Chemistry
Human Anatomy and Physiology		•	•	•	3+	minor elective
<b>THEATRE</b>						
<b>ACTING &amp; PERFORMANCE-BASED COURSES</b>						
9th Grade Theatre	•				2	required minor (one semester)
9th Grade Musical	•				2+	minor elective (one semester)
Acting Methods	•	•			3	minor elective
Acting & Directing Techniques			•	•	3	minor elective
<b>DANCE &amp; MOVEMENT COURSES</b>						
Movement for Theatre		•	•	•	2	minor elective (one semester) can be taken for Theatre or PE credit
Modern Dance		•	•	•	2	minor elective (one semester) can be taken for Theatre or PE credit

\*Requires departmental approval / +May use hook period / See course description for full information

COURSE TITLE	GRADE				TIMES PER CYCLE	INFORMATION
	9	10	11	12		
<b>TECHNICAL THEATRE COURSES</b>						
Technical Theatre I	•	•	•	•	2	minor elective
Scenic & Costume Design			•	•	2	minor elective
Technical Theatre II			•	•	2	minor elective; prerequisite: Technical Theater I
<b>ACADEMIC COURSES</b>						
Musical Theatre			•	•	3	minor elective
Reader's Theatre			•	•	2	minor elective
Playwriting Workshop			•	•	3	minor elective
Sketch Comedy and Improvisation <b>NEW</b>			•	•	3	minor elective
Shakespeare Studio			•	•	3	minor elective
Theatre Major*			•	•	5	major elective
<b>FILMMAKING COURSES</b>						
Introduction to Filmmaking			•	•	3	minor elective
Film Editing & Post-Production			•	•	3	minor elective (one semester) prerequisite: Intro to Filmmaking
Light, Sound, and Production Design			•	•	3	minor elective (one semester) prerequisite: Intro to Filmmaking
Filmmaking: The Picture is the Thing: Advanced			•	•	3	minor elective; prerequisite: Intro to Filmmaking <i>and</i> Film Editing & Post-Production <i>or</i> Light, Sound & Production
<b>DIRECTED INDEPENDENT STUDY</b>						
Please see Directed Independent Study description for details.						
DIS Major*			•	•	appx 5	major elective
DIS Minor*	•	•	•	•	2-3	minor elective
DIS Minor in World Language (American Sign Language, Arabic, German, Italian, Japanese, Russian)*	•	•	•	•	2	minor elective
<b>GLOBAL ONLINE ACADEMY (GOA)</b>						
Please see GOA section for course descriptions and registration details.						
GOA Courses*			•	•		major elective

\*Requires departmental approval / +May use hook period / See course description for full information

# ART

The Upper School Art Program provides depth and breadth—students are introduced to appropriate skills and concepts that gradually build in complexity. Through the exploration of various materials and media, students investigate formal and conceptual issues with increasing independence. We are concerned not only with the making of art but also with the development of critical thinking, visual literacy and art history awareness. Using a problem-solving format, criteria are first presented and examined, and then students develop individual solutions to answer assigned problems creatively. Each assignment culminates in a group critique in which students use appropriate visual arts language to inform their critical thinking. Students learn to recognize quality and to appreciate the uniqueness and diversity of effective responses.

- The course Foundation is a required minor and a prerequisite for all other art electives.
- Students must select a first and second choice for art electives with the exception of Foundation.
- Each course may be taken only once.
- Art courses may be chosen individually as minors, or together in certain configurations to form an Art Major.

## ➤ ART MAJOR

An Art Major is comprised of two art minors taken simultaneously. These two courses make up an Art Major. At course sign-up, students in grades 10-12 wishing to create an Art Major should select their two minors and also select ART790 Art Major.

## ➤ ART GRADUATION REQUIREMENT

As of the class of 2024, and for all subsequent classes, students must complete one full year of Art. For the Classes of 23 and 22, students must take the equivalent of two semesters of theatre or art.

### **ART310** Foundation

required minor | grades: 9, 10, 11, 12

This course is designed to introduce and investigate visual concepts. These concepts of 2D and 3D composition include line, plane, negative/positive space, perspective, color, value and figure/ground. Each unit of study is tailored to build technical skill and theoretical understanding, as well as to develop critical thinking and problem-solving skills regardless of prior experience. Through critiques, students learn to use a visual vocabulary to analyze formal issues. Successful completion of this course is a prerequisite for all subsequent Art courses.

### **ART830** Color & Design

minor elective | grades: 10, 11, 12 | prerequisite: Foundation

In this course, students concentrate on how color and design can be used to describe and communicate ideas through visual means. We investigate color as it can be used emotionally and psychologically for practical and poetic ends. Students will study layout and design, using elements of realistic and abstract form. Assignments emphasize creative problem solving and varying conceptual exercises, the solutions to which may be used for school publications. Multiple techniques and media will be used including collage, drawing, painting and digital media. Skill development will underlay all of our studies. Enrollment limited to 12 students per section.

## **ART840** Drawing & Painting

minor elective | grades: 10, 11, 12 | prerequisite: Foundation

The year will begin with drawing. We will define drawing in many ways, from the observed and structural to the expressive and conceptual. A variety of media will be introduced throughout the course. Painting will follow as a natural outgrowth, with a focus on color, value and materials. There will be continual emphasis on the traditional subjects of figure, landscape, and still life, as well as on the first steps the young artist takes in finding their own subjects and style. Enrollment limited to 12 students per section.

## **ART880** Creative Furniture Making

minor elective | grades: 10, 11, 12 | prerequisite: Foundation

This class will focus on creative furniture making. Students will learn traditional woodworking techniques while practicing discipline, patience, and problem-solving skills. With a strong emphasis on safety, students will develop a practical understanding of hand tools and learn to operate a table saw, band saw, miter saw, routing table, and power tools. Students will first learn about joinery focusing on the mortise and tenon followed by designing and creating a scale drawing. Students will undertake a major furniture project determined by their interests and skills. Enrollment is limited to 10 students.

## **ART810** Sculpture

minor elective | grades: 10, 11, 12 | prerequisite: Foundation

This studio course is an introduction to building three-dimensional forms. Emphasis is placed on creatively solving problems and communicating ideas through the use of a variety of materials including chipboard, plaster, wood, metal, and found objects. We will learn methods of casting, sculpting, shaping, joining materials to make sculptural forms. Students will also learn how to safely handle power tools. As we move through the projects, we will analyze contemporary and historical examples of art or design that incorporate similar methods. Each project will allow the students to develop their own way of handling the material and the development of their own expressive voice. Because enrollment is limited to twelve students per section, students electing this course should specify a 2nd /3rd art course choice when they sign up. Enrollment limited to 12 students per section.

## **ART860** Digital Art

minor elective | grades: 10, 11, 12 | prerequisite: Foundation

This digital lab course introduces the computer as an artistic tool for drawing, painting and collage. We will take advantage of aspects that are unique to digital drawing, such as layering, scaling, the incorporation of photography, and working with states of revision. This course is about expanding the narrative possibilities of image-making through contemporary processes of edition and image construction using Photoshop and Illustrator. Students will be exposed to advanced methods of editing still and moving images, video

and animation. Because space is limited, students electing this course should specify a 2nd/3rd art course choice when they sign up. Enrollment limited to 12 students per section.

## **ART870** Mixed Media Animation

minor elective | grades: 10, 11, 12 | prerequisite: Foundation

This course introduces students to a variety of traditional and contemporary techniques in animation. Looking at examples of animations in art and film, as well as nonfiction topics such as science and history, students learn hand-drawn, stop-motion and digital methods for making their own animations. Story building will be key in developing ideas for production. Students also learn to edit the animations and incorporate sound effects and music. Throughout the course, students produce a series of short animated sequences using a variety of techniques, themes, and media as they explore how these choices impact their stories. These works build to one or more major projects. A historical overview and international perspective are provided through film screenings and group discussion, and students review and discuss current trends in animation. Enrollment limited to 12 students.

## **ART850** Photography I

minor elective | grades: 11, 12 | prerequisite: Foundation

This is an introductory course that explores the technical and aesthetic possibilities of the photograph. Students will first master the skills of black-and-white darkroom photography; an introduction to digital images and alternative photographic processes will follow. Throughout the course, attention will be paid to the content and composition of photographs, as students solve problems in portraiture, documentary, studio photography and social commentary. A limited number of school cameras are available for students on an as-needed basis. Because space is limited, students electing this course should specify a 2nd/3rd art course choice when they sign up. Enrollment limited to 12 students per section.

## **ART920** Photo II: The Journey Continues

minor elective | Grade 12 | prerequisite: Photography I

The Journey Continues provides students the opportunity to grow as artists. Building on their foundational knowledge in the darkroom and the digital lab, students will explore new creative approaches to the medium and learn advanced technical skills as they experiment with light and ways of seeing. As students build their photographic portfolios, they will look critically not only at their own work but also at the work of renowned photographers. The Journey Continues classroom provides students with their own computers and workspace, offering them the time, space, and occasion to organize their portfolios for the college admissions process. At the end of the year, each student will create a final presentation in a form of their own choosing. Enrollment limited to 12 students per section.

## **ART731** Art History: The Individual and Society

minor elective | grades: 10, 11, 12 | prerequisite: Foundation

In Art History we will use the structure of themed inquiry to look at western and non-western art across history. Artworks will be studied through the lens of “The Individual and Society,” allowing students to explore the role of art in the making, changing and maintaining the elements of society and how this impacts the human experience across various cultures and periods of history. The themes that will be examined under this lens will be: Patronage and Commerce in Art, Sacred Spaces, Art as Resistance, Gener in Art and the Role of the Audience in Art.

The major goal of this course is to give students a grounding in looking at art and making sense of what they see. As they learn the skills of observation, analysis, and interpretation, students examine the stylistic, iconographic and technical development of architecture, painting, sculpture, and craft art.

Themes will be on a two-year rotation, allowing students to take the course twice. Art History: Nature, Spirit and Religion will be offered in 2022-23.

## **ART610** Senior Studio: Advanced

major elective | grade: 12 | prerequisite: Foundation plus one of the following: Drawing & Painting; Color & Design; Digital Collage; Photography or 3-Dimensional Art. Drawing & Painting, and Art History are strongly recommended as preparation; departmental approval required

This advanced studio course stresses the development of technical and aesthetic skills, and the development of original, personal vision. Both classical and contemporary approaches to visual arts will receive attention with particular emphasis on personal expression through the synthesis of formal considerations. Other areas of study include color theory, abstraction, observational, conceptual, and narrative work. Guidance and support is provided for the preparation of a strong portfolio for college admissions. Regular homework and some reading and critical writing are required. Enrollment limited to 12 students per section, and will be determined by a portfolio evaluation plus one directed assignment.

# ATHLETICS

The athletics program at GFS stresses participation and encourages all student athletes to develop their capabilities to the fullest extent possible. We value excellence in each sport and aim to field successful teams that are competitive within the Friends Schools League as well as with other comparable schools. We want our student athletes to be committed to themselves, their team, the GFS school community, and the Friends Schools League. In order to do this, it is imperative for students to learn what it means to cooperate with others, set individual and team goals, manage their time with other areas of their lives, deal positively with setbacks, and to learn the physical and technical skills demanded by their sport. It is our hope that as students progress through our athletic program, they can develop holistically, not only as athletes but build upon their role within the GFS community and beyond.

## ➤ GRADUATION REQUIREMENT NOTE

Students must participate in two seasons of Athletics in 9th grade and one season of Athletics in 10th grade.

SEASON	GIRLS		BOYS	
<b>FALL</b>	ATH802	Cross Country	ATH808	Cross Country
	ATH803	Field Hockey	ATH809	Soccer
	ATH804	Soccer	ATH806	Crew*
	ATH805	Tennis		
	ATH806	Crew*		
<b>WINTER</b>	ATH812	Basketball	ATH816	Basketball
	ATH813	Squash	ATH817	Squash
	ATH814	Indoor Track & Field	ATH818	Indoor Track & Field
	ATH811	Wrestling	ATH819	Wrestling
<b>SPRING</b>	ATH822	Lacrosse	ATH826	Baseball
	ATH823	Softball	ATH827	Tennis
	ATH824	Track & Field	ATH828	Track & Field
	ATH807	Crew*	ATH807	Crew*

Several programs offer sport-specific, off-season training. Please contact the Head Coach or Athletics Director with questions.

\*Note on Crew: Rowing is a co-ed sport with additional fees associated with participation. GFS is committed to making all athletic offerings available to the student body. Information about financial aid is available through the Business Office.

## **ATHLETES AND GENDER**

GFS is committed to supporting gender, nonconforming, and transgender athletes. For more on inclusion at GFS, visit the Diversity, Equity & Inclusion page within the About Us section of the GFS website. Please contact our Athletics Director with questions or concerns.

## **ALTERNATIVES TO ATHLETIC REQUIREMENTS**

We value the sense of community, camaraderie, physical well-being and skill development that come through participating in athletics at GFS. It is our expectation that all students will actively participate in our program and fulfill the athletic requirements.

Students who have undertaken a clear course of study and demonstrated a solid commitment to an out-of-school sport may request an alternative for one athletic season at GFS. Since this out-of-school sport would replace an existing part of the school curriculum, both

family and school must give careful thought to such a decision. This does not apply to an activity that is new to a student.

Parents make requests by submitting the Alternatives Request Form during the course sign-up period. This form can be found on the Physical Education page within the Upper School Curriculum section of the website. In addition, students must confirm this request during online course sign-up. Students will be asked for timely updates about their alternative athletic commitment and the school will be in touch with the designated coach outside of school.

Decisions will be made by the Requirements Committee (Upper School Division Director, Director of Athletics, PE Department Head, and, as appropriate, the Grade Dean). Every attempt will be made to communicate about these decisions in a timely manner.

# CLASSICAL LANGUAGE

The Classics department offers Latin and Greek in grades 7-12. Our Classics teachers focus on training students to develop proficiency in the languages and become close, analytical readers of the literature. Our program covers quite a breadth of material. Students read, analyze, interpret, and connect to a wide range of poetry and prose texts, and learn about ancient philosophy, rhetoric, culture, and history. Events like Classics Day involve our students in lively, collaborative learning, and our Classics Trip to Italy every three years allows our students a chance to see their texts in context. Many students go on to study Classics in college and beyond.

## » GRADUATION REQUIREMENT NOTE

Students must complete a Level III modern or classical language to graduate. Anyone considering dropping a language must get approval from the Head of Classics.

### **CLA710** Ancient Greek I

major elective | grades: 9, 10, 11, 12

This course provides an introduction to ancient Greek, beginning with learning the alphabet, a parent of our own alphabet. From this, students study vocabulary, syntax, and grammar with a goal of completing about half of the foundational grammar. Students also read short selections from ancient authors and explore the cultural context of the language in myth, history, and art. Along with the other Greek classes, students put on a performance for Classics Day.

### **CLA720** Ancient Greek II

major elective | grades: 9, 10, 11, 12 | prerequisite: Ancient Greek I

In this course, students complete their study of basic ancient Greek grammar. By the end of the year, students transition to translating original ancient Greek in preparation for reading Greek literature in the following year, whether heroic epic, myth, history, or drama. Students also continue to study the cultural context of the language. Along with the other Greek classes, students put on a performance for Classics Day.

### **CLA730** Ancient Greek III

major elective | grades: 10, 11, 12 | prerequisite: Ancient Greek II

Starting in the third year, students begin to translate and explore actual ancient literature. Topics and genres will vary year to year, and may include Greek history (e.g., Herodotus or Xenophon), legal oratory (Lysias), tragedy (Euripides), or epic (Homer). We will explore the social and historical context of the works as well as their literary aspects and later influences. Students will undertake related projects individually or in small groups.

### **CLA740** Ancient Greek IV: Advanced

major elective | grades: 11, 12 | prerequisite: Ancient Greek III

Topics and genres will vary year by year, and may include Greek history (e.g., Herodotus or Xenophon), legal oratory (Lysias), tragedy (Euripides), or epic (Homer). We will explore the social and historical context of the works as well as their literary aspects and later influences. Students will undertake related projects individually or in small groups.

### **CLA750** Ancient Greek V: Advanced

major elective | grade: 12 | prerequisite: Ancient Greek IV

Topics and genres will vary year by year, and may include Greek history (e.g., Herodotus or Xenophon), legal oratory (Lysias), tragedy (Euripides), or epic (Homer). We will explore the social and historical context of the works as well as their literary aspects and later influences. Students will undertake related projects individually or in small groups.

### **CLA310** Latin I

major elective | grades: 9, 10, 11

Latin I is an introduction to the basic forms, vocabulary, and grammar of Latin. Latin I is taught through English, with a strong emphasis on mastering grammar and forms in sentences. Students begin exploring the vocabulary and examining cognates that bring life to words in English, French, Spanish, and other languages. Alongside this, students study various aspects of the history, culture, and everyday life in Ancient Rome and Greece.

## **CLA320** Latin II

major elective | grades: 9, 10, 11, 12 | prerequisite: Latin I

This second-year course completes the study of Latin grammar, continues the building of essential vocabulary, and provides increasing emphasis on reading longer Latin passages about history, mythology, and life in the ancient world. Students develop the skills necessary to read Latin as the Romans wrote it, and to consider the historical and cultural implications of their language and literature.

## **CLA410** Latin III (History)

major elective | grades: 10, 11, 12 | prerequisite: Latin II

Students who love history will have the opportunity to immerse themselves in an interdisciplinary study of Latin and history. The centerpiece of the course concerns the immediate events that brought the Roman Republic to an end. By reading excerpts from Caesar's narrative accounts, Cicero's letters and speeches, as well as other authors, students will become intimately familiar with the primary documents that have survived from this time — documents which every historian of this period must rely upon and know. Alongside learning new grammatical constructions, rhetorical devices, and storytelling techniques, students will explore the political, historical, and social context of the period and consider how our readings live today through the lenses of democratic philosophy and current events.

## **CLA420** Latin III (Poetry)

major elective | grades: 10, 11, 12 | prerequisite: Latin II

Students who love myths and legends will have the opportunity to examine human nature through the windows and mirrors offered by mythological mortals and gods. Latin III Poetry focuses on Ovid's works: *The Metamorphoses*, *The Amores*, and *The Heroides*. Ovid appeared at an important juncture in Roman literary history, flourishing after Horace, Vergil and Catullus had died, and just as the Roman empire was taking form. Ovid's magnum opus, *The Metamorphoses*,

will lead students through Greek myths and ancient legends in the epic meter of dactylic hexameter. In Ovid's *Amores*, his shorter poems written in elegiac couplets, his persona is struggling with various aspects of love, including rivals and rejection. *The Heroides* is a series of imagined letters by women characters from mythology to the men who rejected them. At each stage, students will examine the nature of language, the deeper meaning of words, and the nuance of the poetic. Alongside learning new grammatical constructions, literary devices, and storytelling techniques, students will explore the history and social context of the period and consider how our readings live today in the world of art, music, poetry, and current events.

## **CLA510** Latin IV: Advanced

major elective | grades: 10, 11, 12 | prerequisite: Latin III – History or Literature

In this course, we will focus on Vergil's *Aeneid* as a literary, historical, and philosophical text, and will discuss such topics as the nature of epic and the use of symbolism in poetry. While continuing to refine their skills in translation, use of meter and knowledge of literary devices, students will also consider the *Aeneid's* place in the broader, inter-cultural literary tradition, both as inheritor of the earlier epics and as influencer on later works. Students will also produce a film for Classics Day.

## **CLA610** Latin V: Advanced

major elective | grade: 11, 12 | prerequisite: Latin IV

Students will read, discuss, and write on a variety of Roman authors and topics, chosen in consultation between the students and the teacher. Readings chosen will allow for continuing exploration of issues vital to both the Roman and contemporary worlds and will be explored with a lens that focuses upon social contexts, historical and cultural background, and literary interpretation. On Classics Day, Latin V students stage a Roman triumph, having first read about triumphs in ancient prose and poetry. Other projects will be developed in consultations between teacher and students.

# COMPUTER SCIENCE + DIGITAL MEDIA

The Computer Science and Digital Media Department provides coursework rich in opportunities for building fundamental skills and exploring programming, robotics, electronics, and digital design. Our programming language of choice is the widely-used Python, a favorite for introductory courses in high schools and colleges due to its gentle learning curve. Additional levels of programming offer our student programmers a substantial forum for learning the skills and techniques necessary for sophisticated large-scale projects. Digital Media coursework at GFS, combining technology and design, provides students with the opportunity to develop design skills and explore the creative potential of technology, using the suite of offerings associated with the Adobe Creative Cloud.

The department revises its courses every year to account for student interest and the dynamics of this rapidly changing field. All Computer Science + Digital Media classes are pass/fail.

**NEW** CS100

## Computer Science for Beginners

minor elective | grades: 9, 10, 11, 12 | one semester

This course is geared towards students who feel that computer science is outside of their comfort zone but are courageous enough to try it out. This is a survey course meant to introduce concepts across a variety of realms of Computer Science to inform students of the breadth of options available in this discipline. Topics to be covered include the Google suite (Classroom, Drive, Sheets, & Slides), Excel, Data Visualization & Infographics, Managing Files, Programming in Python, Web Design, Robotics.

## CS111 Robotics

minor elective | grades: 9, 10, 11, 12 | one semester

This fun one-semester, no-homework minor elective uses robots to introduce students to the intersection of computer programming and mechanical/electronic devices. Students will assemble robots and then learn to program them to perform tasks, ranging from simple (moving forward, turning on a light, etc.) to complex (finding and retrieving an object, playing soccer, etc.). Most units culminate in an exciting challenge: teams of students try to get their robot to accomplish a task (e.g., robot bowling, relay races, tug of war) more effectively than the other teams. No previous experience in robotics or programming is necessary. Students signing up for Robotics may request their preferred semester, first or second. Enrollment limited to 12 students per section.

## CS130 Computer Science I: Introductory Programming with Python

minor elective | grades: 9, 10, 11, 12

This full-year minor elective seeks to introduce students to computer programming. We will focus on learning Python, a programming language used at many colleges and high schools as their introductory language. The learning curve for Python is gentle, so students learn the basics quickly and produce simple programs easily. Students will progress to more advanced projects, such as interactive games, card games and casino simulations.

No previous experience is necessary.

## CS131 Introductory Programming: Girls Who Code

minor elective | grades: 9, 10, 11, 12

This Girls Who Code section of Introductory Programming (see course description above) will also include meetings with women in the field to discuss their work in technology.

No previous experience is necessary.

*A Note on Introductory Programming: Girls Who Code – To encourage girls to study technology, we offer this “girls only” section of Introductory Programming. This section reflects our desire to address the gender gap in technology and engineering. Girls are welcome to take either Introductory Programming offering.*

## **CS140** Computer Science II: Data Science & Object-Oriented Programming

minor elective | grades: 10, 11, 12 | prerequisite: CS I or with  
Department Head approval

This full-year elective course builds on the skills developed in CS I. The course continues to use Python to examine more advanced topics in programming and introduces students to R, a data science program used for statistical analysis. The class will explore data collection, visualization, and analysis using R and topics such as graphics, user-interface, abstraction, recursion, hash tables, and object-oriented programming using Python. This class also serves as a brief introduction to the concept of machine learning and algorithms. Students will spend a mixture of their time learning concepts and working on their own programs, either in collaboration or independently.

## **CS150** Computer Science III: Algorithms & Computer Organization

minor elective | grades: 11, 12 | prerequisite: CS II or with  
Department Head approval

This course is split into two units. The first unit consists of exploring algorithms and data structures with Java, an object-oriented programming language. This will introduce students to the language that is featured on the AP exam (GFS does not require or discourage students from taking AP exams). The second unit introduces students to computer organization, or how a computer works. They will learn about digital logic and explore how transistors interact by modeling them with Arduino boards. Students will be briefly introduced to low-level languages such as C and Assembly.

## **CS190** Electronics Design Workshop

minor elective | grades: 10, 11, 12 | prerequisite: CS I or Robotics,  
or with Department Head approval

In this exploratory course in creative technology and tinkering, students will explore different modes of design involving electronics and software. Students will work on a series of labs structured around paper circuitry, interaction design, interface design, and computational design. Students will use tools like Arduino, Makey Makey, and Bare Conductive paint to explore ways in which the digital world interfaces with analog materials. The course will culminate with an independent project that each student will design, prototype, and fabricate.

## **CS155** Computer Science Programming Capstone

minor elective | grades 11, 12 | prerequisite: CS III or with  
Department Head approval

The Capstone course in the Computer Science/Digital Media department is the culmination of the academic courses we offer in programming. It builds on the concepts and skills covered in the CS II and III programming classes. This course will focus on larger projects and, in many cases, students will work in teams. Students will identify a complex problem or project that requires them to apply, and extend, their programming skills and knowledge and to produce an appropriate programmatic outcome. Based on student interest, so students in the course will drive the content of the class.

## **CS171** Digital Design I

minor elective | grades: 9, 10, 11, 12

This introductory survey course is open to students eager to explore and develop their creative and technical design skills. While following industry-level digital design methodologies and practices, students gain experience with Adobe Creative Cloud tools including Illustrator, Photoshop, InDesign, and After Effects. Students apply their knowledge and skills to create a variety of hands-on projects in digital illustration, digital compositing and online graphics, print media design, and motion graphics design. Supporting topics include creative direction, typography, design principles and techniques, and human-centered design. Throughout the course, class readings and discussions introduce an historical overview as well as emerging trends, and students share their original work and critically reflect on their classmates' work as well as real-world examples. Students will be able to use and apply their skills in course work and projects throughout the curriculum and in clubs and student publications such as Earthquake, Polyphony, and Anno.

## **CS160** Web Design & Development I

minor elective | grades: 9, 10, 11, 12

This course covers the basics of designing websites, as well as web development using the HTML and CSS authoring languages. Students learn about the creative design of websites, including the strengths, constraints, and limitations of this medium of communication. Students code their own web pages from scratch, using the latest web standards and tools, such as HTML5, CSS3, coding software, wireframing, and browser tools and plug-ins for web developers. Students complete several assignments and projects to master the course objectives, including a final project to create an original design for a microsite on a topic of the student's choice. To support their work, students complete readings from the course texts and selected articles; they share their original work and critically reflect on real-world examples.

**CS170**

## Web Design & Development II

minor elective | grades: 10, 11, 12 | prerequisite: Web Design & Development I or permission of instructor

This course builds upon the principles and skills acquired during the Web Design & Development course. Students learn more advanced CSS3 coding techniques to create web pages employing the latest trends and standards in web design, including CSS animations and JQuery plugins for increased interactivity. Students learn how to better control the layout and responsiveness of their web pages using advanced CSS layout and grids, responsive web design, and popular frameworks such as Bootstrap. Projects are completed using code editing software and developer tools, and the workshop format allows ample time for students to immerse themselves into topics and practice techniques. The course culminates in a final project of the student's choosing, to design and implement a functional site for a real client using Wordpress or another content management software. Throughout the course, students share their original work and critically reflect on their classmates' work as well as real-world examples. Readings, guest speakers, and hands-on projects expose students to opportunities available in creative technology fields.

## **CS180** Mobile Application Development I

minor | grades: 9, 10, 11, 12

Mobile Application Development (M.A.D.) I is an entry-level course in the Computer Science and Digital Media Department. This elective course presents students with key concepts and terminology involved in mobile technologies. Students of all coding experience levels are welcome, as this class is responsively designed around student interest and familiarity with technology. Topics covered in this course include user experience design, interface design, business analysis, technical documentation, and project management. This project-based course will operate like a start-up and allow students to work in teams to create a mobile application that solves a problem for a specific group.

## **CS200** Machine Studio

minor elective | grades: 9, 10, 11, 12

This course will introduce students to the processes of developing, prototyping and testing simple machines that include motors, gears, levers, and pendulums. Students will learn 3D modeling, 3D printing, and laser cutting, as well as traditional fabrication techniques. The class will follow a lecture and workshop format as students prototype inventions, create works of art, and critically revise design objects to update their function. This course is a collaboration between the Computer Science and Art departments. Enrollment limited to 12 students.

## **CS210** Digital Humanities: Advanced

major elective | grades 11, 12

This class connects the dots between all the various courses you have taken in high school thus far. Together, we will explore how the languages of technology are translating and encoding society. Art meets Science meets English meets Math, all through the lens of our increasingly digital world and the data it generates. Everything from the ads we see on social media to the legal decisions rendered by our judges is affected by algorithms and clouds of information. This course will give you the skills to filter and make meaning of the rising tide of data. Together, we will learn how to understand and parse text, visuals, maps, and networks to uncover the stories hidden in the metadata around us. The objective of this course is to introduce students to the scope and impact of data science on all fields of study. Students in Digital Humanities will level up their understanding of technology, critical thinking, and communication skills. Through independent and group projects, students will craft research questions and draw conclusions validated with data and research. This content-rich, interdisciplinary class will have regular readings, graded discussions, presentations, research reports, and group/individual projects.

Digital Humanities is open to Juniors and Seniors interested in weaving together a broader understanding of their educational journey across the humanities and sciences. This course will stretch your analytical, research, and reporting skills.

# ENGLISH

Students engage in lively dialogue with texts in English classes at Germantown Friends School. Close critical reading of novels, poems, plays, and essays invites students to develop an appreciation for literature, and the classroom provides a forum for exploration and expression of ideas. Through thoughtful analysis, creative response, and reflective writing, students grapple with the perspectives and ideas of a diverse and ever-expanding repertoire of authors. Students contemplate a range of issues introduced within texts and consider the larger social implications of their reading. We also ask them to consider historical context. Writing is at the center of everything we do, from personal and analytical essays, short stories and poems to chapbooks, graphic novels, manifestos, scenes, podcasts, and newspapers. Along the way, students gain increased syntactic flexibility and precision through the study of grammar, vocabulary, and rhetoric. A hallmark of the department is the Essentially English program in the spring of tenth, eleventh and twelfth grades, which allows students to elect innovative day or nighttime classes. Our program cultivates writers and readers who are joyous, reflective, honest, and artful.

## ➤ GRADUATION REQUIREMENT NOTE

Students must complete four years of major coursework plus one semester of Style Fundamentals to graduate.

## ➤ NOTE ON PROGRAM FOR GRADES 10-12

- **Quarters One, Two, and Three:** English is devoted to the required courses at each grade level.
- **Quarter Four:** The English Department shifts to elective courses in its Essentially English program for students in grades 10-12.

Essentially English courses can be elected by adults in the community, including parents. Some courses are held in the evening (from 7-9:15 p.m.).

## ENG310 Representations of Identity

required major | grade: 9

Ninth grade students study works of literature that explore issues of identity. Included in the curriculum are a short story unit, *Claire of the Sea Light*, *The Autobiography of Malcolm X*, *The Laramie Project*, *Persepolis*, a Shakespeare play, and *Dr. Jekyll and Mr. Hyde*. Vocabulary study is based on words drawn from the texts. Teachers emphasize expository and creative writing with three substantial written projects each semester. Through active reading, students learn to support their arguments with carefully chosen textual examples and consolidate their knowledge of MLA format, style, and correct punctuation by drafting and revising their essays. In keeping with the theme of identity development, students plan a one-day experience project in which they explore a hobby or potential career and write an essay about that

experience. Concurrent with our critical and structural study of short stories and poetic forms, students write their own short stories and various poems, compiling a writing portfolio by the year's end.

## ENG650 Style Fundamentals

required minor | grade: 9 | one semester

In addition to their regular English classes, students in ninth grade will study key elements of style and grammar during one half of the year. Topics include, but are by no means limited to, clear reference, phrases and clauses, subordination, syntax, and clarity. Coursework will be supplemented by written assignments and practice using IXL, an online learning tool. The semester concludes with a major summative assessment.

## ENG410 The Poetry of Language

required major | grade: 10

Students in sophomore English examine the ways that writers create meaning through imagery and language, as well as the ways that writers are created by their own worlds. Students read Sophocles' *Oedipus Rex*, Mary Shelley's *Frankenstein*, William Shakespeare's *Macbeth*, Zora Neale Hurston's *Their Eyes Were Watching God*, and Madeline Miller's *Circe*, along with poetry by diverse authors. Dramatic and oral presentations are particularly important; students memorize and perform choral odes, soliloquies, blues songs, and dramatic scenes. Formal and informal writing assignments provide frequent opportunities for students to work on usage and coherence in their own creations. An emphasis on drafting, peer-editing, and thoughtful revision develops student voice and precision of expression. Vocabulary lists are drawn from the reading.

## ENG510 Literature and Composition Part I: Advanced

required major | grade: 11

Junior English classes focus on authors whose innovative writing challenged the status quo and continues to resonate today. Through close reading, study of form and content, and investigation into historical context, we cultivate student engagement. Class discussions invite students to delve into challenging texts and present their ideas and interpretations to their peers. Books studied include F. Scott Fitzgerald's *The Great Gatsby*, Nella Larsen's *Passing*, Jean Toomer's *Cane*, and Yuri Herrera's *Signs Preceding the End of the World*. Shorter texts include Wilde's play *The Importance of Being Earnest*, Romantic poetry (focusing on William Blake's *Songs of Innocence and Experience*), Franz Kafka's *Metamorphosis*, and stories in Yiyun Li's collection, *Gold Boy, Emerald Girl*. As they read, students learn about parallels in the visual arts, specifically photojournalism, modernism, Romanticism, and expressionism.

Writing is central to the course: Students compose informal reading responses, formal analytical essays, poetry, narratives, and creative nonfiction. They undertake an intensive study of the essay, including examples by Langston Hughes, Gloria Anzaldúa, David Sedaris, Chang-Rae Lee, Rebecca Solnit, and Margaret Atwood. Through revision, writing conferences and workshops, we encourage students to sharpen their writing skills, experiment with style, and develop an academic voice of their own.

## ENG610 Literature and Composition Part II: Advanced

required major | grade: 12

Advanced Literary Analysis, Poetics, and Composition (Part II) is an intensive course in the analysis of literary texts and writing. The literature frames issues of aesthetics and politics in a global historical context, emphasizing major movements such as realism, modernism and postmodernism, as well as major historical events such as the transatlantic slave trade, and eras including colonial and postcolonial. The course covers a range of genres from modern and postmodern fiction and drama to poetry and the literary essay.

Students examine the ways in which identity is formed through language, the politics of self and other, and the tensions that exist when authors write both artfully and meaningfully. Literature may include James Joyce's *Dubliners*, Toni Morrison's *Song of Solomon*, a play by William Shakespeare; and essays by an array of writers like Claudia Rankine, Jamaica Kincaid, Ta-Nehisi Coates, Toni Morrison, James Baldwin, and David Foster Wallace. Students attend the performance of a locally produced play. Writing assignments designed to build skills and explore important concepts include in-class essays, an expository personal essay, a comparison paper, a paper using secondary sources, an essay based on a moral dilemma, a creative work of prose, a character analysis, and an original poem. Other requirements include vocabulary tests on words drawn from each book and substantial memorization.

## ENG700 Poetry Workshop

minor elective | grades: 10, 11, 12

In Poetry Workshop, we will work together to create a writing practice for ourselves and each other, placing composition and the development of literary voice at the center of our work as we explore the aesthetic, political, and transformational possibilities of language.

Students will produce new work for each class session: experimentation with poetic form will be integral to our studies. As we read contemporary poetry and the poetry of previous centuries aloud, we will together observe successful elements of composition. Students will master a vocabulary for discussing and analyzing poetry. As we learn about ourselves and each other as readers and writers of poetry, we will construct a portfolio of a year's worth of work, organize several readings/events, and seek out opportunities for growth and exposure to poetry in the Philadelphia area. We will also hold ourselves accountable to GFS as a poetic community, highlighting poetry and fostering poetic connections between disciplines and divisions.

**NEW** ENG431 **Introduction to Journalism**

minor elective | grades: 9, 10, 11

In this introductory class, students will learn the fundamentals of journalism, from how to write a compelling lede and catchy headline to how to conduct an interview, develop a story angle, and pitch an article. We will cover a variety of journalistic forms, including the basic news story, features, profiles, Q&As, and Op-Eds, and will introduce the *AP Stylebook*. Weekly assignments will include reading, research, reporting, writing projects, and peer editing. The goals for the course are for each student to publish at least one piece in the Upper School's news magazine, *Earthquake*, in print or online, and to emerge with a new set of writing and editing skills.

ENG440 **Magazine Journalism**

minor elective | grades: 10, 11, 12

This year-long course focuses on the ins and outs of magazine journalism. During the first semester, we will study magazine structure (front of book, feature well, back of book); magazine writing (features, profiles, departments, personal essays, reviews, packages, etc.) and writing techniques (e.g. what makes a good story, finding your “hook” and writing a compelling lede, how to conduct a successful interview); and magazine design (e.g., the process of creative direction, choosing a cover image, the use of typography). Reading will include the text *Magazine Writing* by Christopher D. Benson and Charles F. Whitaker, magazine articles and essays, and various blogs; we will listen to some magazine-style podcasts as well. In the second semester, the class will collectively create (write, edit, and design) a magazine on a topic of the group's choosing, which will be printed at the end of the year and distributed in the Upper School. We will learn to use the *AP Stylebook*.

# HEALTH EDUCATION

The health of our bodies, minds, and spirits informs all that lies before us in life. The goal of the Health Education Department is to lead students in understanding that our individual health does not stand alone, but is integrated into every aspect of our lives and is greatly impacted by our identity. Our aim is to educate students on the merits of clear communication and the clarification of their values. We also show them how to access credible health information. Health Education courses are developmentally appropriate and cover a range of health topics, including sexuality, mental health, mindfulness, safety, alcohol and drug use, nutrition, and healthy eating. Health education is interdisciplinary by its very nature—we continually collaborate with both the DEI, science, and physical education departments.

## » GRADUATION REQUIREMENT NOTE

One semester of the minor course Health Education 10 is required in grade 10. A full year of the minor course Life Issues is required in grade 12.

### **HEA401** Health Education 10

required minor | grade: 10 | one semester

Health Education is a semester-long course focused on decision-making and information gathering on the topics of mental and emotional health, drugs, and sexuality. We begin with a mindfulness-based stress reduction program, where together we explore and practice different forms of meditative practices to cultivate our ability to pay attention to the present moment with the hope of allowing us to make more thoughtful decisions. We also discuss stress and our stress reactions, how we experience and process the world through our body, thoughts, and emotions, and ways to cultivate gratitude in our everyday lives. Another main focus of the mental health unit is how to recognize when someone needs help and how to seek help for yourself or others. Sleep, addiction, depression, anxiety, and disordered eating are also addressed. We then examine substance abuse both at a societal level and also the individual consequences of choosing to use, including addiction. We explore drug-related issues through various lenses, including current research, statistics, media, societal norms, and direct and indirect pressure. Sexuality is presented in a holistic manner, and the topics include sexual identity, gender and society, reproductive health, and building and maintaining healthy relationships. All topics in the course are explored through information gathering, analyzing of media, personal reflection, and discussion.

### **HEA600** Life Issues

required minor | grade: 12 | yearlong course

The objective of the Life Issues course is to provide students with the information and tools they need to navigate their senior year and the transition into the next phase of their life, including college. The course is coordinated with Advisory meetings once a cycle all year. The course focuses on a list of topics that the students help generate, including personal finance, mental health and mood disorders, happiness, stress, basic car maintenance, resume writing and business communications, personal safety, healthy romantic relationships, maintaining a strong relationship with parents and family, buying and preparing food, physical intimacy, sexual consent, bystander intervention, contraception, sexually transmitted infections, sexual identity, social media, and alcohol and drug use. We recognize that many parents and caregivers are also reflecting on how to prepare students for their lives after GFS and are happy to offer resources to support these conversations.

**NEW HEA500** **Queer Culture:  
Past, Present, and Future**

minor elective | grades: 9, 10, 11, 12

In *Queer Culture: Past, Present, and Future*, students will examine the scope of queer culture from early societies to present day with an eye towards our ever-expanding future. Students will begin by delving into queer theory, its origins, where it stands at current, and where it is headed. We will then survey our LGBTQIA ancestors from around the world, settling into a more in-depth exploration of the Americas. The study of our ancestors will segue into a look at queer art & culture, queer surrealism, and finally queer futurity. Guest teachers will join us over the course of the year to share about areas of expertise as they relate to queer culture. Over the course of the year, students will keep a journal/research log and complete short response pieces to the texts we read. The class will culminate with a research project.

Possible texts:

- *A Queer History of the United States* by Michael Bronski
- *Cruising Utopia: The Then and There of Queer Futurity* by Jose Esteban Munoz
- *A Critical Introduction to Queer Theory* by Nikki Sullivan
- *Queer: A Graphic History* by Meg-John Barker & Julia Scheele
- *Gender Outlaws, The Next Generation* by Kate Bornstein and S. Bear Bergman

**NEW HEA520** **Public Health and  
Modern Society**

minor elective | grades: 9, 10, 11, 12

In *Public Health*, students will examine the scope of public health and how it works in our society, from conceptual theories to real-life applications. Students will begin by becoming acquainted with the history of modern-day public health and epidemiology. Once that foundation has been built, we will examine public health in today's world; paying specific mind to disparities and differences that exist in groups based on race, sexual orientation, gender identity, age, sex, ability, etc. A group of diverse guest lecturers, who are experts in their field will join us over the course of the year. These lectures will coincide with heritage, awareness, and appreciation months, but will also be flexible to include developing situations happening in the world. Over the course of the year, students will formulate a research question based on a sector of public health they are interested in. This will culminate with a research proposal presentation for faculty and staff, as well as public health professionals.

Possible texts:

- *Medical Apartheid: The Dark History of Medical Experimentations on Black Americans from Colonial Times to the Present* by Harriett A. Washington
- *Disability Visibility: First Person Stories from the 21st Century* by Alice Wong
- *The Health Gap* by Michael Marmot
- *Bodies and Barriers: Queer Activist on Health* by Adrian Shanker
- *Just Medicine: A Cure for Racial Inequality in American Health Care* by Dayna Bowen Matthew
- *Black & Blue: The Origins and Consequences of Medical Racism* by John Hoberman
- *Race, Ethnicity, and Health. A Public Health Reader* by Thomas A. Levist

# HISTORY

In our history classrooms, students and faculty explore and challenge ideas together, building on the foundational Quaker belief in continuing revelation. Examining differences and empathizing with multiple perspectives are central to this process. We endeavor to help students make meaning out of a variety of sources through thoughtful questioning, close reading, analysis, and research. Students and faculty practice communicating ideas with clear, direct expression supported by evidence. Creating historical consciousness—the consciousness that people in the past had different values, assumptions and worldviews from people in the present—is foundational to our work together. Our hope is to gain a deeper sense of our own identities, develop moral understanding, and foster engaged citizenship that will contribute positively to the world.

## » GRADUATION REQUIREMENT NOTE

Students must complete 3 years of major coursework in History. United States History: Advanced is a Pennsylvania state and GFS requirement.

### **HIS310** Comparative Cultures

required major | grade: 9

Students take an interdisciplinary approach to this study of culture and society, developing important skills in critical thought, research, writing, and collaboration. By examining how different peoples address a variety of social challenges, students gain a better understanding of their own cultures and societies. The course also fosters cultural competence with its careful look at the context and history of people around the world. Topics covered may include value systems, governance, social relationships, economic systems, cultural expression, and intercultural dynamics. The course's rigorous writing curriculum helps students grow as analytical thinkers, requiring them to organize large quantities of course material in crafting arguments that are clearly expressed and supported with trustworthy evidence. One quarter-long unit guides students through a step-by-step research process that starts with formulating a question on a topic of their choice and ends with writing a sound research paper.

### **NEW HIS500**

### African American History

required major | grade: 10

This course will take a comprehensive approach to studying the African American experience, including contemporary issues, in the United States through explorations of identity formation, African history, and the contributions of Black

people to the growth and development of the country. Central to the course will be seeking to understand the ways that race and racism, both institutional and individual, influence our larger history as well as our interpersonal relationships and experiences. Students will continue to hone skills including critical reading of primary and secondary sources, in-depth analysis of historical concepts, identifying and evaluating historical sources, and presenting ideas in writing and presentations. In this course students will deconstruct the traditional mainstream view of America's history, understand the complicated ways that we come to know and live race in the United States and, in the words of the National Museum of African American History and Culture, "dream a world anew."

### **HIS610** United States History: Advanced

required major | grade: 11, 12

United States History is a survey course that examines the development of the United States as a cultural, political and economic entity from its 17th-century European and African antecedents to the recent past. Heavy emphasis is placed on primary sources through numerous documents and images collated by the faculty. Students are also given recent books by historians, which change from year to year, together with selected scholarly articles. Students are required to express their understanding through a combination of intensive class work, papers, tests, debates, presentations, and simulations.

## HISTORY ELECTIVES

major elective | grade: 11, 12

Students electing to pursue these electives may select either a yearlong course or two semester-long courses. For the latter option, students must select both a fall and a spring course to create a yearlong history major that allows them to delve into two different areas of interest for one semester each.

### FALL SEMESTER ELECTIVES

#### **HIS474** History of Science: The Origins of Modern Science

In this course, students will study the historical development of science in the modern world, focusing on developments in astronomy, mathematics, physics, and chemistry from the 16th century to the present. We will take a comparative approach, investigating how societies around the world developed an understanding of nature and were able to apply this knowledge to control and configure their environment. Specific topics include: astronomy and astrology in ancient Egypt and China, Islamic science, alchemy and chemistry, Galileo's trial and the Catholic Church, and the Scientific Revolution, among others. Students will also explore the interaction between scientific research and the political process, societal norms, religious beliefs, business decisions, and their day-to-day lives.

#### **HIS431** United States Government & Civics: Advanced

This course will cover the structure and operation of the modern United States government. It will be rooted in the United States Constitution and the three branches of government described therein but will extend far beyond that. Topics may include an investigation of when the president is permitted to act without the direct consent of Congress, how courts should interpret the Constitution, the efficacy of the two-party system, how committees work within Congress, whether lobbying is problematic or beneficial for our system, campaign strategies, federal civil rights including those included in the Bill of Rights and the Fourteenth Amendment, the strengths and limitations of democracy, and how citizens can effect change.

#### **HIS451** War and Peace: The Modern Middle East: Advanced

This course will examine the conflicts and politics of the Middle East in the 20th- and 21st-centuries. Our studies will include the history and geography of the region, focusing on the breakup of the Ottoman Empire, the mandate system, and the lead-up to the UN partition of Israel and Palestine. Students will grapple with multiple perspectives in that complex conflict, as well as others, and examine peace negotiations. The ongoing conflict in Syria will also be studied, as well as other case studies based on student interest and current events. The course will prioritize analyzing the causes and effects of current challenges, understanding the perspectives of diverse stakeholders, and considering possible local and international solutions. US involvement in Middle East conflicts in recent decades, with an eye towards the US government's strategy, may also be discussed.

#### **HIS471** African American Studies

This course will take a holistic approach to analyze African American heritage and pressing issues that impact the African American community today. The course will commence with a thorough investigation of contemporary issues that face the African American community, ranging from identity to the disparate criminal justice system. Our study will shift with a review of African empires such as Ghana, Mali, and Songhai. This will enable us to gain a concrete understanding of African rituals, customs, arts, religion, and social organizations. Students will be able to trace the retention of African culture as millions of slaves were forced into bondage through the middle passage to be seasoned in Caribbean plantations. African culture and the slave experience will be examined as we explore the literary works of Olaudah Equiano, Phyllis Wheatley, George Moses Horton, Jean Toomer, James Baldwin, Amari Baraka, and Sonia Sanchez. The same threads will be analyzed in music from ragtime through hip-hop. We will examine 20th-century film and consider the stereotypes rooted in D.W. Griffith's Birth of Nation to gain a sense of the shifting societal and gender roles of African Americans over time.

## SPRING SEMESTER ELECTIVES

### **HIS473** History of Science: Biology from Darwin to DNA

This course will explore the historical development of the biological sciences over the past two centuries. Topics to be studied include: Darwin and evolutionary theories of the origin of species, including religious objections and social applications; materialist theories of heredity and development; eugenics and the application of scientific theories of genetics to human social issues; and the rise of molecular genetics, the biotechnology industry, cloning and gene editing. Students will learn about how current scientific issues affect the political process, societal norms, business decisions, and their day-to-day lives.

### **HIS462** Modern U.S. Political Ideologies and Issues: Advanced

Why are conservatives such jerks? Why are liberals so clueless? We live in a culture that encourages us to demonize those who hold different political views than we do. This class seeks to overcome that divide by discovering how kind, thoughtful people can come to drastically different conclusions about what is best for the country. After spending half of the semester seeking to uncover the core values of conservatives and liberals, the course turns to careful analyses of modern issues that divide the American electorate, such as immigration, health care, and inequality. The final project requires groups of students to research a modern issue of their choosing, find compelling arguments from the political left and right about how to solve that issue, and lead the class through a careful analysis of the arguments.

### **HIS482** Genocide and Human Rights

This course will work to understand the historical roots, immediate causes, implementation, and the aftermath of acts of state-sponsored violence and genocide. The term genocide emerged near the end of WW II and was further defined by the United Nations Genocide Convention as “acts committed with intent to destroy, in whole or in part, a national, ethnic, racial or religious group”. Case studies may include the Holocaust, Rwanda, Cambodia, Armenia, an examination of indigenous peoples in the Americas, and the Rohingya among others. Studying both primary sources and historians’ interpretations of the events, we will work to comprehend genocide as both a personal human experience and also as a brutal form of government policy.

Our study will require considering the plight of victims, their various forms of agency through acts of resistance, perpetrators, and the complicit nature of bystanders. Due to the inherent nature of genocides, content covered in this course will be difficult and oftentimes disturbing, but necessary to foster empathy and deeper understanding of the atrocities. As citizens of the world the greater understanding we have of past genocides, the better equipped we are to identify, prevent and respond to future genocides and mass atrocities.

### **HIS433** Europe: World War II and Beyond

In this course, we will explore the political and social developments in Europe before, during, and after the Second World War. We will study how the lingering effects of the First World War led to continued conflict and how ideological and geopolitical differences split Europe between the United State and the Soviet Union after the war ended. We will also look at the rise of liberal democracy in the West, the formation of the European Union, the fall of Communism, and the current rise of right-wing nationalism.

# JUNIOR/SENIOR SEMINARS

## **NEW SEM300** The Underground Railroad: Telling the Story

major elective | grades: 11, 12

The Underground Railroad—in fiction and in history, in the South and in the North, in Germantown history and in the American imagination—has been explored across three centuries of American writing. This seminar will study the Underground Railroad and Abolition Movement, beginning with two classic works of autobiography from the 19th century: Frederick Douglass’s *Narrative of The Life of Frederick Douglass* and Harriet Jacobs’s *Incidents in The Life of A Slave Girl*. Our emphasis will then shift to three novels by contemporary Black authors who confront these issues in their writing. Toni Morrison’s novel, *A Mercy*, James McBride’s *The Good Lord Bird*, and finally, Colson Whitehead’s much-discussed postmodern novel, *The Underground Railroad*, which won the National Book Award in 2016. Further, we will study how GFS and the Germantown Monthly Meeting were involved in the Abolition Movement and learn how Germantown was not only an important site for the Underground Railroad, but also notable in the lettered culture of abolitionism. Many vitally important Black intellectuals worked, wrote, and advocated in Philadelphia and in Germantown. The course will connect the local public sphere to the literature studied, with a larger mapping and charting of the Abolition Movement that will provide students an enhanced understanding of the intersection between literature and historical scholarship.

## **NEW SEM320** Comic Studies: The Sequence and Synergy of Text and Image

major elective | grades: 11, 12

This class provides an introduction to the political and aesthetic history of comics and to the academic discipline of Comics Studies. Students will explore a spectrum of comic-art forms (the newspaper strip, the comic book, the graphic novel) and a variety of modes and genres (fiction, memoir, journalism, and so on). Blending contemporary literary criticism with artistic practice, this seminar will mix theoretical and hands-on explorations of the sequential art form. We will examine visual storytelling and, by the course’s end, create an anthology of our work. We’ll look at the history of the medium and its permutations resulting from geography (manga) and technology (webcomics). Students will analyze comics through four different lenses: form, genre, activism, and impact. The work of Sousanis and McCloud will lay a foundation for our studies while the pedagogical practices of MacArthur

Genius Lynda Barry will guide our journey, connecting the mind and body. This content-rich, interdisciplinary seminar will have regular readings, response papers, presentations, research reports, and group/individual projects. Comics Studies is open to Juniors and Seniors interested in the neurological synergy caused by images and words arranged in sequence. This course will stretch your critical thinking and visual analysis skills. No drawing experience is required for this course but students will be asked to take creative risks and communicate with image and text.

## **NEW SEM340** Research Methods in Neuroscience

major elective | grades: 11, 12

Research Methods in Neuroscience will be a course that links neuroscience topics to the methodologies used by scientists in the field. Students will embark on a process of discovery that will allow them to explore how their brains create their world. Our work will have various interconnected components: a survey of neuroscience content, an exploration of research methodologies, a focus on technical writing, and laboratory investigations dedicated to understanding the brain. Throughout the year, lessons dedicated to topics in neuroscience will allow students to understand the cognitive processes that shape their worlds and connect these processes to the anatomy and physiology of the brain. Moreover, these topics will inspire students to further explore ideas which resonate with them as they design their own research project. The research phase of the course will engage students in methodologies used by scientists in the field. Furthermore, we will create a “journal club” where the students will present neuroscience journal articles to the rest of the class and lead discussions on these articles. We will also use these “journal club” classes to explore statistical methods used by neuroscientists. Lastly, we will conduct neuroscience labs so that students can connect the topics and methods we explore in the laboratory to their own work. The course will culminate with a formal research project, with both a write-up and a presentation of work.

# ADDITIONAL OFFERINGS

## **SEM950** Social Justice Dialogue

minor elective | grades: 9, 10, 11, 12

The Intergroup Dialogue minor offers students a supportive environment where they engage in “real talk” about issues of race, class, gender, sexual orientation, social identity, and power. Intergroup dialogue involves an exploration of the personal-interactional-reflective dynamics among individuals who analyze their social contexts and share their experiences. Students in this class lean into the work of building a learning community comprised of people of different backgrounds and social identities, they commit to sustained, face-to-face, facilitated, and confidential conversations, and they engage in analysis and reflection about some of the most troubling issues facing U.S. society and the world in the 21st century. Through the process, students learn about possibilities for transformation and social change, they become leaders in diversity and social justice, and they learn how to design and facilitate Intergroup Dialogue using different techniques such as the SEED model.

## **SEM990** Peer Writing Advisor

### Training Part 2: Theory into Practice

minor elective | grades: 11, 12 | prerequisite: Peer Writing Advisor Training (Essentially English course)

Peer Writing Advisors are students trained to work with other students one-on-one on writing assignments. They believe that writing is communicating. This course expands on the content of the spring training of the Peer Writing Advisors and translates much of the theory covered in that course into the practical work of being a PWA. During the fall portion of a Peer Writing Advisor’s work, more specific questions arise, as well as a desire for deeper knowledge and expertise that would bolster their one-on-one sessions with students. Throughout this yearlong minor, topics will include: how to “read” a school culture to offer a relevant service, the politics of teaching grammar, and how to lead a writing workshop to a group. Relative to the spring training, students receive more direct observation and feedback; students receive more feedback on their own writing from both the teacher and their fellow cohort members; and students learn how to support various types of learners, such as ESL students and students with learning differences. Assessments include committee work, self-assessments, presentations, and publicly available blog entries and writing assignments.

# MATHEMATICS

The math program strives to equip each student with the skills to think logically and analytically and to articulate strategies for solving problems, particularly those related to math and science. We seek to develop a student's understanding of algebra and other mathematical concepts throughout the curriculum. Topics in each subject are explored visually, symbolically, and verbally. Scientific and graphing calculators and various software applications are used as instruments for exploration and deeper understanding. Our aim is to encourage students to become confident in their math abilities and to recognize math as a powerful subject and tool. The standard mathematics progression is rigorous, leading to advanced courses in calculus and statistics. In addition, accelerated courses are offered at each grade level, starting in eighth grade. These courses move at a faster pace and explore topics in greater depth and breadth.

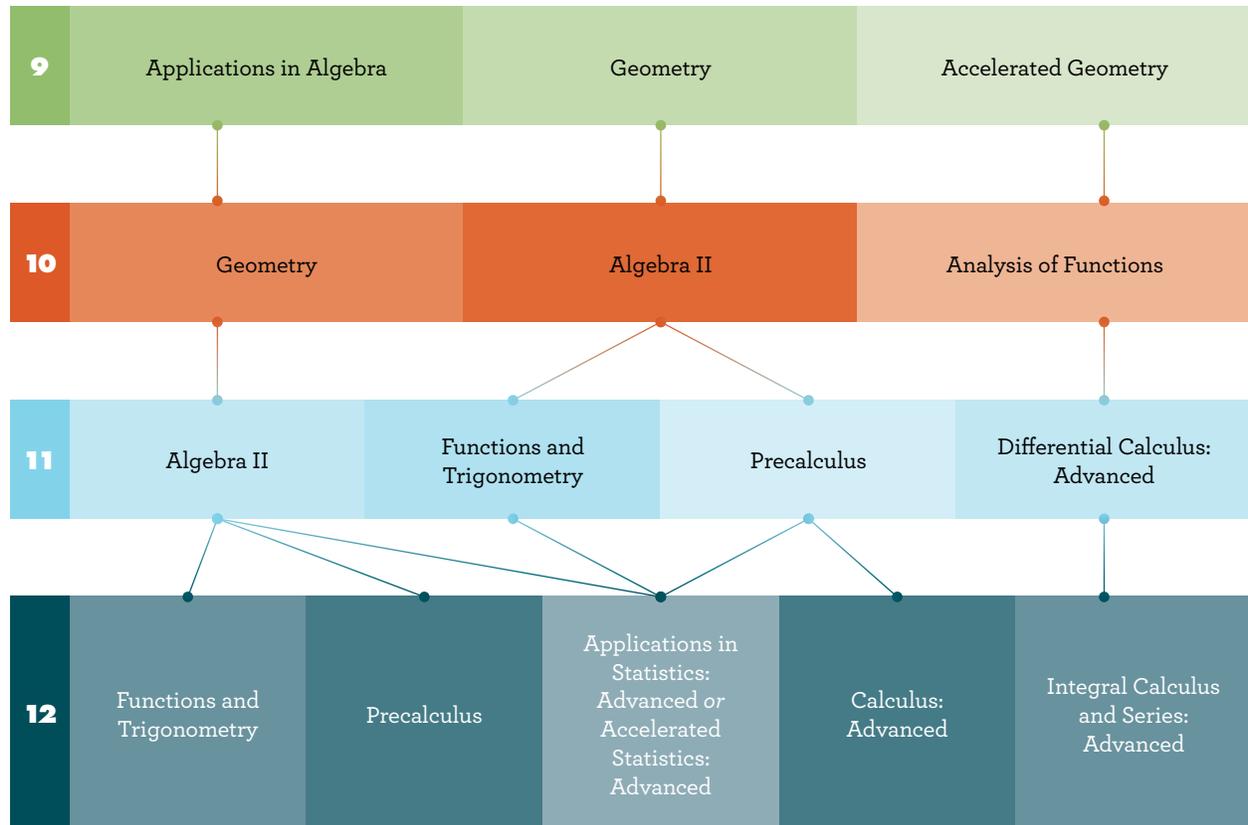
## » GRADUATION REQUIREMENT NOTE

Students must complete three years of major coursework to graduate. Because students progress through the math program differently, there is a range of courses that can be elected to fulfill these three years of required coursework. Please attend closely to information about prerequisites and departmental approval.

- Placement in accelerated courses is based on student performance, teacher recommendation, and the approval of the math department.
- Students in an accelerated course who wish to continue on to the next accelerated math class must have the approval of the math department.
- Students who wish to move from a standard course to an accelerated course must have the approval of the math department and earn an A in the current standard course.
- A student who moves out of an accelerated course, or who drops math before the requirement is met, must have the approval of the math department.
- The courses Accelerated Geometry and Analysis of Functions can lead to the equivalent of two years of college-level Differential and Integral Calculus. When enrolling in Differential Calculus, students must commit to taking the full two-year sequence: typically Differential Calculus in eleventh grade and Integral Calculus and Series in twelfth grade.

## MATHEMATICS COURSE OFFERINGS 2021-22

Lines indicate typical course progression, but students may deviate from this in some instances. Calculus or Integral Calculus students may concurrently add a Statistics course in 12th grade with departmental approval.



### **MTH310** Applications in Algebra

can fulfill required major for grade 9

The Applications in Algebra course gives students an opportunity to further explore the connections between Algebra I topics and the real world. Students build foundational comprehension of algebra concepts and skills as they examine how mathematics can be used to analyze and model the world around them. Particular emphasis will be placed on constructing methods for exploring what algebra can teach us about topics in social justice, the sciences, and economics.

### **MTH420** Geometry

can fulfill the required major for grades 9 or 10 | prerequisite: Algebra I or Accelerated Algebra I

This course in Euclidean geometry includes the study of geometric figures, shapes, angles, parallel lines, similarity and congruence, circles, area and volume, coordinate geometry, and introductions to analytic geometry, and trigonometry. The deductive thought process is emphasized throughout this course, and algebraic skills are reviewed and reinforced. Through the process of writing two-column proofs, students construct logical arguments and develop valid conclusions. Students will explore and visualize concepts using dynamic geometric software. The goal of this course is for students to think geometrically and to see geometry in the world around them.

## **MTH430** Accelerated Geometry

can fulfill the required major for grade 9 | prerequisite: Accelerated Algebra I; departmental approval required

This course takes a strong analytical approach to the study of Euclidean geometry. Progression through this course is broader and more rigorous than MTH420 Geometry. Some topics of study include geometric figures, shapes, angles, parallel lines, similarity and congruence, circles, area and volume, coordinate geometry, and trigonometry. Proofs are emphasized throughout the year to develop strong deductive reasoning. Students will explore and visualize concepts using dynamic geometric software. Algebra will be used frequently in the development and solving of problems. Through the process of making conjectures and testing hypotheses, students will develop a deeper appreciation of thinking geometrically, as they defend their thought processes.

## **MTH520** Algebra II

can fulfill the required major for grades 10 or 11 | prerequisite: Geometry

Building from the topics covered in Algebra I, this course guides students through an exploration of linear and nonlinear functions. Students gain fluency in translating between representations of patterns as equations, tables, and graphs. Students also examine function behavior, particularly by exploring transformations and function inverses. Throughout the course, real world applications and problem solving activities will provide students with the opportunity to demonstrate a deeper understanding of the material. Students will also use the TI-Nspire, online graphing calculators, and web resources as they explore these topics.

## **MTH530** Analysis of Functions

can fulfill the required major for grade 10 | prerequisite: Accelerated Geometry; departmental approval required

This accelerated level course moves at a brisk pace while covering a robust selection of topics from Algebra II and Precalculus. The course focuses on algebraic manipulation of expressions, equations, and inequalities. Students will make deep connections between functions and their graphs and explore graphs of non-functions not encountered in previous courses. Rich problem solving and proof writing opportunities are integrated into each unit, providing students with a solid base to enter the two-year Differential and Integral Calculus sequence. Students are encouraged to engage with each other to develop understanding through classroom discourse and to persevere through complex, abstract topics.

## **MTH610** Functions and Trigonometry

can fulfill the required major for grades 11 or 12 | prerequisite: Algebra II

Functions and Trigonometry can be an alternative to Precalculus. This course expands on topics from Algebra II and focuses on enhancing students' algebra and problem-solving skills. Topics include exponential and logarithmic functions, polynomial and rational functions, and trigonometric functions, sequences, and series. This course is for students who have completed Algebra II and wish to strengthen and broaden their mathematical background.

## **MTH620** Precalculus

can fulfill the required major for grades 11 or 12 | prerequisite: Algebra II; departmental approval required

Precalculus builds on material from Algebra II and provides a necessary foundation for further mathematical studies. Polynomial, rational, exponential, and logarithmic functions are explored graphically and algebraically. Additionally, Precalculus includes a study of trigonometry from analytical and graphical perspectives, bringing together concepts learned in Geometry and Algebra II. Students planning on taking Calculus must take Precalculus.

## **MTH630** Differential Calculus: Advanced

can fulfill the required major for grade 11 | prerequisite: Analysis of Functions; departmental approval required

Differential Calculus delves deeply into the topics of limits, derivatives, and derivative applications. This is the first year of our accelerated two-year study of calculus. It covers material that is typically found in the first course of college calculus. In addition to the foundational skills of calculus, the course covers selected advanced precalculus topics. Students in Differential Calculus can expect to explore and discover differentiation rules and their underlying reasoning through labs, proofs, and technology. This course aims to build strong mathematical thinkers and communicators and an emphasis is placed on proper notation and the formation of a strong mathematical argument. Students who take this course are expected to complete the calculus sequence by taking Integral Calculus the following year.

## **MTH720** Calculus: Advanced

major elective | grade: 12 | prerequisite: Precalculus; departmental approval required

Calculus begins with a review of essential material from previous courses, which leads to the central calculus concept of a limit, the underlying foundation of the derivative, and the integral. In addition to exploring these big ideas, the course delves into the procedures involved in differentiating and integrating a variety of functions and then explores applications of these calculus techniques. This course covers the skills and concepts of a first-year college-level course.

## **MTH730** Integral Calculus and Series: Advanced

major elective | grade: 12 | prerequisite: Differential Calculus;  
departmental approval required

Integral Calculus is a thorough investigation of the integral and its role in the study of calculus. This is the second year of our accelerated two-year study of calculus. It covers material that is typically found in the second course of college calculus. The integral is built upon the ideas of limits, summation, and the infinite; that is where the course starts. The main content consists of techniques of integration, applications of the integral, and infinite series. The work is rich, algebraically intense, and detailed. Students are guided to craft solid and clear mathematical arguments, and they will see many previously learned techniques surface throughout this work.

## **MTH710** Applications in Statistics: Advanced

major elective | grade: 12 | prerequisite: Algebra II or Analysis of Functions

If mathematics is the language that describes the natural world, statistics is the language of society. This yearlong, project-based course emphasizes statistical literacy through exposure to the foundational concepts of statistics while also exploring the relevance and role of modern day statistics. Topics included are displaying data numerically and visually in one and two quantitative variables, designing experiments and surveys, understanding basic probability, and introductory statistical inference. The main goal of the course will be to use these tools and techniques to represent and interpret data in meaningful ways while also developing the tools to critically evaluate verbal and written claims made from data by individuals and organizations in our society. In addition, students will be required to read at least one nonfiction work reflecting current scholarship in statistics.

## **MTH810** Accelerated Statistics: Advanced

major elective | grade: 12 | prerequisite: Algebra II or Analysis of Functions; departmental approval required

This accelerated course begins with the same foundational topics and goals of Applications in Statistics. However, students in this class move through these concepts at a quicker pace, exploring more challenging problems and examples with a stronger emphasis on the formal mathematical derivations of procedures as they are developed. Students will cover the full range of inference procedures from a first-semester college statistics course, including one and two means and proportions, slope, and chi-square. It will then move on to more advanced topics, including curve straightening, statistical programming, multiple regression, and nonparametric tests.

## **MTH830** Topics in Advanced Mathematics

major elective | grade: 12 | prerequisite: Integral Calculus;  
departmental approval required

Study in advanced mathematics is available to students who have completed our typical course offerings. Based on the number of qualified students, as well as their interests and background, course offerings and course formats may vary. Previous offerings have included Multivariable Calculus and Linear Algebra. Students have studied advanced topics in mathematics in courses offered by GFS faculty, the Global Online Academy, or another online course. Interested students should consult with the department head about available course offerings.

# MODERN LANGUAGES

The goal of the Modern Language Department is to equip students with the skills to achieve fluency in a new language. Graduates of the program will approach the world with a sustained curiosity, greater empathy, and openness to new people, places, and cultures. Students will develop listening, speaking, reading, and writing skills in the target language as well as cultural competencies. The department offers many diverse opportunities for student travel in line with our departmental goals.

## ➤ GRADUATION REQUIREMENT NOTE

Students must complete a Level III modern or classical language to graduate. A second language, not fulfilling the graduation requirement, must be completed through Level II before it may be dropped.

## ➤ ADDITIONAL NOTE

Grade levels listed for courses are typical. Students wishing to take a course out-of-grade should see the Head of the Modern Language Department.

### MOD310 French I

major elective | grades: 9, 10, 11

This course sets the foundation for the acquisition of a modern language. Students will develop the linguistic skills necessary to learn a language in an immersion setting through the use of targeted vocabulary and expressions. The emphasis is on building communication skills through dynamic and interactive activities focused on the four skills (listening, speaking, reading, and writing), while developing cultural competencies.

### MOD320 French II

major elective | grades: 9, 10, 11, 12 | prerequisite: completion of the two-year course in Middle School (French Ia and Ib) or French I

A dynamic classroom environment conducted uniquely in French provides ample opportunity to practice new language skills grounded in real-life scenarios. Several creative projects require Internet exploration on French-language sites, including a dedicated unit on the Francophone world. Students also read a short book *Le Nouvel Houdini*, designed to improve all language skills. Basic grammatical structures and thematic vocabulary are acquired through the use of *Bien Dit!*, the second textbook in a series. Continued exposure to French music, poetry, and rhymes provide students with the opportunity to improve their pronunciation and increase their aural comprehension. Students engage in spontaneous conversations and develop more extensive reading and writing skills by working with authentic and diverse materials.

### MOD410 French III

major elective | grades: 10, 11, 12 | prerequisite: French II

Students complete a thorough grounding of grammatical concepts and pertinent vocabulary through the continued study of the textbook *Bien Dit!*, news articles, and authentic texts such as poetry and fables. Spontaneous conversation and oral presentations are used to improve proficiency and to gain confidence in oral expression. Aural comprehension is enhanced by exposure to podcasts, music, and French voices from around the world. Language skills are also reinforced through analytical and creative writing. Throughout the course of the year, Francophone culture is investigated through videos, Internet articles, and current events.

### MOD510 French IV: Advanced

major elective | grades: 11, 12 | prerequisite: French III

This advanced level class provides a systematic review of finer communication skills, written and oral, as well as providing an introduction to literary analysis. A grammar textbook will provide an intense review of the language, while the International Baccalaureate coursebook will guide students through a variety of contemporary topics. Selected authors will represent the Francophone world with a concentration in the 19th, 20th and 21st centuries through various genres, such as poetry, short story, novel, film, Internet articles, and a comic book. Students will demonstrate their proficiency through various assessments: quizzes, tests, oral presentations, essays, and group projects.

## **MOD610** French V: Advanced

major elective | grades: 11, 12 | prerequisite: French IV

This advanced level French course is designed to further strengthen the students' expressive language skills, cultural competencies, and their creative and analytical abilities in the target language. Finer points of grammar and stylistics are reviewed and enriched through the study of Francophone literature, art, cinema, news, and magazine articles. Literary pieces may include readings of Camus, Sartre, Duras, Schmitt, and contemporary short story authors. Formal writing assignments, oral presentations, and extemporaneous interactive discussions are required.

## **MOD810** Mandarin I

major elective | grades: 9, 10, 11

Students are introduced to the speaking and writing of Mandarin within a thematic context. Vocabulary is introduced in authentic encounters, including greetings, family and school life, seasons and weather, and shopping, through authentic videos, websites, music and readings. Additionally, with support of the textbook and workbook, students will be given a solid foundation in reading, writing, listening, and speaking. Assessments of student learning will be based on oral and written mastery, with an emphasis on spontaneous production.

## **MOD820** Mandarin II and III

major elective | grades: 9, 10, 11, 12 | prerequisite: Mandarin I or placement | determined by placement test and teacher

Students will work towards the mastery of speaking and writing Mandarin. Within authentic contexts, students will work on further developing their vocabulary as well as their ability to converse fluently. Readings of increasing complexity from contemporary newspapers will help students to develop their language skills and cultural awareness. Throughout, a solid foundation will be given in reading, writing, speaking and hearing Mandarin. In this beginner-intermediate level course, students begin to do oral presentations on contemporary and cultural topics. Assessments will be based on oral and written mastery, with an emphasis on spontaneous production.

## **MOD830** Mandarin IV and V: Advanced

major elective | grades 9, 10, 11, 12 | prerequisite: Mandarin III or IV (placement | determined by placement test and teacher)

Students will systematically work towards mastery of the speaking and writing of Mandarin. In these years students will solidify their sense of grammar and expand considerably the complexity and scope of their conversational fluency. Authentic readings in an array of genres will help students develop their skills and cultural awareness and understanding. Students will be asked to complete presentations, skits and give oral reports. Assessments will be based on oral and written mastery, with an emphasis on spontaneous production.

## **MOD710** Spanish I

major elective | grades: 9, 10, 11

This course sets the foundation for the acquisition of a modern language. Students will develop the linguistic skills necessary to learn a language in an immersion setting through the use of targeted vocabulary and expressions. The emphasis is on building communication skills through dynamic and interactive activities focused on the four skills (listening, speaking, reading and writing), while developing cultural competencies.

## **MOD720** Spanish II

major elective | grades: 9, 10, 11, 12 | prerequisite: completion of the two-year course in Middle School (Ia and Ib) or the yearlong Spanish I course

This course provides a continuation of the goals of beginning Spanish at a more advanced level. The use of authentic materials, film, articles, short stories and music will enhance cultural awareness while developing reading, writing, and oral comprehension skills. Students are expected to speak exclusively in the target language and will begin to develop increased spontaneous speaking skills focusing on real-life scenarios.

## **MOD730** Spanish III

major elective | grades: 10, 11, 12 | prerequisite: Spanish II

Students complete a thorough grounding of basic grammatical concepts and increasingly sophisticated vocabulary as presented thematically in short stories and other authentic materials. Spontaneous conversation and oral presentations are used to improve proficiency and to gain confidence in oral expression. Aural comprehension is enhanced through exposure to podcasts, music, and Spanish voices from around the world. Language skills are also reinforced through analytical and creative writing. Throughout the course of the year, Spanish and Latin American culture is investigated through videos, internet articles, and current events.

## **MOD740** Spanish IV: Advanced

major elective | grades: 10, 11, 12 | prerequisite: Spanish III

This course is designed to improve students' mastery of grammar, reading comprehension, and oral fluency through short readings, discussion, dramatizations, as well as creative and analytical reading and writing. The International Baccalaureate coursebook will guide students through a variety of contemporary topics. The curriculum will include units on identity, war and propaganda, and folklore. Additional readings will include short stories, Spanish theater, a Latin American novel, poetry, essays, and periodical literature. Authors may include Jorge Luis Borges, Julio Cortázar, Federico García Lorca, Julia Alvarez, and Carlos Fuentes. Students will demonstrate their proficiency through various assessments: tests, quizzes, oral presentations, essays, and collaborative group projects.

## **MOD750** Spanish V: Advanced

major elective | grades: 11, 12 | prerequisite: Spanish IV

This advanced level course will focus on increasing both students' language skills and their analytical abilities through the study of a novel, short stories, poetry, art, film, and online resources. Students will further explore the people, places, culture, and history of Latin America and its relationship to Spain. Authors may include Gabriel García Márquez, Isabel Allende, Sor Juana Inés de la Cruz, and Antonio Skármeta. Students will explore the Spanish Conquest of Latin America, women's voice in Latin American literature, dictatorships in the Southern Cone, and Latinidad in the United States today, while improving writing and speaking skills through guided discussions and directed grammatical study.

# MUSIC

Rooted in the conviction that students learn most about music by making and experiencing music, the Music Department offers numerous performance and skill-based classes throughout the GFS curriculum. In the Upper School, students may elect classes in both large and small ensembles; study in these ensembles typically culminates in public performances. Students may also elect to take academic music classes that cover specific historical topics, technical skills, or theoretical and practical understanding.

## ➤ FULFILLING THE MUSIC REQUIREMENT

2 semesters taken in grades 9-12 for Class of 2023 and all classes thereafter (Classes prior to the Class of 2023 automatically fulfilled the Music Requirement by taking 9th Grade Music)

## ➤ MUSIC MAJOR

The Music Major is comprised of two or more minor classes taken simultaneously to fulfill a major course requirement. Students may create a Music Major by combining an academic music course (e.g., Music Theory or Advanced Music Composition) with a performance music course (e.g., Orchestra or Choir). The number of course meeting times must be the equivalent of five or more classes. At course sign-up, students in grades 9-12 wishing to create a Music Major select their two or more minors and also select Mus690 Music Major. Departmental approval required.

## FALL OFFERINGS

### MUS340 Music and Cultures

minor elective | grades: 9, 10, 11, 12 | one semester

This course explores how styles of music changed throughout history along with other art forms, based on what was happening in the world. Developments in communication, technology, and relationships between nations all played a part with how composers created music. Defining characteristics of four significant periods in music history will be identified, and parallels in styles of literature, visual art, fashion, and dance will be studied. Why did large concert halls become more common starting in the 1800s? What is the fabled tradition that goes along with Handel's famous "Hallelujah" chorus? How did the invention of recording devices change the music industry? These are some questions that will be delved into. This project-based class requires no previous musical training.

### MUS320 Musical Instrument Building

minor elective | grades: 9, 10, 11, 12 | one semester

This hands-on class will focus on how musical instruments are made. Students will experiment with sound production by designing and creating musical instruments from household

and recycled materials. We will learn about the science of how instruments work in each of the major instrument families, not only in Western music but also in music from other cultures around the world. We will also compose short pieces for our homemade instruments. Projects may include constructing some of the following instruments: electric kalimba, tin whistle, Cajon, slide trombone, stomp percussion, PVC thongophone, cigar box guitar, and bamboo pan flute.

### MUS310 Critical Listening in Music

minor elective | grades: 9, 10, 11, 12 | one semester

This class will challenge students to listen more deeply, carefully and thoughtfully through the lens of recorded and live music. While learning about some of the more creative/artistic music genres (classical, ambient/electronic, jazz, and world music to name a few), students will also examine the relationship between listening and mindfulness. We will learn about dissonance in music and art, about the difference between thematic and experiential content, and about some basic music theory ideas and how they pertain to our perception of music. Students can expect a hefty amount of listening and discussion, along with creative writing assignments meant to reflect on, and put to words, our listening skills.

## **MUS345** History and Impact of

### Hip-Hop

minor elective | grades: 9, 10, 11, 12 | one semester

In this course, students will explore the musical and social contributions and conflicts that hip-hop and rap have contributed to both American and global culture over the past half-century. In addition to studying the musical characteristics of both early and contemporary styles, students will discover the historical influences of the genre, including connections to jazz, gospel, and reggae, among others. Students in the course will also compose, create, and record essential elements found in the genre, using the GarageBand app. The social impact of hip-hop will also be explored, with discussions centered around social justice, cultural appropriation, and other topics highlighted in the lyrics of rap and hip-hop.

## **MUS780** Fundamentals of Piano

minor elective | grades: 9, 10, 11, 12

This introductory course is designed to teach students essential elements of playing the keyboard. Students will learn chord progressions and melodies from songs in all genres as well as how to read musical notation on the grand staff, treble and bass clef simultaneously, and in the fake book style with chords and melody on one line. We listen to and analyze music regularly and write in listening logs about identifiable characteristics of many genres of music. This course will also explore improvisation and give students the opportunity to create their own chord progressions and melodies as well as collaborate together to write songs with their peers.

## SPRING OFFERINGS

### **TH830** 9th Grade Musical

minor elective | grade: 9 | one semester

In this course, students will rehearse and produce a full-book musical. They will engage in the process of taking a show from script and score to stage and performance. Students will have the choice of auditioning for a lead role or participating as a member of the ensemble. Once the show has been cast, the course will move to the rehearsal process, including the study of scene work, choral, solo, and dance pieces. In the final stages of the rehearsal process, the rest of the grade will also join the efforts and support the final production. Performances occur in early May and will require evening rehearsals. No previous singing or acting experience is necessary. May be taken for Music or Theatre credit.

### **MUS300** Songwriting

minor elective | grades: 9, 10, 11, 12 | one semester

This class will explore the craft of songwriting by listening and analyzing popular music, examining chord progressions, and studying melodic and chordal relationships. We will look

at the role that poetry plays in lyrics, phrasing, and rhyme schemes, and dissect song structure, and social and political themes. Musicians and bands to be studied include the Beatles, Simon & Garfunkel, Joni Mitchell, Nirvana, and Bob Dylan. No instrumental or choral experience needed, but these skills can be utilized in the class. Students will be able to record their songs on GarageBand and score using Sibelius or Noteflight. We will build the art of singing while playing, and potentially pursue keyboarding skills and guitar skills as an accompaniment.

## **MUS310** Critical Listening in Music

minor elective | grades: 9, 10, 11, 12 | one semester

This class will challenge students to listen more deeply, carefully and thoughtfully through the lens of recorded and live music. While learning about some of the more creative/artistic music genres (classical, ambient/electronic, jazz, and world music to name a few), students will also examine the relationship between listening and mindfulness. We will learn about dissonance in music and art, about the difference between thematic and experiential content, and about some basic music theory ideas and how they pertain to our perception of music. Students can expect a hefty amount of listening and discussion, along with creative writing assignments meant to reflect on, and put to words, our listening skills.

## YEARLONG COURSES

### **MUS360** Conducting

minor elective | grades: 9, 10, 11, 12

Through the development of basic conducting technique, students will develop the relationship between gesture and sound. New conductors will learn to demonstrate musical ideas clearly and efficiently through fundamental conducting gestures. The conducting gesture includes appropriate posture, the use of the baton, expressive and independent use of both hands, beat patterns, cueing, and control of tempo, dynamics, and phrase shaping. We will also study and review musical terminology, instrument transposition, and score reading. Students will need to purchase a baton (of their choice) for use in the class.

### **MUS880** Jazz Ensembles

minor elective | grades: 9, 10, 11, 12 | co-requisite: private instrumental lessons

The jazz ensembles are open to all instrumentalists who wish to explore music from the jazz tradition. Students explore facets of performing as an ensemble, with special attention given to the study of jazz history, important musicians, theory, improvisation and listening to influential recordings. Styles of music other than jazz are sometimes included. Ensembles are arranged with regard to instrumentation, student ability and scheduling. Students in the ensembles are required to take private lessons in order to gain facility

and adequate technique. These skills will greatly enhance the proficiency of the individual, and the collective progress of the ensemble. Performance opportunities include GFS assemblies, community events, and the Jazz Night in April.

## **MUS790** Chamber Ensembles

minor elective | grades: 9, 10, 11, 12 | co-requisite: private instrumental lessons

The Chamber Ensembles are open to all instrumentalists who wish to explore music in small ensembles. Students explore facets of performing as an ensemble, with special attention given to the unique communication and independence of parts within this structure. Repertoire is drawn from a wide range of genres including classical, contemporary, pop, rock, medieval, and instrument-specific styles. Students who enroll in Chamber Ensembles are placed in duets, trios, quartets or quintets to experience the unique and intimate level of communication that occurs in a small ensemble setting. Ensembles are arranged with reference to instrumentation and students' abilities; all instruments and levels of playing are placed in appropriate groups. Chamber ensembles may include traditional instrumentation (e.g. two violins, viola & cello) or more non-traditional formations (e.g. ukulele or guitar ensemble), depending on the students' interest. Students may also propose their own groups, with the assistance of the orchestra director. Performances include community events, GFS functions, and the Chamber Music Concert in May. Interested musicians should speak with the Orchestra Director for placement.

## **MUS800** Orchestra

minor elective | grades: 9, 10, 11, 12 | co-requisite: private instrumental lessons

The Orchestra is open to all instrumentalists (except guitar) who wish to perform within a large ensemble context. (Pianists are often taught percussion technique as well.) The ensemble plays repertoire from a wide variety of genres, including classical, contemporary, Broadway, and pop music; these works are featured in many assemblies, the Holiday Concert and the Orchestra Night concert. In addition to learning challenging repertoire, students focus on orchestral playing techniques that include accurate intonation, dynamic range, sectional blend, and musical phrasing. Students are required to take private lessons on their instrument in order to gain an adequate technical facility. Although most rehearsals occur during the academic day, occasional after-school and weekend commitments are required.

## **MUS940** World Percussion Ensemble

minor elective | grades: 9, 10, 11, 12

Study in percussion techniques from Africa, the Middle East, Cuba and Brazil is available to any interested student. The course accommodates students of all levels, from beginner to advanced. Students will learn about the process of building a percussion ensemble based on the traditional instrumental

and vocal cues used within the various cultures studied. Techniques and repertoire are presented through rote, traditional notation, graph notation, audio and visual examples, and transcriptions. Instruments used are provided by the instructor, and include Bata drums, Agbadza drums, doumbeks, djembes, and Gyili (African balafons). Students will develop an understanding of and appreciation for the collaborative nature of a percussion ensemble, and gain insight into their own creative forces via this genre. Although most rehearsals occur during the academic day, occasional after-school and weekend commitments are required.

## **MUS730** Chorus

minor elective | grades: 9, 10, 11, 12

Chorus is a large choral ensemble, and is open to any student who wishes to participate in a singing group. Students in this ensemble work to establish and develop vocal technique, aural skills, and sight-reading abilities. Singers focus on both choral and choral-orchestral works in this ensemble, culminating with concert exhibitions in December and May, among others. This is a non-auditioned ensemble that is open to all students in the Upper School. Although most rehearsals occur during the academic day, occasional after-school and weekend commitments are required.

## **MUS750** Choir

minor elective | grades: 10, 11, 12 | co-requisite: Chorus

Choir is an auditioned choral ensemble in the Upper School that seeks to achieve excellence in choral study. Through the examination and performance of a diverse range of repertoire as well as participation in rehearsals and performances throughout the year, students develop their vocal technique, sight-singing skills, and sense of ensemble. Selection is through audition only and singers are expected to attend regular rehearsals and performances outside of the academic day, including bi-weekly Sunday rehearsals. Auditions begin in February of the preceding academic year and are open to all students in grades ten, eleven, and twelve.

Singers are also required to attend Choir Camp, which is usually held during the last weekend in August. Dates may be obtained on the GFS calendar. Additional fees for Choir Camp, attire, and materials are required for this class; financial aid is available.

## **THT840** Musical Theatre

minor elective | grades: 10, 11, 12

Acting, singing, dancing: this course is what they call a 'triple threat'. We will study Broadway musicals, both past and present, through the complementary but distinct lenses of libretto, score, and choreography. Students can expect to learn through participation as we study the vocal, acting, and movement techniques common in this genre of theatre. Coursework will also include dramaturgical studies of particular periods in history as they relate to the creative team and director's vision, performance, and writing styles of a

given show. The course will culminate with an in-class showcase of student work and can be taken for either Music or Theatre credit.

### **MUS760** Instrumental Improvisation

minor elective | grades: 9, 10, 11, 12

This course is designed to give students an in-depth, thorough technique of how to improvise on their instrument. The first half of the course will be spent studying the tonal theory behind chordal structures in a variety of musical styles, as well as analyzing transcriptions of notable soloists. This includes jazz terminology, chords, progressions, and soloing guidelines. The second half of the course will involve students actually playing their instruments in class. In doing this, they will gain not only a better concept of the art of spontaneous improvisation, but also learn how to utilize these concepts in their ensembles and musical settings in/out of school. Students who choose this course should have prior training on a musical instrument.

### **MUS350** Sight Singing & Ear Training

minor elective | grades: 9, 10, 11, 12

This course develops the skills necessary to read and sing melodies at sight and notate aural material. Classwork includes the study of solfège, rhythm and meter, key signatures, the major, minor and chromatic scales, pitch and interval identification, dictation and error detection, conducting patterns, and the application of sight-reading to musical scores. Basic piano skills will be incorporated into our study as a tool for understanding pitch relationships. This course develops fundamental aural and sight singing skills, building confidence that will prepare students for more advanced literature and musical performance.

### **MUS710** Music Theory I

minor elective | grades: 9, 10, 11, 12

Students in this course study the fundamental skills and language of music in order to become increasingly expressive and literate musicians. Course content includes major and minor scales, intervals, key signatures, basic harmonic progressions, and rhythmic figures in simple and compound meters. Aural skills are developed through sight singing with solfège syllables, rhythmic dictation, interval identification, and melodic dictation. Four-part writing and analysis will be studied towards the end of the second semester.

### **MUS720** Music Theory II: Advanced

minor elective | grades: 10, 11, 12 | prerequisite: Beginning Music Theory or approval by Department Head

This course continues work in four-part writing and analysis through proper voice-leading technique and advanced harmonic progressions. Strong emphasis is placed on the development of aural skills through rhythmic and melodic dictation, as well as intervallic and harmonic identification.

Students explore various compositional techniques, culminating in a performance of original works during a spring assembly.

### **MUS610** Music Composition I: Advanced

minor elective | grades: 11, 12 | prerequisite: Advanced Music Theory or approval by Department Head

This course focuses primarily on 19th-, 20th- and 21st-century Western music, developing the students' understanding of advanced chromatic techniques through both analysis and composition. Material covered includes variation technique, orchestration, form, and model composition. Throughout the year, students will learn a number of techniques to grapple with different repertoires, such as chromatic-mediant relationships in early-Romantic music, basic Riemannian functions for late-Romantic harmony, scale networks in Debussy and Faure, ostinato techniques in Stravinsky, post-tonal theory in Bartok and the Second Viennese School, and minimalist techniques in Part, Berio and Reich. Our study of a wide diversity of musical styles will serve as an incentive for student compositions in those styles, and throughout the year, students will compile a portfolio of their original compositional work so they can track their progress. The course will culminate with the performance of an original composition in a style of the student's own choosing during a spring assembly.

### **MUS620** Music Composition II: Advanced

major elective | grades: 11, 12 | prerequisite: Approval by Department Head

This course is a continuation of Advanced Music Composition I and focuses on 20th- and 21st-century Western music, developing students' understanding of advanced musical techniques through analysis and original composition. Material covered will depend largely on student interest and personal compositional goals, but some possible topics might include choral music, canonic and fugal writing, orchestration, scoring for film, video games, and theatre. Throughout the year, students will learn a number of analytical and compositional models to understand different repertoires, such as scale and modal networks from French music, ostinato techniques from Stravinsky and Glass, octatonic writing from Messiaen, and film scoring from Herrmann and Williams. Our study of a wide diversity of musical styles will serve as an incentive for student compositions in those styles, and throughout the year, students will compile a portfolio of their original compositional work so that they can track their progress. The course will culminate with the performance of an original composition during a spring assembly.

## **MUS770** Masterworks in Music

minor elective | grades: 9, 10, 11, 12

This course is designed to familiarize students with Masterworks in Music from the Western tradition (Renaissance to the present day). Music in this course will be drawn from a variety of genres, styles and musical traditions, which may include: Bach's St. Matthew's Passion, Beethoven's Symphony no. 9, Brahms's German Requiem, Stravinsky's Firebird, Bernstein's West Side Story, Bob Dylan's Highway 61 Revisited, Stevie Wonder's Innervisions, etc. In this course, students will come to understand and learn how to describe the stylistic, expressive and structural aspects of selected musical compositions, as well as communicate their experiences with these works. The course will focus on whole musical works, presented chronologically, which will be examined in detail and depth. The principal text of this course, therefore, will not be a book, but rather recordings of musical compositions. An exploration of the works represented on these recordings will be the basis for the discussions and assignments undertaken in this course. Additional readings will be assigned to inform class discussions, many taken from historical source texts written at the time of each composition. This course does not require a reading knowledge of music, but students will gain a rudimentary understanding of musical terminology; the development of students' close listening skills is its central objective.

## **MUS910** Digital Music Recording and Production

minor elective | grades: 9, 10, 11, 12

This course is about the future of music. This is a digital age, and the absolute transformation of everything we thought music to be, is well under way. This course is designed to inspire students to create new music, and to push the boundaries of what music is, has been, and can be in their lives. We will first survey the history of sound synthesis, the art of noise, and the role electronic technology has played in sonic culture throughout the past 120 years. We will timeline the progression from analog to digital recording, synthesizers, MIDI, beat-making, and finally today's 'in the box' software based computer music. After providing a thorough background on electronic music, we will work primarily with Ableton Live; a software already installed on every computer in the M-306. The class will cover the basic functionality of both hardware and software mixing consoles. We will discuss the dichotomy between 'button-pushers' and 'real musicians,' and how artists bring soul and true musicality to computer music.

# PHYSICAL EDUCATION

Physical Education in the Upper School is focused on fostering a culture of wellness through regular, meaningful physical activity for all members of our community. Our emphasis is on leading students to develop movement skills and to discover individual interests through their participation in class. Upon completion of a semester-long foundational course in the freshman year, students take on increased responsibility for choosing a PE activity plan that best meets their needs and interests.

## REQUIREMENTS

- 9th grade: One semester PE 9 Foundations; two seasons Athletics
- 10th grade: Three seasons: one season of Athletics; choice of PE or Athletics for other two seasons
- 11th grade: Three seasons, choice of PE or Athletics
- 12th grade: Two seasons, choice of PE or Athletics

## GRADE 9

### PE300 PE 9 Foundations

required minor | grade: 9 | one semester

This interdisciplinary class provides a foundation for lifetime fitness and wellness and includes a thorough introduction to the use of our Fitness Center. The understanding and management of one's own fitness and health are at the core of the curriculum. Topics include nutrition, proper strength-training techniques and the components of fitness.

## GRADES 10, 11, 12

The Physical Education Department provides a rich menu of options in terms of developing personal fitness and exploring fitness options. Students may choose to participate in physical education classes while they are playing a GFS sport but are not required to do so. Physical Education courses are offered by sport season: fall, winter, and spring.

Course offerings are organized as follows:

- GFS Fitness Club: Personal fitness activities that meet during or after school (see course descriptions for full information). Fitness Club is two workouts weekly.
- PE Electives: These courses generally occur during the school day and may vary by season. Courses meet for two or three single periods per 8-day cycle, or two extended periods per 8-day cycle to facilitate travel off-campus.

## YEARLONG ELECTIVES

### PE610 GFS Fitness Club—After School

minor elective | grades: 10, 11, 12

Join the GFS Fitness Club and customize your personal fitness plan. This program consists of movement activities and classes that generally occur after school. Students commit to a minimum of 2 workout periods per week, choosing the days and times that are most convenient.

### PE670 Personal Fitness

minor elective | grades: 10, 11, 12

Need to finish your school day by 3:20 p.m.? This Personal Fitness course consists of workout sessions that will occur during the school day. It will meet 3 times per 8-day cycle to allow two workouts per week. No after school workouts are required. All skill levels welcome as you develop an individualized plan that works for you.

### PE601 Vinyasa Yoga

minor elective | grades: 10, 11, 12

This all-levels vinyasa (flow) yoga class offers poses designed to stretch and strengthen your body using your own breath as your guide, so that you can find the balance that is most appropriate for you! A strong emphasis is placed on proper alignment, which helps you to stay centered and present

while avoiding injury. Poses, especially more challenging ones, are taught slowly and thoughtfully. This class offers a nice opportunity to release physical and mental stress, while cultivating inner peace and relaxation—no experience necessary! Class meets after school twice a week. Students must be available each Tuesday and Thursday from 3:30-4:30 p.m. to take this class.

## FALL ELECTIVES

### PE710 Archery

minor elective | grades: 10, 11, 12

Experience the Zen of this target shooting sport. All skill levels welcome.

### PE720 Golf

minor elective | grades: 10, 11, 12

Learn the basics of golf and head out to the links. All skill levels welcome.

### PE700 Badminton/Net Games

minor elective | grades: 10, 11, 12

Back by popular demand! Take your game to a new level. Hone your skills and play, play, play. We will begin with badminton and may include other net games, e.g. volleyball or pickle ball based on student interest. All skill levels welcome.

### THT800 Movement for Theatre

minor elective | grades: 10, 11, 12

This course trains the actor in methods and techniques for opening and conditioning the physical body, one of the actor's primary instruments for artistic expression. Students increase awareness, range, and freedom of movement while exploring the fundamental importance of space, weight, and time as theatrical principles. The course assumes a collaborative approach to theater-making in the study of ensemble-based techniques. Students can also expect to focus on flexibility, strength-training, breathwork, coordination and balance, creative and improvisational movement. This is not a performance-based class and no prior experience is needed. This course can be taken for Theatre or PE credit.

## WINTER ELECTIVES

### PE730 Table Tennis/Urban Adventures

minor elective | grades: 10, 11, 12

Individualized instruction and visits to the local table tennis club to play. Explore other recreational opportunities based on student interest. All skill levels welcome.

### PE750 Winter in the Wissahickon/Urban Adventures

minor elective | grades: 10, 11, 12

Majestic at any time of year, the Wissahickon beckons hikers, birders and outdoor enthusiasts in the winter months. Explore it, and other urban recreational opportunities in this class. All skill levels welcome.

### PE755 Volleyball/Table Tennis

minor elective | grades: 10, 11, 12

Are you an outside hitter, defensive blocker or libero? Not sure? Delve into volleyball on the tactical level while you further hone your skills. In this class we will up your game in two of the most popular recreational activities: volleyball and table tennis. Get ready to play, play, play!

## SPRING ELECTIVES

### PE760 Ultimate Frisbee/Disc Golf

minor elective | grades: 10, 11, 12

Get outside and play! Get comfortable learning to throw and catch the disc playing Ultimate Frisbee. Then try your hand at Disc Golf. We will travel to the Disc Golf course in Fairmount Park to play after learning how to throw disc "drivers" and "putters." All skill levels welcome.

### PE780 Wissahickon Hiking

minor elective | grades: 10, 11, 12

Take to the hills, rocks and valley. Observe the reawakening of the forest. Venture onto a variety of trails, and savor the spring. Bouldering and rock climbing are possibilities, depending on student interest. All skill levels welcome.

### THT810 Modern Dance

minor elective | grades: 10, 11, 12

This course is an all-levels modern dance class that includes explorations in technique, improvisation, and choreography. Students will engage methods and language common to a variety of modern dance styles and concepts. Most material will be learned through physical participation as students

deepen their awareness of the body and explore the connection between the physical, cognitive, and emotional aspects of themselves. Should they choose, students will have the opportunity to perform as part of the annual Poley Festival of student-created work. Course material will be leveled based on the experience of those registered, therefore, previous dance experience is welcome, but not necessary. This course can be taken for PE or Theatre credit.

### **PE770** **Advanced Archery**

minor elective | grades: 10, 11, 12 | prerequisite: PE710 Archery or permission of instructor

The course, designed for students with some archery experience, uses both compound and recurve bows. Our purpose is to take students beyond the basic techniques of archery emphasizing the care and use of equipment, range safety, stance and shooting techniques, using a sight, scoring and competition, and learning how to teach novice archers. We will be following the USA Archery Level 1 Instructor Curriculum. Students completing the course will earn a USA Archery Level 1 teaching certificate.

## **Request for Alternative Physical Education Credit**

Tenth through twelfth graders who pursue an activity outside of the GFS PE/Athletics program that is equal to being on a GFS Athletics team may request Alternative Physical Education Credit for their participation. Requests should be made online (see Physical Education section within Upper School Curriculum page of website). In general, alternate credit is only given for activities which are not offered as part of the GFS PE/Athletics program. Students must apply before the requested season.

# SCIENCE

The study of science provides students with powerful ways to understand the natural world. We seek to inspire students' curiosity, develop critical thinking and analytical skills, and provide a foundation for further exploration. Our curriculum emphasizes laboratory work, data analysis, problem-solving and clear communication. All science courses are lab-based and meet for the equivalent of five periods each cycle. Students must satisfactorily complete one course in physical science and one course in biological science. Typically, students take Physics in 9th grade, Chemistry in 10th grade and Biology in 11th grade. Advanced Physics, Advanced Chemistry, Advanced Biology, Principles of Engineering, and Environmental Science are available to students who complete introductory coursework. The Science Department also offers one minor elective, Human Anatomy and Physiology, to 10th, 11th, and 12th graders.

## GRADUATION REQUIREMENT NOTE

All students must take three years of major coursework in science. All students are required to take one year of a physical science and one year of Biology.

### **SCI310** Physics (Physical)

major elective | grades: 9, 10

This introductory physics course primarily focuses on concepts and laws of classical physics, especially mechanics, including the topics of motion in one and two dimensions, Newton's Laws of Motion, work, energy, power, circular and rotational motion, and the relevant laws of conservation. Material is also drawn selectively from wave motion, sound, light and color. The emphasis in this course is on conceptual comprehension of this material, but there will be quantitative work that complements the information being studied. Frequent laboratory experiments and reading material will reinforce problem-solving skills. Participation in the Physics Olympics is required.

### **SCI720** Chemistry (Physical)

major elective | grades 10, 11

This introductory course covers basic chemical vocabulary, nomenclature, stoichiometry, thermochemistry, gas laws, atomic theory, molecular geometry, equilibrium and acid-base chemistry, and provides a solid foundation for more advanced work in chemistry and biochemistry. Weekly labs are included. Participation in Science Night is required. We strongly recommend that students take chemistry before taking biology.

### **SCI710** Biology (Biological)

required major | grades: 11, 12 | prerequisite: Chemistry or departmental approval

This is an introductory biology course. Students study a range of topics in evolutionary biology, cell biology, systems biology, and molecular biology. Specific units include evolution and biodiversity, ecology, cellular structure and function, cell cycle, biochemistry, DNA and genetics, protein synthesis, cell respiration, photosynthesis, and systems biology. Labs and several projects give students hands-on experience with biological materials and concepts. It is strongly recommended that students take chemistry before they take biology. Participation in Science Night is required.

### **SCI810** Principles of Engineering (Physical) Advanced

major elective | grades: 11, 12 | prerequisite: satisfactory completion of Chemistry, Physics and departmental approval

The solutions to society's greatest problems lie between disciplines. On top of that, the techniques necessary for approaching our most vexing questions are changing and will continue to evolve in unpredictable ways. In Principles of Engineering, students will work independently and collaboratively to use the engineering design process and equity-informed variables to design solutions to a variety of challenges. In that process, each student will master a number of skills including fabrication, graphical analysis, data

collection, time management, presentation and critique. They will apply these skills to complete projects focused on different areas of Engineering, including Mechanical, Electrical, Civil, Chemical and Biomedical.

## **SCI730** Advanced Chemistry (Physical)

major elective | grades: 11, 12 | prerequisite: satisfactory completion of Chemistry; departmental approval required

This course covers much of the same material encountered in first-year college chemistry programs. Labs will occur on a nearly weekly basis and include experiments using pH, temperature, pressure, and other Vernier probes that employ computer-based data acquisition and analysis methodology. Topics covered include: the structure of matter; solution stoichiometry; the kinetic theory of gases and gas laws; thermodynamics; quantum theory and periodicity; chemical bonding; the chemistry of solids, liquids, and solutions; kinetics and equilibria; acids, bases and aqueous equilibria; spontaneity, entropy and free energy; oxidation-reduction reactions and electrochemistry; nuclear chemistry; and a brief overview of organic chemistry. Students will develop a deep understanding of the foundational concepts of chemistry, fluency in dealing with complex chemical problems, and the ability to form mental models of the molecular world.

## **SCI750** Advanced Biology (Biological)

major elective | grade: 12 | prerequisite: satisfactory completion of Chemistry and Biology; departmental approval required

This course focuses on a variety of topics including, but not limited to, the origin of life, cancer biology, population genetics, gene regulation, genetic engineering, evolutionary theory, and phylogenetics. Laboratory activities are a part of each unit. During the spring semester, students will learn how to apply molecular data to analyze evolutionary patterns, and they will work collaboratively to build a data set that can be used to answer a specific evolutionary question. Participation in Science Night is required.

## **SCI770** Advanced Physics (Physical)

major elective | grade: 12 | prerequisite: concurrent enrollment in or completion of Calculus or Integral Calculus; departmental approval required

This is a fast-paced course that will focus on a variety of topics, including mechanics, energy, electrostatics, circuits, and magnetism. We will integrate current events, both scientific and social, into our daily explorations. Advanced Physics builds on material from the introductory physics course, but the introductory course is not a prerequisite. This course is math-intensive and we will use calculus and trigonometry as tools to develop a rigorous understanding of the world around us. Computers will be used for simulation, data analysis and the completion of labs. Experimental design will be an important aspect of the laboratory experience. Participation in Science Night is required.

## **SCI740** Environmental Science

major elective | grades: 11, 12 | prerequisite: Chemistry

Students will look at a wide range of topics covering five major themes: ecology, human population, energy and climate, resource use and reform, and applied sustainability. Concepts in each theme will be explored by considering global and local environmental issues with special consideration of current events as they arise. The coursework will make use of laboratory and field experiments, which use local resources such as the GFS Cary Arboretum and the Schuylkill River, as well as a simulation of the UN Framework Convention on Climate Change. This course is designed for students who would like to pursue a science course that is not a second-year course in chemistry, biology or physics. Participation in Science Night is required.

## **SCI800** Human Anatomy & Physiology

Minor elective | grades: 10,11,12

Students will study basic principles of human form and function at the system level, including the integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic/immune, respiratory, digestive, urinary, and reproductive systems. Laboratory activities will be included as part of each unit. In addition, students will engage in independent research.

# THEATRE

Our Theatre program provides a range of opportunities that allows every talent to find a place for expression. In addition to an active schedule of annual stage productions, students may elect to pursue coursework in the dramatic arts, movement, technical theatre, and film. Classes and productions focus on articulate speech, clarity of utterance, fullness of expression, and storytelling that explores both aesthetics and our common humanity.

## THEATRE GRADUATION REQUIREMENT

As of the class of 2024, and for all subsequent classes, students must complete one full year of Ninth Grade Theatre. For the Classes of 23, 22, and 21, students must take the equivalent of two semesters of theatre or art.

## THEATRE MAJOR

A theatre major is comprised of two year-long minors (or the equivalent) taken simultaneously. At course sign-up, students in grades 11 and 12 wishing to create a theatre major should select their two or three minors and also select THT990 Theatre Major. Departmental approval required.

## ACTING & PERFORMANCE-BASED COURSES

### THT725 Ninth Grade Theatre

required minor | grade: 9

This introductory class investigates the art form of theatre and explores performance as a vehicle for self-expression; it aims to bring to life each student's personal sensibility as a story-teller, story-maker, and story-seeker. The course includes a survey of the ritualistic and performative storytelling methods that have developed in ancient civilizations and how they have evolved into the medium of theatre we currently practice. Students will also engage with the storytelling of personal narratives, dramatic theory, writing and physical theatre exercises, as well as explore elements of design and technical theatre. In the spring, students have the opportunity to be involved in the Ninth Grade Production, a long-standing GFS production - on-stage, backstage, and beyond.

### THT840 Ninth Grade Musical

minor elective | grade: 9 | one semester

In this course, students will rehearse and produce a full-book musical. They will engage in the process of taking a show from script and score to stage and performance. Students will

have the choice of auditioning for a lead role or participating as a member of the ensemble. Once the show has been cast, the course will move to the rehearsal process, including the study of scene work, choral, solo, and dance pieces. In the final stages of the rehearsal process, the rest of the grade will also join the efforts and support the final production. Performances occur in early May and will require evening rehearsals. No previous singing or acting experience is necessary. May be taken for Music or Theatre credit.

### THT720 Acting Methods

minor elective | grade: 9, 10

This course trains actors in two distinct, but complementary styles of acting as they relate to text and improvisation. The first focuses on the acting and auditioning methods of Stanislavski, Uta Hagen, and Declan Donnellan. Students can expect to study acting and directing techniques using outstanding dramatic classical and modern texts. The class explores how different interpretations affect both direction and performance. The spring term study is dedicated to production and performance work for the Poley Festival.

### THT730 Acting & Directing Techniques

minor elective | grades: 11, 12

What is acting and how is it done? How does someone become someone else? How does the actor free their emotions?

How important is believability? Is acting an art or a craft? This course explores these questions and the evolution of actor training as we study and investigate the techniques of: Stanislavski, Strasberg, Adler, Meisner, Esper, Hagen, and Brecht. The texts studied are chosen from the anthologies of our finest playwrights from the past to present time. Our classwork culminates in the Poley Festival of student-written, -directed and -acted works as presented each spring.

## DANCE & MOVEMENT COURSES

### **TH T800** Movement for Theatre

minor elective | grades: 10, 11, 12 | one semester

This fall course trains the actor in methods and techniques for opening and conditioning the physical body, one of the actor's primary instruments for artistic expression. Students increase awareness, range, and freedom of movement while exploring the fundamental importance of space, weight, and time as theatrical principles. The course assumes a collaborative approach to theater-making in the study of ensemble-based techniques. Students can also expect to focus on flexibility, strength training, breathwork, coordination and balance, as well as creative and improvisational movement. This is not a performance-based class and no prior experience is needed. This course can be taken for Theatre or PE credit.

### **TH T810** Modern Dance

minor elective | grades: 10, 11, 12 | one semester

This spring course is an all-levels modern dance class that includes explorations in technique, improvisation, and choreography. Students will engage methods and language common to a variety of modern dance styles and concepts. Most material will be learned through physical participation as students deepen their awareness of the body and explore the connection between the physical, cognitive, and emotional aspects of themselves. Should they choose, students will have the opportunity to perform as part of the annual Poley Festival of student-created work. Course material will be leveled based on the experience of those registered, therefore, previous dance experience is welcome, but not necessary. This course can be taken for Theatre or PE credit.

## TECHNICAL THEATRE COURSES

### **TH T700** Technical Theatre I

minor elective | grades: 9, 10, 11, 12

In Technical Theatre, students have an opportunity to work on all aspects of bringing a show to opening night and running that show once it gets there. Students work on set

construction, stage painting, lighting, design, run crew, and all of the other aspects that go into bringing a show to life. Each trimester will focus on the technical needs of the specific production in season. Students are expected to participate as a member of a production team for at least one mainstage show, which will include call times outside of the regular school day.

### **TH T791** Scenic and Costume Design

minor elective | grades: 10, 11, 12

This course exists at the intersection of fine art and theatrical storytelling. Design is an essential part of the theatrical form; sets and costumes create the world of the play and have a powerful effect on how an audience experiences the story being told. In this class students will learn both conceptual and practical skills related to theatre design, scenic painting, and costuming. Students can expect to support GFS Theatre productions as part of their work in this course.

### **TH T765** Technical Theatre II

minor elective | grades: 10, 11, 12 | prerequisite: Technical Theatre I

If the first level of Technical Theatre is about skill acquisition and development, this course is about the direct application of those skills in the context of theatrical production. A hands-on course, students will do the work of bringing a concept to life through the 'magic' of theatre. Study will include lighting, sound, and set construction with a focus on how to interpret design and working drawings. In addition to class time, students are expected to be involved in at least one GFS Theatre production throughout the performance season.

## ACADEMIC COURSES

### **TH T830** Musical Theatre

minor elective | grades: 10, 11, 12

Acting, singing, dancing; this course is what they call a 'triple threat'. We will study Broadway musicals, both past and present, through the complementary but distinct lenses of libretto, score, and choreography. Students can expect to learn through participation as we study the vocal, acting, and movement techniques common in this genre of theatre. Coursework will also include dramaturgical studies of particular periods in history as they relate to the creative team and director's vision, performance, and writing styles of a given show. The course will culminate with an in-class showcase of student work and can be taken for either Music or Theatre credit.

## **THT680** Reader's Theatre

minor elective | grades: 11, 12

This survey course is designed for juniors and seniors who are interested in reading plays within a theatrical historical context. There will be introductory lectures on the evolving styles and the influence that these playwrights had on one another. The course curriculum includes the following playwrights and works: Seamus Heaney's adaptation of Euripides, Commedia Lazzis, Kabuki, Kyogen and Noh plays, Marlowe, Shakespeare, Moliere, Congreve, Dickens adapted by Edgar, Ibsen, Chekhov translated by Frayn, Shaw, Strindberg, Wedekind, Brecht, Pirandello, O'Neill, Wilde, Ionesco, Beckett, Pinter, Williams, Miller, Hellman, Shaffer, Fugard, Albee, Stoppard, Wilson, Shepard, Kushner, Suzan-Lori Parks, Mamet, Friel, and Hwang.

## **THT120** Playwriting workshop

minor elective | grades: 11, 12

A play is an event where bodies, language, sound, movement, and visual arts are equal partners, giving theatre many tentacles for transforming the audience, for transforming society. The play, in written form, is the blueprint for transformation and this class aims to help us gain access to the cockpit inside the metaphysical octopus' mainframe. In this writing workshop, students will study and explore playwriting, a form of writing more closely related to poetry or music than the novel; a polyphonic art of many voices coming from your many selves. Over the course of the year, students will sample a range of plays, from modern drama to bold contemporary works, surveying the wide array of structures. Students will be offered writing prompts in class that will hone various aspects of the form and can expect to write a one-act play as well as various short plays. We will also explore collaborative writing and create a script together. This is a course for students who enjoy writing and are eager to explore a new form.

## **THT940** Shakespeare Studio

minor elective | grades: 11, 12

The influence of Shakespeare's plays on our language and culture is evident and alive in daily conversation and across artistic genres — cinema, theatre, opera, and pop culture. Shakespeare Studio is a course dedicated to the premise that few things are as interesting as the works of William Shakespeare. This course welcomes actors and non-actors alike. We seek a dynamic and diverse range of backgrounds and experiences. All voices are necessary when it comes to interpreting Shakespeare. Centered around four Shakespearean plays, the course gives students the opportunity to delve in and get to know these plays well. In Shakespeare Studio we will work around the table and get up on our feet. We will study as actors, directors, and dramaturgs in the staging of various scenes from all five plays. Students will begin the course with a Shakespeare toolkit to introduce them to the world of text work, rhetoric, scansion, and dramaturgical study. Professional theatre artists will workshop various techniques and approaches to Shakespeare's plays. We

hope to attend professional productions in the region and screen cinematic interpretations, considering varying directorial viewpoints.

## **NEW THT200** Sketch Comedy & Improvisation

minor elective | grades: 10, 11, 12

In this comedy intensive, students will study long and short-form improvisation techniques. Using methods developed by Upright Citizens Brigade, Keith Johnstone, Viola Spolin, and Del Close, students will focus on character and plot development as they explore the famous 'Harold' longform improv game. Students will then use improv to generate written material, individually and together as a group in a "writer's room," as they work to hone their sketch writing skills. There will be a balance of live performance and digital content creation, culminating in a Saturday-Night-Live-esque final showing.

## **FILMMAKING COURSES**

### **THT750** Introduction to Filmmaking

minor elective | grades: 10, 11, 12

This entry-level course provides students with a foundation in cinema studies and filmmaking. Students begin the course by examining the history and technology of film while discovering their cinematic voices through micro-films and exercises shot and edited with their smartphones. Students will gain an appreciation of the technical, theatrical, and narrative elements of cinema through assignments that introduce concepts related to cinematography, production design, genres, and editing. Once essential terminologies are defined and students have a greater appreciation for the production process professional filmmaking equipment is introduced to the mix as students are trained to use and maintain the necessary hardware and software to create films. By the end of this course, students will have a firm grasp of pre- and post-production filmmaking techniques. They will also have a portfolio of films that demonstrate their burgeoning skills and unique point of view as a storyteller. The course will also include assignments related to film criticism and screenings to create dynamic cinephiles out of every student.

### **THT751** Film Editing & Post-Production

minor elective | grades: 11, 12 | one semester | prerequisite: Intro to Filmmaking

In this intermediate course, students learn the incredible creative power that post-production provides the filmmaker. Topics of study will include color correction, sound editing and mixing, and visual effects (VFX). Emphasis is on the overall post-production process and editing, and the importance of knowing the production direction well before filming

takes place. Hands-on learning with non-linear editing software will introduce students to creating a project and properly organizing and naming files for the purposes of editing. Students will also wrestle with the philosophy and craft of editing to imbue their projects with more substance and meaning.

## **THT792** Light, Sound, and Production Design

minor elective | grades: 11, 12 | one semester | prerequisite: Intro to Filmmaking

This hands-on semester course is intended for students interested in building upon their filmmaking skills and diving deeper into aspects of production design with a particular focus on lighting and sound. For the lighting portion of the class, students will learn about three-point lighting and other aesthetic and technical tricks of the trade. Students will also develop an understanding of “how” sound works through the practical use of microphones and digital audio tools. The history of sound design from analog to digital formats will inform this process as students learn about recording original sound effects (Foley) and dubbing audio. Additional topics include lighting and makeup for actors of all hues and sound mixing and sampling.

## **THT760** Filmmaking: The Picture is the Thing: Advanced

minor elective | grades: 11, 12 | prerequisite: Intro to Filmmaking and Film Editing & Post-Production OR Light, Sound, and Production

The goal of this year-long course is to complete one feature-length film by years end. Requirements during the year will consist of a series of short films including one completed for submission to the Philly Youth Film Festival. Participants will also be required to attend the film festival. Additional assignments will include watching and discussing multiple films with an eye towards approach and execution. Another goal of the class is for students to decide on the genre of the feature film; narrative, documentary or experimental and complete the film. The final feature length will be between 50 and 90 minutes long. During the course of the year, we will commit to making 2-3 short films and simultaneously complete work on the long term feature-length film. Focus on technical; lighting, sound, set design etc. as well as a focus on story construction, budgeting, casting etc. will be ingrained into the academic year. From time to time we will have subject area guest lectures visit with the class.

# REQUIRED PROGRAMS

## JANUARY TERM (J-TERM)

January Term enables our community to live the mission and values of our school and explore new passions, interests and interdisciplinary ways of learning about the world. Through a schedule dedicated to course offerings outside of the regular curriculum, January Term provides teachers and students a space for experimentation, investigation and reflection. Students sign up for their January term courses during the fall of each school year.

### GRADUATION REQUIREMENT NOTE

Students must complete January Term in grades 9, 10, and 12.

## JUNIOR PROJECTS

The faculty believes that independent study outside the bounds of any particular classroom is an important part of any student's education. The experience of creating a project, organizing it and sustaining it to completion is invaluable in helping students take responsibility for what they learn and how they learn it. By completing their Junior Projects before senior year, students will be able to incorporate the experience of their project into their work in 12th grade. Colleges often ask for assessments of the student's ability to do independent work.

### GRADUATION REQUIREMENT NOTE

In 11th grade, every student completes a month-long independent project during the month of January.

### JUNIOR PROJECT PROCESS

In early May, each member of this year's 10th grade class will be assigned a liaison from the Junior Project Committee. Students should arrange to meet with their liaison twice before the end of the school year. Liaisons help students decide on a project by discussing opportunities that are available to them through members of the school community and programs outside school.

### JUNIOR PROJECT COMMITTEE

This committee, composed of faculty and staff, the 11th Grade Advisors and the Upper School Division Director, oversees the students as they plan and complete their proposals. The committee works hard to give every student the support they need to select a project and complete a successful proposal by December.

## GUIDELINES

- All projects must be student-initiated and student-designed.
- All projects must have definite start and end dates. Students are expected to undertake their projects five days a week for four weeks.
- Proposals must clearly state goals for the project and plans for final presentations, which include both oral and written reports.
- Each student must arrange to have an advisor, who is a member of the GFS faculty, and an on-site supervisor.
- Proposals must be specific, may require a bibliography and always require a letter from the on-site supervisor confirming details of the project.
- Students must report to their GFS advisors once a week during the duration of the project.
- Expensive projects are discouraged. Students are required to earn at least half the money necessary to cover the cost of any project.

# DIRECTED INDEPENDENT STUDY

GFS encourages students to take initiative in their own education. Last year, more than 150 students pursued their particular interests beyond the GFS course catalog by developing a Directed Independent Study (DIS) in consultation with a faculty advisor.

## A DIS MIGHT BE COMPOSED OF ONE OF THE FOLLOWING:

Individual or group study with a GFS teacher on a subject of mutual interest

Language classes taught by a part-time instructor

An online course not already included in the GFS catalog

A significant weekly project (such as tutoring in a neighborhood school)

## **DIS800** DIS Major

major elective | grades: 11, 12

Students in the upper grades may elect a program of Directed Independent Study as part of their academic schedule. A DIS major is equivalent to a full-credit course and graded in the same way. DIS majors may not replace a preexisting course offering without the permission of the department in question. In the past year, students have created DIS majors in Arabic, Japanese, Philosophy, Creative Writing, and Animation.

## Proposing a DIS Major

Interested students first consult with the Director of Independent Study.

Students must submit a formal proposal to the Director of Independent Study by early May, for approval by the Academic Standards Committee.

Students choosing independent study are required to keep a journal, to write a major paper each quarter, and to make periodic informal presentations of their work. In the spring, they are required to make a formal presentation of their work to their advisor and two other faculty members.

Students should expect to meet regularly with an advisor (a member of the faculty or another adult) and with the Director of Independent Study.

## DIS Minor

minor elective | grades: 9, 10, 11, 12

Students may elect a program of Directed Independent Study as part of their academic schedule. A DIS minor should demand the same commitment as the equivalent of a minor elective course. DIS minors may not replace a preexisting course offering. Students may create a course of study that focuses on an academic interest or a community outreach project within GFS or in the Germantown community. DIS minors have included philosophy, biology research, oil painting, creative writing, computer programming, and tutoring at GFS or local elementary schools. Students must consult with the Director of Independent Study to discuss the details of their DIS. Those who develop a DIS minor after course sign-up must register for a DIS minor before October 1. For more details, email the Director of Independent Study.

## Opportunities in World Languages

A variety of languages are offered for minor or major credit as part of the Directed Independent Study program that supplement the Modern Language and Classics offerings. Students may elect to take a language DIS in addition to, but not in place of, their foreign language requirement. A language DIS may be taught by an outside instructor or by a GFS teacher. Students wishing to create a DIS Major in a global language should refer to the previous section, Proposing a DIS Major.

When signing up, students should indicate their level of study in the notes section of the electronic sign-up form.

## **DIS540** American Sign Language

minor elective | grades: 9, 10, 11, 12

This DIS in American Sign Language and Deaf Culture is a credit/no credit course. Three levels are offered.

## **DIS500** Arabic

minor elective | grades: 9, 10, 11, 12

This DIS in Arabic language and culture is a credit/no credit course. Three levels are offered.

## **DIS900** German

minor elective | grades: 9, 10, 11, 12

This DIS in German language and culture is a credit/no credit course. Three levels are offered. Availability strictly limited by teacher's schedule.

## **DIS810** Italian

minor elective | grades: 9, 10, 11, 12

This DIS in Italian language and culture is a credit/no credit course. Three levels are offered.

## **DIS520** Japanese

minor elective | grades: 9, 10, 11, 12

This DIS in Japanese language and culture is a credit/no credit course. Three levels are offered.

## **DIS970** Russian

minor elective | grades: 9, 10, 11, 12

This DIS in Russian language and culture is a credit/no credit course. Availability strictly limited by teacher's schedule.

# GLOBAL ONLINE ACADEMY

GFS is a founding member of Global Online Academy, a consortium of outstanding independent schools offering an innovative selection of online courses. Sophomores, juniors, and seniors can supplement their education by taking an online course in a variety of interdisciplinary subjects offered by experienced teachers around the country and abroad.

Students in tenth through twelfth grades may elect, as part of their academic schedule, a semester course in the Global Online Academy (GOA). Students must be responsible in collaborating with their classmates across time zones as they complete class assignments. GOA online courses may be taken as an elective major or as an overload. Students considering registering for a GOA course should consult their grade and/or college counselor. Students enrolled in GOA courses will have weekly check-ins with the Site Director to assist and oversee student progress. GOA registration will take place through the GOA Site director. Sophomores will need to register with approval of Upper School Division Director. Once enrolled in a course, students will receive an email from the Global Online Academy about their course and what the next steps are.

The cost of a one-semester GOA course is \$100 per course. The Business Office will bill parents this amount. Should a student withdraw from a course after the drop date, there will be an additional \$200 fee. The cost of a summer course is \$750.

## KEY DATES

- SEMESTER 1: September 4 – December 20, 2019
- SEMESTER 2: January 15 – May 1, 2020
- YEARLONG: Both Semesters

## ART, MEDIA, AND DESIGN

### OFFERED IN SEMESTERS 1 AND 2

#### **GOA258** 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. We begin 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 will have the opportunity to work towards a personal presentation for the GOA Catalyst Conference. Students will, 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 will refer to the design process and will use journaling techniques to track, reflect, and evidence their understanding of architecture.

#### **GOA317** 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 will include individual and collaborative group projects, graphic design, content curation, analytical and creative writing, peer review and critiques, and online presentations.

## SEMESTER 1

### GOA253 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 will 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 will practice essential craft elements (e.g., voice, style, structure) while reflecting on stories from their own lives, communities, and interests. They will 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 will support one another intentionally. Feedback is an essential component of this course, and students will gain experience in the workshop model, actively participating in a thriving, global writing community.

## SEMESTER 2

### GOA272 Computer Science II: Game Design and 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 will work in teams to brainstorm and develop new games in response

to a theme or challenge. Students will develop their skills in communication, project and time management, and creative problem-solving while focusing on different aspects of asset creation, design, and coding. Prerequisites: Computer Science I: Computational Thinking or its equivalent.

*\*Cross-listed in Mathematics and Technology*

### GOA254 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.

## MATHEMATICS AND TECHNOLOGY

OFFERED IN SEMESTERS 1 AND 2

### GOA321 Cyber Security

Cyber criminals leverage technology and human behavior to attack our online security. This course explores the fundamentals of and vulnerabilities in the design of computers, networks, and the internet. Course content includes the basics of computer components, connectivity, virtualization, and hardening. Students will learn about network design, Domain Name Services, and TCP/IP. They will understand switching, routing and access control for internet devices, and how denial of service, spoofing and flood attacks work. Basic programming introduced in the course will inform hashing strategies, while an introduction to ciphers and cryptography will show how shared-key encryption works for

HTTPS and TLS traffic. Students will also explore the fundamentals of data forensics and incident response protocols. The course includes analysis of current threats and best practice modelling for cyber defense, including password complexity, security, management, breach analysis, and hash cracking. Computational thinking and programming skills developed in this course will help students solve a variety of cyber security issues. There is no computer science prerequisite for this course, though students with some background will certainly find avenues to flex their knowledge in this course.

## **GOA285** Game Theory

In this course, we 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 we can treat as mathematical games. We consider significant global events from fields like diplomacy, political science, anthropology, philosophy, economics, and popular culture. We 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.

## **GOA281** 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. We do some paper-and-pencil calculations early in the course, but the computer software package Geogebra (free) will be 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 will learn how to model social networks using matrices as well as discover things about the network with linear algebra as your tool. We will consider applications like Facebook and Google. Prerequisite: Geometry and Algebra 2 or the equivalents.

### SEMESTER 1

## **GOA298** 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. We progressively develop the tools needed to understand the RSA algorithm, the most common encryption scheme used worldwide. Along the way we invent some encryption schemes of our own and discover how to play games using number theory. We also get a taste of the history of the subject, which involves the most famous mathematicians from antiquity to the present day, and we see parts of the story of Fermat's Last Theorem, a 350-year-old statement that was fully proven only twenty years ago. While most calculations will be simple enough to do by hand, we will 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.

### SEMESTER 2

## **GOA272** Computer Science II: Game Design and 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. Prerequisites: Computer Science I: Computational Thinking or its equivalent.

*\*Cross-listed in Art, Media & Design*

### YEARLONG

## **GOA278** Multivariable Calculus

In this course, students learn to differentiate and integrate functions of several variables. We extend the Fundamental Theorem of Calculus to multiple dimensions and the course will culminate 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. We 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, and this allows us to break free from one-dimensional calculus and investigate paths, velocities, and other applications of science that exist in three-dimensional space. We

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 our study of differentials in multiple dimensions, we move to integral calculus. We use line and surface integrals to calculate physical quantities especially relevant to mechanics, electricity and magnetism, such as work and flux. We will 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.

## SCIENCE AND HEALTH

OFFERED IN SEMESTERS 1 AND 2

### GOA266 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 we consider 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.

### GOA267 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 will 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.

### GOA263 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 multi-faceted 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.

### GOA264 Medical Problem Solving I

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.

### GOA290 Neuropsychology

Neuropsychology is the exploration of the neurological basis of behavior. Within this course, students will learn about basic brain anatomy and function as well as cognitive and behavioral disorders from a neurobiological perspective. They will 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 will 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.

### **GOA305** 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, we will 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. We will 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 will 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 will also imagine, research, design, and create projects that they will share with a larger community. Throughout the development of these projects, students will collaborate with each other and seek ways to make their work experiential and hands-on. Students will 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.

### **GOA268** 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 we take up these topics and questions, students will 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.

## SEMESTER 2

### **NEW GOA350** 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.

### **GOA269** 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 Conference, 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.

## SOCIAL SCIENCES

### OFFERED IN SEMESTERS 1 AND 2

### **GOA331** 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 cyber-crime? What 21st century skills are you cultivating in your

leadership team? Students in this course will 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 will 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 will identify, analyze and propose solutions to business problems, engaging in research of traditional and emerging industries, from established multinationals to startups.

### **GOA319** Climate Change and Global Inequality

Nowhere is the face of global inequality more obvious than in climate change, where stories of climate-driven tragedies and the populations hit hardest by these disasters surface in every news cycle. In this course, students will interrogate the causes and effects of climate change, and the public policy debates surrounding it. In case studies, we will research global, regional, and local policies and practices along with the choices of decision makers and what they mean to the populations they serve. Who benefits, who suffers, and how might we change this equation? We will collaborate in workshops with classmates to deepen our collective understanding of the complex issues surrounding climate change. Throughout the semester, we will meet with professionals working in the field of climate change, and will also build and curate a library of resources and share findings in varied media, engaging as both consumers and activists to increase knowledge and advocate for sustainable norms. Finally, students will have the opportunity to reach a global audience by participating in GOA's Catalyst Conference in the spring, as they present their individual projects to spark change in local communities through well-informed activism.

### **GOA333** 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 & Pivots, Brand Strategy & 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.

### **GOA315** 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, you will go beyond the soundbites and menacing headlines to explore the context, causes, and consequences of the most pressing global issues of our time. Through case studies, you will 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, you will also identify and model ways to prevent, mediate, and resolve some of the most pressing global conflicts.

### **GOA312** Introduction to Investments

In this course, students simulate the work of investors by working with the tools, theories, and decision-making practices that define smart investment. We 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 taking calculated financial risks and leave this course not just with a simulated portfolio of investments, but the skills necessary to manage portfolios in the future.

### **GOA316** 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 will sharpen their ability to think like lawyers who research, write and speak persuasively. The course will focus 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 will approach such questions as the law and equity, the concept of justice, jurisprudence and legal ethics.

### **GOA332** Personal Finance

In this course, students learn financial responsibility and social consciousness. We will 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 will 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 will 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 will begin to consider how they can positively impact the world around them through their financial decisions.

### **GOA310** Prisons and 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, we immerse ourselves in the different forms of rhetoric and media that brought the U.S. and other nations to our present. We 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.

### **GOA317** 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 will 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 will 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 will explore, research, reflect on and discuss the complex set of relationships governing race and society.

#### **SEMESTER 1**

### **GOA330** 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.

### **GOA288** 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 will help them better understand their roles as consumers and workers, and someday, as voters and producers.

#### **SEMESTER 2**

### **GOA286** 9/11 In a Global Context

The tragedy of September 11, 2001 changed the world in profound ways. In this course, students explore the causes of 9/11, the events of the day itself, and its aftermath locally, nationally, and around the world. In place of a standard chronological framework, students instead view these events through a series of separate lenses. Each lens represents a different way to view the attacks and allows students to understand 9/11 as an event with complex and interrelated

causes and outcomes. Using a variety of technologies and activities, students work individually and with peers to evaluate each lens. Students then analyze the post-9/11 period and explore how this event affected the U.S., the Middle East, and the wider world.

### **GOA291** 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 will be our focus in this course. Students will 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 will then study theoretical methods of influencing national economic activity with monetary and fiscal policy and will learn about some of the controversy surrounding these policy tools. The advantages and disadvantages of international trade and of methods of setting exchange rates will also be introduced. The course will include an individual student investigation of a national economy other than their home country. Students will identify their economic findings and present resolutions in their final report.

### **NEW GOA340** 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 will 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, psychology), students will grapple with the complex ways in which society and religious identity relate to one another.



## NOTES





## NOTES



**GFS**

**GERMANTOWN FRIENDS SCHOOL**

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