



The Bronx High School of Science  
75 West 205 Street  
Bronx, New York 10468

Jean Donahue  
Principal

Course Guide  
For  
School Year 2018-19

© The Bronx High School of Science 2018

## **DIRECTORY OF ADMINISTRATORS**

<b>Jean Donahue</b>	<b>Principal</b>	<b>Room 135</b>
<b><u>ASSISTANT PRINCIPALS ADMINISTRATION</u></b>		
Andrew Nasser	Assistant Principal Pupil Personnel Services	Room 035I
Phoebe Cooper	Assistant Principal Organization	Room 135
<b><u>DEPARTMENT SUPERVISORS</u></b>		
David Colchamiro	Assistant Principal Social Studies Department	Room 307D
Allison Davis	Assistant Principal Biology Department	Room 329D
Rachel Hoyle	Assistant Principal Physical Science Department	Room 231D
Marci Papageorgiou	Assistant Principal English Department	Room 207D
Michael McGrath	Assistant Principal Physical Education Department	Room 002A
Vikram Arora	Assistant Principal Mathematics and Technology Department	Room 107D
Lisa Rocchio	Assistant Principal World Languages, Art and Music Department	Room 315D

## **Table of Contents**

<b>DIRECTORY OF ADMINISTRATORS .....</b>	<b>3</b>
<b>THE ENGLISH DEPARTMENT .....</b>	<b>5</b>
<b>THE SOCIAL STUDIES DEPARTMENT .....</b>	<b>10</b>
<b>THE MATHEMATICS DEPARTMENT .....</b>	<b>15</b>
<b>THE BIOLOGY DEPARTMENT .....</b>	<b>21</b>
<b>THE PHYSICAL SCIENCE DEPARTMENT.....</b>	<b>29</b>
<b>THE WORLD LANGUAGES DEPARTMENT .....</b>	<b>36</b>
<b>THE ARTS.....</b>	<b>40</b>
<b>THE PHYSICAL EDUCATION DEPARTMENT.....</b>	<b>45</b>
<b>FRESHMAN REQUIRED MINORS.....</b>	<b>46</b>
<b>SOPHOMORE REQUIRED MINORS .....</b>	<b>47</b>
<b>GRADUATION REQUIREMENTS .....</b>	<b>49</b>
<b>COURSE SELECTION AND CRITERIA INFORMATION FOR SPECIAL PERMISSION CLASSES.....</b>	<b>51</b>
<b>PROGRAM PLANNING GUIDELINES .....</b>	<b>59</b>
<b>ON-LINE ELECTRONIC COURSE GUIDE .....</b>	<b>63</b>

# **THE ENGLISH DEPARTMENT**

## **FRESHMAN ENGLISH CLASSES**

### **EES81 - FRESHMAN ENGLISH**

(5 periods per week for 1 year – Not a Special Permission course)

This course, aligned with the Grade 9-10 grade band of Common Core Learning Standards, strengthens fundamental skills in reading, writing, language use and speaking and listening. Students engage in the writing process and peer edit, attending to the “writer’s dirty dozen”: subject/verb agreement, verb tense consistency, pronoun/antecedent agreement, relative pronoun agreement, wrong word/diction, audience/purpose, adverb/adjective errors, dangling/misplaced modifiers, sentence fragments/run-ons, parallelism, faulty comparatives, and proper capitalization. Students focus on writing evidence-based arguments. Anchor texts for ninth grade units may include: *Things Fall Apart*, *A Raisin in the Sun*, *The Odyssey*, *A Tree Grows in Brooklyn*, *A Lesson Before Dying*, *Ethan Frome*, *Midsummer Night’s Dream*, *Romeo & Juliet*, *Julius Caesar*, *Taming of the Shrew*, and *Animal Farm*. In a minimum of six theme based units, students read from a variety of genres (including drama, memoir, novel, short story, nonfiction) to explore the essential question for Freshman English: **How do conflict and growth shape identity?**

## **SOPHOMORE ENGLISH CLASSES**

### **EWS11 – RHETORIC AND COMPOSITION**

(5 periods per week for 1 term – Not a Special Permission course)

Rhetoric and Composition is a one-term course taken in addition to 10th Grade English or Speech, with the purpose of developing the practical writing skills required of challenging colleges and careers. Guided by rubrics and templates, students write argument, informational and narrative essays. They identify and analyze rhetorical strategies and logical fallacies, practice synthesizing diverse source material, and gain confidence in using the writing process, visible in their portfolios, to participate in academic discourse. Texts include Graf’s *They Say, I Say* and Lopate’s *The Art of the Personal Essay*.

### **EES83 – SOPHOMORE ENGLISH**

(5 periods per week for 1 year – Not a Special Permission course)

This course, aligned with the Grade 11-12 grade band of Common Core Learning Standards, enriches students’ skills in reading, writing, language use and speaking and listening. Students continue to engage in the writing process, attending to the “writer’s dirty dozen,” with a focus on mastering the literary analysis essay and the synthesis essay, inspired by readings of memoirs, articles, novels, short stories, visual texts and plays. Anchor texts may include: *Macbeth*, *The Kite Runner*, *The Merchant of Venice*, *The Tempest*, *Canterbury Tales*, *Beowulf*, *Lord of the Flies*, *Dracula*, *Frankenstein*, *1984*, *Brave New World*, *Cry the Beloved Country*, *Jekyll and Hyde*. Book club selections relate to the course’s essential question and include *First They Killed My Father*, *The Bookseller of Kabul*, *Persepolis*, *How the Garcia Girls Lost Their Accents* and *Balzac and the Little Chinese Princess*. In a minimum of six theme based units, students explore the essential question for Sophomore English: **To what extent do the values of a culture influence the roles and rights of the individual?**

## **EES83HF – HONORS SPEECH**

(5 periods per week for 1 year, Special Permission required)

This Sophomore English Honors course, in addition to following the Sophomore English curriculum and exploring the same essential question through minimally six theme based units of study, provides instruction in debate and public speaking. Students read self-selected titles related to the essential question in book clubs and study Shakespeare plays and classic novels as a whole class. Anchor texts may include *1984*, *Cantebury Tales*, *A Tale of Two Cities*, *The Kite Runner*, *The Merchant of Venice* and *Macbeth*. One fourth of the course will be devoted to speech and debate. Students learn how to deliver an original speech and to debate using logic, rhetorical language, and rhetorical strategies. No previous experience in speech and debate is necessary or preferred.

## **JUNIOR ENGLISH CLASSES**

### **EES85 – AMERICAN LITERATURE**

(5 periods per week for 1 year – Not a Special Permission course)

This course, aligned with the grade 11-12 grade band of Common Core Learning Standards, focuses on topics in American culture. Students pursue at least six units of study, each of which may include novels, plays, poetry, short stories and/or nonfiction works (e.g. historical documents, sermons, newspaper articles) that help define American society, culture and values. They build on their mastery of a variety of essay types learned as underclassmen (argument, informational, personal narrative). They work frequently on group projects which build critical reading, thinking, and writing abilities, as they prepare to take the English Regents exam in June. Anchor texts may include: *The Scarlet Letter*, *The Crucible*, *Song of Solomon*, *Ragtime*, *Black Boy*, *The Invisible Man*, *The Joy Luck Club*, *Sister Carrie*, *The Age of Innocence*, *Incidents in the Life of a Slave Girl*, *Girl in Translation*, *The Jungle*, *Walden*, *Fences*, *Huckleberry Finn*, *The Great Gatsby*, *Death of a Salesman*, and/or *A Streetcar Named Desire*. Each unit centers around the 11th grade essential question: **How does the American dream involve both oppression and opportunity?**

### **EES85XH – ADVANCED PLACEMENT AMERICAN STUDIES, (AP Language: American Studies)**

(5 periods per week for 1 year, Special Permission required)

This interdisciplinary course will align the curricula of A.P. English Language and Composition and A.P. U.S. History and Government. Students will explore American history and literature from the country's foundations through the present day and think critically about contemporary American culture and its origins. They will discuss how individuals develop identities and form communities, examine how writing inspires action, investigate how historical context influences writers, and explore how concepts like racism, nativism, assimilation, class, and gender shape American life. In the process, students will analyze art and music and—most frequently—read challenging fiction and non-fiction sources. They will learn to write about these sources with care and precision. By May, students will be prepared to take both the A.P. English Language and A.P. United States History exams. **Students must take both HUS21XE and EES85XH.**

## **EES85X – ADVANCED PLACEMENT ENGLISH LANGUAGE AND COMPOSITION**

(5 periods per week for 1 year, Special Permission required)

Advanced Placement Language & Composition is a college level course that builds on the 10<sup>th</sup> grade Rhetoric & Composition writing class, as well as on all previous English classes, to deepen knowledge of rhetoric, to immerse students in the study of a variety of prose styles and text purposes, and to enable students to comprehend and analyze complex texts. This course is aligned to the 11-12 grade band of the Common Core Learning Standards and to the College Board Standards for College Success (i.e. rhetorically analyzing author's purpose, audience, craft, use of literary and rhetorical devices, language and style; making stylistic choices with language to achieve intended effects; understanding the transactional nature of the communication process and understanding, interpreting, analyzing and evaluating media communication). Units of study mirror those in 11<sup>th</sup> Grade American Literature and explore the same essential question while proceeding at a brisker pace and focusing more on nonfiction texts. Anthologies include *Conversations in American Literature*, *50 Essays and Argument in America*. Performance tasks are aligned to College Board standards and to AP exam tasks, as well as to tasks on the English Regents exam taken in June. Students may take the Advanced Placement test in May.

## **SENIOR ENGLISH CLASSES**

### **EES87 – WORLD LITERATURE**

(5 periods per week for 1 year – Not a Special Permission course)

Senior English is a course that starts with a unit on the personal narrative essay, culminating in the college essay, and which includes at least five more theme-based units of study, including one on the short story and one on poetry. Anchor texts may include *Hamlet*, *Othello*, *King Lear*, *Antigone*, *Jane Eyre*, *Pygmalion*, *The Stranger*, *The Plague*, *Native Son*, *The Bluest Eye*, *Their Eyes Were Watching God*, *The Overcoat* and *Metamorphosis*. Anchor texts are supplemented with nonfiction poems and short stories from *Literature: An Introduction to Reading and Writing*. Units are aligned to the 11-12 grade band of the Common Core Learning Standards and to the College Board Standards for College Success in Language Arts, include tasks aligned to the SAT, and address the 12<sup>th</sup> grade essential question: **How is power legitimately gained, used or justified?**

### **EES87XC – ADVANCED PLACEMENT LITERATURE: CREATIVE WRITING**

(5 periods per week for 1 year, Special Permission required)

Students who appreciate nuance, creative expression and frequent peer review may wish to take this AP Literature course that also involves creative writing and a focus on developing an individual style as a writer. It prepares students for success on the AP Literature exam in May but also asks students to view literature studied as mentor texts to inspire their own creative efforts. Six units of study parallel those in the sister course (AP Literature: Traditions) but culminating assessments for each unit involve writing creatively. Projects may include multimedia and genre studies, research using MLA style, crafting spoken word and poetry, writing longer stories and creative nonfiction, and/or creating podcasts and films. Students review aesthetics and critical schools of thought to examine a work's structure, style, and themes through a particular lens, and attend to smaller-scale elements of fiction, drama and poetry (eg figurative language, symbolism, and tone) as practitioners of the craft rather than merely as literary scholars. Using a "learning by doing" approach, will workshop a portfolio of their own work by the end of the course, having applied what they learned as critics to works of

their own. Selected texts are chosen from several genres and periods to reflect a survey of World Literature - from the sixteenth century to the twenty-first century. Reading is accompanied by thoughtful discussion and analytical writing. Literature and Composition: An Introduction to Reading and Writing (Jago) is the course anthology.

### **EES87X – ADVANCED PLACEMENT LITERATURE: TRADITIONS**

(5 periods per week for 1 year, Special Permission required)

Advanced Placement Literature and Composition mirrors the same progression of theme-based units of study seen in 12<sup>th</sup> Grade World Literature, all linked by the same essential question, but it proceeds at a faster pace and tasks assume the ability to do rigorous college level work. Units are supported by the AP reader *Literature: An Introduction to Reading and Writing* and begin with the personal narrative essay, culminating in the college essay. They may include studies of poetry as a marriage of form and function, the bildungsroman's hegemonic ideology, world views of women and madness in literature, Shakespeare Studies and/or Existentialism. Students in this class may take the Advanced Placement test in May and engage in interdisciplinary multimedia projects at the end of the year.

## **ELECTIVE MINORS IN ENGLISH**

**ELECTIVE MINORS in English are specially designed workshop courses. Students who wish to take any of the below classes must also take a regular English class.**

### **EJS21QNM - JOURNALISM WORKSHOP (NEWSPAPER & YEARBOOK)**

(5 periods per week for 1 year –Special Permission rrequired – Elective Minor)

This is an elective minor for juniors and seniors who would like to learn how to produce two award-winning publications, our school's yearbook The Observatory, and our school's newspaper The Science Survey, and are interested in creative writing, journalistic writing, and the art of photography. Students will develop marketable skills in layout and design (Adobe Creative Suite: InDesign CC and PhotoShop CC), creative and journalistic writing, editing, proofreading, journalistic photography, time management, and advertising. Students must exhibit creativity, organization, responsibility, and they must have skills in photography and writing. Even for those not interested in journalism as a career, the class offers an invaluable opportunity to master interviewing and reporting skills and the ability to write and speak clearly for a particular audience, and the chance to learn how a variety of professionals conduct research and collaborate for a variety of purposes (e.g. business, advertising, and desktop publishing). Traditional photography principles such as the art of composition; adjusting white balance, aperture, and shutter speed; and the history of photography, will be taught. All participants will be expected to work outside of class and to meet after school during certain times of the year. In addition to individual responsibilities, all participants have a duty to the entire student body and to the school to produce newspaper articles and a printed yearbook of the highest quality. The Journalism Workshop is a very rewarding experience for students who are willing to work hard. Students are especially encouraged to join the Journalism Workshop during their junior year, as they are most likely to receive leadership positions during their senior year, if they make a two year commitment to the program. Interested applicants should contact Mr. Thorp.

## **EJS21QND - YEARBOOK GRAPHIC DESIGN STUDIO WORKSHOP**

(5 periods per week for 1 year – Special Permission rrequired – Elective Minor)

Graphic Design is the art and technique of using both text and images to effectively communicate a message. Students will focus on the principles and elements of graphic design in the development of visual ideas for our award winning yearbook, *The Observatory*, using state-of-the-art computers, software, and Nikon cameras in the Yearbook Graphic Design Studio class. You will learn the industry-standard design program Adobe Creative Suite (Adobe CC Version), including InDesign, Photoshop, and Illustrator. After learning the basics of graphic design, you will apply your graphic design, photography, and compositional skills towards designing all of the spreads in the yearbook. Color theory, typography, promotional advertising, pre-press, and page layout are some of the concepts which will be explored. You will also work on designing other school publications when the need arises, and work on web design for Bronx Science's online newspaper. Students will also learn the basics of journalistic photography, becoming acquainted with professional Nikon Digital SLR cameras and lenses (including prime lenses), studio lighting, and digital correction, and will learn the basics of Adobe Photoshop CC. Digital photography assignments will expose students to the full range of photojournalism. The objective of this fundamental program is to strengthen a student's visual acuity and to enhance conceptual and creative thinking.

## **THE SOCIAL STUDIES DEPARTMENT**

The Social Studies Department of The Bronx High School of Science develops courses and techniques that stimulate active and analytical learning about a great variety of subjects that encompass the social sciences. The following pages, which describe this department's elective and required offerings, are dedicated to achieving these goals.

### **FRESHMEN SOCIAL STUDIES COURSES**

#### **HGS41 – GLOBAL HISTORY 1**

(5 periods per week for 1 year – Not a Special Permission course)

This course is the first of a 2-year sequence that satisfies the New York State Global Studies requirement. The course covers world history from pre-historic times to 1789.

Or

#### **HGS41X – ADVANCED PLACEMENT WORLD HISTORY**

(5 periods per week for 1 year – criteria provided to incoming freshman upon acceptance)

This is the first of a 2-year sequence that culminates in the taking of the Advanced Placement World History exam and fulfills the New York State Regents requirement in Global Studies. It is open to highly motivated students with a strong interest in history and demonstrated superior writing and research skills. Students are expected to handle college level texts and primary sources.

### **SOPHOMORE SOCIAL STUDIES COURSES**

#### **HGS43 – GLOBAL HISTORY 2**

(5 periods per week for 1 year – Not a Special Permission course)

This course covers world history from 1789 to contemporary times. Some of the topics included in the first term are the revolutions of the early nineteenth century, economic and social changes, nationalism, imperialism, World War I, and the Russian revolution. Issues covered in the second term include fascism, World War II, the Cold War, Post- World War II economics, the Chinese Communist Revolution, Post- World War II Africa, Post WWII South East Asia, Latin America, the collapse of communism and the break-up of the Soviet Union and current world affairs.

#### **HGS43XE – ADVANCED PLACEMENT EUROPEAN HISTORY**

(5 periods per week for 1 year - Special Permission required)

The sophomore course will cover the period from 1400 to the contemporary times. It replaces Global Studies 3- 4 and uses a high level textbook and supplementary reading material. There will be supplementary primary and interpretive readings. The class will be conducted primarily in discussion fashion but may include lectures, panel discussions, and debate. Considerable attention will be paid to developing writing and interpretive skills for test essays and for research. There is a research requirement. In addition to taking the Global Studies Regents, students enrolled in this class may take the Advanced Placement exam in May.

## **HGS43XW – ADVANCED PLACEMENT WORLD HISTORY – YEAR 2**

(5 periods per week for 1 year – Special Permission required)

This is the continuation of the two-year Advanced Placement World History (HGS41X) course. All freshmen currently in Advanced Placement World History must take the second year of the course. No other students may enroll in this course.

Prerequisite: HGS41X

## **JUNIOR SOCIAL STUDIES COURSES**

Students may take either of the following classes to satisfy their Junior Social Studies requirement:

- U.S. History and Government
- Advanced Placement U.S. History
- Advanced Placement American Studies

## **HUS21 - U.S. HISTORY AND GOVERNMENT**

(5 periods per week for 1 year – Not a Special Permission course)

This course begins with the American Revolution and ends with contemporary times. The study of the function of American Government is emphasized throughout the year.

## **HUS21X – ADVANCED PLACEMENT US HISTORY**

(5 periods per week for 1 year - Special Permission required)

This course addresses the Advanced Placement American History Program and prepares students to take the AP US History Examination in May. We begin with the Colonial period and continue through to contemporary times. The course prepares students for the United States History and Government Regents in June.

## **HUS21XE – ADVANCED PLACEMENT AMERICAN STUDIES, (AP US HISTORY: American Studies)**

5 periods per week for 1 year – Special Permission required)

This interdisciplinary course will align the curricula of A.P. U.S. History and Government and A.P. English Language and Composition. Students will explore American history and literature from the country's foundations through the present day and think critically about contemporary American culture and its origins. They will discuss how individuals develop identities and form communities, examine how writing inspires action, investigate how historical context influences writers, and explore how concepts like racism, nativism, assimilation, class, and gender shape American life. In the process, students will analyze art and music and—most frequently—read challenging fiction and non-fiction sources. They will learn to write about these sources with care and precision. By May, students will be prepared to take both the A.P. English Language and A.P. United States History exams. **Students must take both HUS21XE and EES85XH.**

## **SENIOR SOCIAL STUDIES COURSES**

Any of the following classes will fulfill the senior Social Studies requirement. Where noted, some of these classes may be taken as a 5<sup>th</sup> or 6<sup>th</sup> major.

## **ADVANCED PLACEMENT CLASSES**

### **HFS21XU – ADVANCED PLACEMENT UNITED STATES GOVERNMENT AND POLITICS WITH ECONOMICS**

(5 periods per week for 1 year - Special Permission required)

(May also be taken as a 5<sup>th</sup> or 6<sup>th</sup> major – HFS21XU5/HFS21XU6)

The course begins by examining the basic principles that underlie how our federal government is designed. The role of political parties and interest groups is examined. Topics such as the differences in the way that citizens of different races and gender vote and issues surrounding the relationship between the branches of government will be examined by a series of case studies. Topics include campaign finance reform and its relationship to the First Amendment to the Constitution. The course will cover the Supreme Court and some of its recent decisions in the area of civil rights and civil liberties. Additional topics, lessons and assignments will satisfy the requirements for *Economics, the Enterprise System and Finance*.

Students who take the course may take the AP Exam in May.

### **HFS21XC – ADVANCED PLACEMENT COMPARATIVE GOVERNMENT AND POLITICS WITH ECONOMICS**

(5 periods per week for 1 year - Special Permission required)

(May also be taken as a 5<sup>th</sup> or 6<sup>th</sup> major – HFS21XC5/HFS21XC6)

The comparative politics course focuses on the governments and policies of six core countries: China, Great Britain, Mexico, Nigeria, Iran, and Russia. Throughout the course, students learn to make systematic comparisons and evaluate the different political systems involved. Students who are interested in a senior course that is explicitly focused on issues outside of the American context will find this course stimulating. Additional topics, lessons and assignments will satisfy the requirements for *Participation in Government and Economics, the Enterprise System and Finance*.

### **HFS21XW – ADVANCED PLACEMENT MICROECONOMICS WITH GOVERNMENT**

(5 periods per week for 1 year - Special Permission required)

(May also be taken as a 5<sup>th</sup> or 6<sup>th</sup> major – HFS21XW5/HFS21XW6)

Microeconomics is the theory of the free market that focuses on how business owners and households make economic decisions. Additional topics, lessons and assignments will satisfy the requirements for *Participation in Government*.

### **HFS21XA – ADVANCED PLACEMENT MACROECONOMICS WITH GOVERNMENT**

(5 periods per week for 1 year - Special Permission required)

(May also be taken as a 5<sup>th</sup> or 6<sup>th</sup> major – HFS21XA5/HFS21XA6)

Macroeconomics is the theory of the free market that looks at the economy as a whole. It includes national income and price determination, economic performance measures, economic growth and international economics. Money, banking, monetary policy and inflation are important topics. Additional topics, lessons and assignments will satisfy the requirements for *Participation in Government*.

## **HFS21XB – ADVANCED PLACEMENT ECONOMICS WITH GOVERNMENT**

(5 periods per week for 1 year - Special Permission required)

(May also be taken as a 5<sup>th</sup> or 6<sup>th</sup> major – HFS21XB5/HFS21XB)

This Advanced Placement course is taken in place of the regular senior social studies requirement and is an accelerated combination of both Advanced Placement Economics courses. Upon completion of this course, students may take the Advanced Placement Microeconomics *and* Macroeconomics examinations. Additional topics, lessons and assignments will satisfy the requirements for *Participation in Government*.

## **SENIOR SOCIAL STUDIES COURSES**

### **HVS11/HES11 – PARTICIPATION IN GOVERNMENT/ECONOMICS**

(5 periods per week for 1 year – Not a Special Permission course)

This senior course satisfies the graduation requirement. The Participation in Government course is taught during the fall term. The curriculum includes a study of the American system of government. The Constitution is a focal point of study and it is examined from both historical and contemporary perspectives. Students will also be involved in a “participation in government” experience. The spring term is devoted to an examination of the American economy. Basic economic institutions will be examined including banking, labor, taxation and international trade. Comparisons will be made with other economic systems.

The first term will be Participation in Government and the second will be Economics.

## **SOCIAL STUDIES ELECTIVE MINOR:**

### **HQS21 - HOLOCAUST LEADERSHIP CLASS**

(5 periods per week in class + 5 periods arranged per week for 1 year – Special Permission required)

The Holocaust Leadership elective is one of the most unique classes found in any high school in the world. Students selected for this course become administrators in Bronx Science’s internationally renowned Holocaust Museum. The leadership class meets one period each day and students must be willing to serve one additional period a day (arranged hours). Interested students should see the Director of the Holocaust Museum in Room 214 or the Social Studies Department Chairman in room 307D.

### **HQS21QD – SPEECH AND DEBATE LEADERSHIP**

(5 periods per week for 1 year - Special Permission required – Elective Minor)

This leadership course is open to officers of the Bronx Science Speech and Debate Team. The focus of this class is to develop leadership skills which will allow the student officers to fulfill the responsibilities required for managing a “World-Class” Speech and Debate Team. Class time will be used for the head coaches and officers to discuss and review Policy and Lincoln-Douglas debate strategies as well as Individual Events techniques.

## **SOCIAL SCIENCE RESEARCH PROGRAM**

The research program in the social sciences offers students an opportunity to do original research in all areas of social science, including but not limited to sociology, psychology, economics, political science and religious and ethnic studies. *Interested students apply for sophomore research courses in the spring of their freshman year.* Students who are accepted into the program take a three-year sequence of research courses. During this time, they develop and complete an independent research project and write a scientific paper, which they submit to Regeneron Science Talent Search and other scientific competitions in their senior year. Students generally spend part of two summers working on their projects. Students also participate in a variety of problem-solving individual and team projects and skill-building activities in the classroom.

### **HQS61QJ – SOPHOMORE SOCIAL SCIENCE RESEARCH**

(5 periods per week for one year –Special Permission required. Satisfies the Sophomore required minor requirement. See page 47 for list of all options which satisfy this requirement.)

Students will develop an individual independent research project and write a formal research proposal, which they will present and defend during the spring semester. In addition, students will participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. They will receive individual guidance at every stage of the process: narrowing down the areas of research that interest them, selecting, contacting, and interviewing with potential mentors, discipline-specific training in their area of research, including, writing a research proposal (during sophomore year), completing their research (during Junior year), and entering research competitions (during Senior year). Students are generally expected to devote part of the summer between their sophomore and junior year to working on their research project.

It is expected that students who enroll in the research program will complete the three-year sequence.

### **HQS63QJ - JUNIOR SOCIAL SCIENCE RESEARCH**

(Up to 3 periods per week for one year – Special Permission required, elective minor)

Students continue to work on their individual independent research projects. They present a research progress report during the fall semester and write a draft of their research paper in the spring semester. They continue to participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. Students are expected to devote part of the summer between their junior and senior year to working on their research project.

### **HQS65QJ – SENIOR SOCIAL SCIENCE RESEARCH**

(Up to 3 periods per week for one year – Special Permission required, elective minor)

Students complete their individual independent research projects. The product of the research work is the scientific research paper. Students will submit their papers to Regeneron STS, NYCSEF, SIGMA Xi, JSHS, and other research competitions. Students will present a research seminar during the spring semester and provide assistance to sophomore and junior research students.

# THE MATHEMATICS DEPARTMENT

The Mathematics Department of the Bronx High School of Science builds directly on the curriculum standards set forth by the National Council of Teachers of Mathematics. These standards present a balance among conceptual understanding, procedural skills and problem solving.

The following four standards are the important conceptual areas of mathematics:

- Number and Operation Concepts
- Geometry and Measurement Concepts
- Function and Algebra Concepts
- Statistics and Probability Concepts

Bronx Science students will be able to apply these concepts in multiple ways using numbers, graphs, symbols, diagrams, and words.

Complementing the conceptual standards are the following four standards\*:

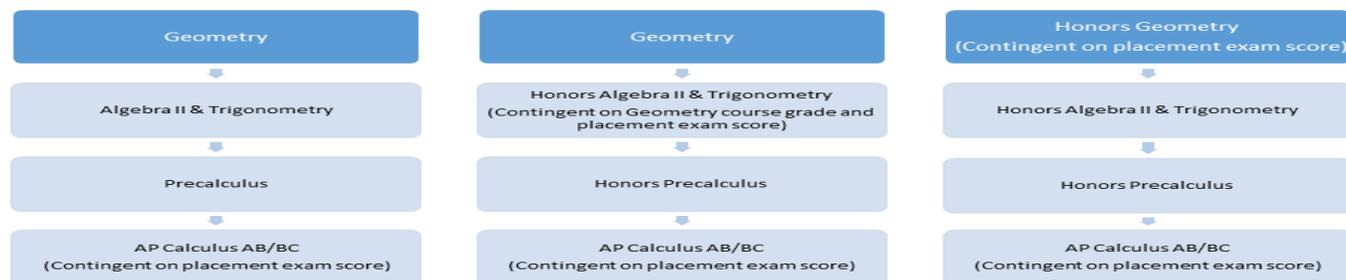
- Problem Solving and Reasoning
- Mathematical Skills and Tools
- Mathematical Computation
- Mathematics Applications

\*Adapted from the first edition of the New York City Performance Standards in Mathematics.

## REQUIRED MATHEMATICS COURSES

Algebra I .....	MES21, MES22
Geometry .....	MGS21, MGS22
Algebra II & Trigonometry .....	MRS21, MRS22
Precalculus .....	MPS21, MPS22

Note: Honors courses are designated with the letter “H” after the course code. Acceptance to the Honors Mathematics Program is determined by a placement exam taken as an incoming freshman or as a rising sophomore. Honors Algebra II & Trigonometry is the prerequisite course for Honors Precalculus. The following flowchart depicts three possible four-year course sequences leading to AP Calculus AB or AP Calculus BC.



## **ADVANCED PLACEMENT ELECTIVE MATHEMATIC COURSES**

### **MCS21XA - ADVANCED PLACEMENT MATHEMATICS - CALCULUS AB**

(5 periods per week for 1 year – Special Permission required)

### **MCS21XB - ADVANCED PLACEMENT MATHEMATICS - CALCULUS BC**

(5 periods per week for 1 year – Special Permission required)

Calculus AB and Calculus BC are college-level courses offered to students who have completed four years of high school mathematics or the equivalent. Calculus BC is more extensive and more intensive than Calculus AB. Students may receive college credit and/or advanced standing in college placement depending upon the mark received on the required College Board Advanced Placement exam given in May.

Prerequisite: Precalculus (MPS21/MPS21H). Advanced Placement Calculus cannot be taken in addition to MCS21C – Calculus

### **MKS21X - ADVANCED PLACEMENT COMPUTER SCIENCE A (JAVA)**

(5 periods per week for 1 year – Special Permission required)

The AP Computer Science course is the equivalent of an introductory computer science course offered at colleges and universities. Students will learn object-oriented programming through a number of structured projects in the Java programming language. Topics include basic programming concepts, such as basic program design, variable declaration, method design, loops, control structures, and recursion, as well as classes and data structures.

Prerequisite: Introduction to Computer Science (MKS21QJ)

### **MSS21X - ADVANCED PLACEMENT STATISTICS**

(5 periods per week for 1 year – Special Permission required)

The AP Statistics course is the equivalent of an introductory statistics course offered in colleges and universities. The course deals with the statistical methodology used in research, data analysis, and the theoretical basis for these statistical techniques. It includes probability distributions, hypothesis testing and linear regression. Students interested in mathematics, engineering, business, or the biological or social sciences, and who have shown evidence of mathematical proficiency, are excellent candidates for this course. The material covered is extremely valuable to those planning to engage in research in science, mathematics or the social sciences. The course may be taken in junior or senior year. Students may receive college credit and/or placement depending upon the mark received on the required College Board Advanced Placement exam given in May.

## **POST-AP MATHEMATICS COURSES**

### **MCS21CM – MULTIVARIABLE CALCULUS & PARTIAL DIFFERENTIAL EQUATIONS**

(5 periods per week for 1 year – Special Permission required)

This course extends the limit, differentiation, and integrations concepts of first year calculus to functions of more than one independent variable. Some topics covered are the geometry of space, vector-valued functions, tangential and normal components of acceleration, cylindrical coordinates, spherical coordinates, curvature, Kepler's Laws, functions of several variables, increments and differentials, directional derivatives, partial derivatives, Lagrange multipliers, multiple integrals, surface area, vector calculus, line integrals, Green's theorem, curl and

divergence, surface integrals, the divergence theorem and Stokes theorem. Students will solve problems by methods of traditional analysis and through the use of 2D and 3D web based graphers. Some applications include proving theorems from Euclidean geometry using vectors, analysis of Magnus forces, Cobb-Douglas production function, static equilibrium, analysis of sags in beams used in construction. The applications of concepts are made as visual as possible through the use of technology. The course concludes with an introduction to partial differential equations. .

Prerequisite: AP Calculus AB (MCS21XA) or Corequisite: AP Calculus BC (MCS21XB)

### **MQS21CA – LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS**

(5 periods per week for 1 year – Special Permission required)

Students will gain experience using differential equations to explore various phenomena such as electric fields, forensic evidence, drug metabolism, predator-prey interactions, electrical circuits, chemical reactions, and chaotic motion. Students will be taught to solve systems of linear equations using matrices leading to the development of vector spaces. Solutions to first and second order differential equations will be explored by analytic methods as well as interactive computer software and graphing calculators. Students interested in pursuing careers in math, physics, engineering (electrical, civil, aerospace, chemical) as well as medical research would benefit greatly from taking this course.

Prerequisite or corequisite: AP Calculus AB (MCS21XA) or AP Calculus BC (MCS21XB)

### **MKS21CA – APP DEVELOPMENT**

(5 periods per week for 1 year)

Students will create programs written in Java to run on the Android Operating System. Topics covered in the course will include fundamental concepts in Android programming and designing user interfaces. Students will work both terms to create fully functional Apps that can be used on Android phones or tablets.

Prerequisite: Advanced Placement Computer Science course (MKS21X)

### **MKS21CG – GAME PROGRAMMING**

(5 periods per week for 1 year)

Students will apply their knowledge of Computer Science concepts to game design and programming. The concepts that will be discussed include artificial intelligence, collision detection, matrices, high-level event handling, game state management. Cohesive storyline development will also be discussed. Student will utilize concepts covered to develop a game for a major gaming console by the end of the course.

Prerequisite: Advanced Placement Computer Science course (MKS21X)

## **NON SPECIAL PERMISSION COURSES**

### **MCS21C - CALCULUS**

(5 periods per week for 1 year)

This course covers the scope of a first year college calculus course. It is designed for seniors who have completed Precalculus and are not taking Advanced Placement Calculus.

Prerequisite: Precalculus (MPS21/MPS21H)

## **MQS21QA – ALGORITHMS**

(5 periods per week for 1 year)

ALGORITHMS are everywhere. They play the stock market, decide whether you can have a mortgage and may one day drive your car for you. Even Google is an algorithm – a search Algorithm. Algorithms are recipes for solving computational problems. Algorithms is for students with an interest in theoretical computer science. There will be a heavy emphasis on proof, as students will analyze the effectiveness and efficiency of the algorithms presents and the algorithms created. In this course we will study fundamental algorithms. More importantly, we will focus on general design and analysis techniques that underlie these algorithms. Students will also learn to implement data structures, which help us to organize large amounts of information, and develop the algorithms necessary to build and maintain them.

Prerequisite or corequisite: Algebra 2 (MRS21) and Coding for All (MKS11)

## **MKS21CC – INTRODUCTION TO C++ PROGRAMMING WITH APPLILCATIONS TO FINANCE**

(5 periods per week for 1 year)

C++ is arguably the most important of the programming languages given its run time efficiency, access to hardware level functionality and the profligacy of well optimized libraries. C++ is the language of choice in any real time environment and therefore has huge applications in the Wall Street banks besides other enterprise applications. C++ provides a distinct competitive advantage to participants in coding competitions like the USA computing competition. Knowledge of C++ will boost the prospects of anyone serious about pursuing a career in engineering and computer science. This course provides in-depth coverage of object-oriented programming principles and techniques using C++. Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, exceptions, container classes and low-level language features like pointers. Additionally this course also teaches students about symbolic computing in Mathematica. Mathematica can generate code in C which can be embedded in C++ applications. Students will gain practical skills in problem solving as well as preparation for the USA Computing Olympiad. As capstone project, students will learn how to write real life applications for the financial industry. These projects will include trading simulations, and financial derivative pricing.

Prerequisite or corequisite: Advanced Placement Computer Science course (MKS21X)

## **MKS21CE – MATHEMATICAL APPLICATIONS IN ENGINEERING**

(5 periods per week for 1 year)

Mathematical Applications in Engineering introduces students to the real-life applications of mathematics in the world of engineering. This course is designed to connect specific mathematical concepts learned throughout junior and senior years to structural engineering, finite element analysis, optimization, and computing. Finite Element Analysis is a relatively new discipline in engineering allowing for efficient problem-solving techniques that previously were difficult or impossible to perform. Increasingly more engineering firms are implementing Finite Element Analysis to solve complex real-life problems in a simple and systematic way. Students will also apply vectors and matrices for Matlab computing language to analyze truss-bridges. Since this course requires Calculus as a corequisite, derivatives and integrals are being utilized in the second semester of this course to calculate loading conditions & internal behaviors of structures. At the end of the course, students will have acquired all the necessary knowledge and experience to decide to embark on a career of engineering and to be a part of improving human civilization. Prerequisite or corequisite: Calculus (MCS21C), AP Calculus AB (MCS21XA) or AP Calculus BC (MCS21XB)

## **THE MATHEMATICS DEPARTMENT ENRICHMENT PROGRAM**

### **MQS81 – FRESHMAN MATH TEAM**

### **MQS83 - SOPHOMORE MATH TEAM**

### **MQS85 – JUNIOR MATH TEAM**

### **MQS87 – SENIOR MATH TEAM**

(Up to 5 periods per week for 1 year – Elective Minor – Final team selection is determined by a qualifying exam – taken in lieu of lunch)

The sophomore, junior and senior math teams are designed for sophomores, juniors, and seniors who are interested in mathematics competitions. Students will be taught interesting mathematics and advanced problem solving techniques. The teams enter several local and international competitions such as NYML, NYCIML, and A&P. These teams meet during a lunch period and students are permitted to eat lunch in class. Note: Math Team enrollment is based upon a qualifying examination. Prerequisite: Previous year's Math Team

## **MATHEMATICS & COMPUTER SCIENCE RESEARCH PROGRAM**

The research program in mathematics and computer science offers students an opportunity to do original research in all areas of mathematics and computer science, including but not limited to applied computer science, pure computer science, quantum computing, computational quantum physics, computational biochemistry, computational medicine, quantitative economics, mathematical modeling for sciences, numbers theory and cryptography. *Interested students apply for sophomore research courses in the spring of their freshman year.* Students who are accepted into the program take a three-year sequence of research courses. During this time, they develop and complete an independent research project and write a scientific paper, which they submit to Regeneron Science Talent Search and other scientific competitions in their senior year. Students generally spend part of two summers working on their projects. Students also participate in a variety of problem-solving individual and team projects and skill-building activities in the classroom.

### **MQS61QJ – SOPHOMORE MATHEMATICS/COMPUTER SCIENCE RESEARCH**

(5 periods per week for 1 year – Special Permission required) After completion of this course, students will satisfy the sophomore required minor requirement. See page 47 for list of all options which satisfy this requirement.

Students will develop an individual independent research project and write a formal research proposal, which they will present and defend during the spring semester. Students will also study foundations of applied mathematics and pure mathematics and computer science, programming (in Python, Matlab, Mathematica, Excel and other languages). In addition, students will participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. Students will find mentors at local universities working in areas of interest to them. They will receive individual guidance at every stage of the process: narrowing down the areas of research that interest them, selecting, contacting, and interviewing with potential mentors, discipline-specific training in their area of research, including laboratory skills, writing a research proposal (during sophomore year), completing their research (during Junior year), and entering research competitions (during Senior year). Students are generally expected to devote part of the summer between their sophomore and junior year to working on their research project.

It is expected that students who enroll in the research program will complete the three-year sequence.

### **MQS63QJ – JUNIOR MATHEMATICS/COMPUTER SCIENCE RESEARCH**

(Up to 3 periods per week for 1 year – Elective Minor - Special Permission required)

Students continue work on their individual independent research projects. They present progress report during the fall semester and write a draft of their research paper in the spring semester. Students are expected to devote part of the summer between their junior and senior year to working on their research project.

### **MQS65QJ – SENIOR MATHEMATICS/COMPUTER SCIENCE RESEARCH**

(Up to 3 periods per week for 1 year – Elective Minor - Special Permission required)

Students complete work on their individual independent research projects in the form of a scientific research paper which they will submit to Siemens, Regeneron STS, NYCSEF, JSHS and other competitions during the fall semester. Students will present at a research seminar during the spring semester and provide assistance to sophomore and junior research students.

### **MKS11 - CODING FOR ALL**

(5 periods per week for 1 semester)

This is a project-based course that is designed to introduce students to the study of computer science. Students will learn a high level programming language PYTHON through a variety of computer science applications such as animation, music, media, games, encryptions, polls, and text analysis. Students will utilize PHYTON, an interactive programming environment, in which they will learn the basics of object-oriented and procedural programming by creating animations. Students will learn modular design in PYTHON and apply various programming techniques to top-down and bottom-up project design. Students will satisfy one semester of the two semester sophomore graduation requirement and be eligible to apply for Computer Science Research and/or AP Computer Science (MKS21X) for their junior year. This course alternates with a one semester sophomore writing course.

## **THE BIOLOGY DEPARTMENT**

Our primary goal is to teach students to think scientifically. The foundational courses are Research Literacy and Regents (or Honors) Biology. Students have the opportunity to explore their interests through the many advanced electives offered. Those interested in immersing themselves in the research process and performing an original scientific investigation with the guidance of a university mentor are encouraged to apply to the Research Program.

All students take Research Literacy as freshman. (It is a one semester course which flips with Elements Of Engineering Design). Regents-level Biology, Chemistry and Physics must be completed by the end of junior year. Students generally take biology freshman year, chemistry sophomore year, and physics junior year. Students who have taken biology and passed The Living Environment Regents in middle school take chemistry freshman year, AP Biology or another biology elective sophomore year, and physics junior year. Students who take Honors Chemistry freshman year but have not taken biology and have passed The Living Environment Regents in middle school take biology sophomore year, unless they qualify for and elect to take Regents Physics or AP Physics 1. They then take biology or AP Biology junior year. All students must take an additional lab science elective their senior year. Students may elect to take science courses their junior and senior years in addition to those that are required.

Students are encouraged to explore their interests and may take any combination of electives that they choose. If they wish to concentrate in a particular area, they can consider taking electives in the following cluster areas. Please note, if you wish to take a post AP course in your senior year, you must have taken the AP prerequisite in your junior year.

1. Area: Medicine
  - AP Biology
  - Organic Chemistry (Physical Sciences Department)
  - Microbiology
  - Epidemiology (also consider AP Statistics, Math Department)
  - Post-AP Advanced Genetics (*prerequisite: AP Biology*)
  - Post-AP Advanced Evolution (*prerequisite: AP Biology*)
  - Biology Research Program
  - Spanish for Professions (*prerequisite: Regents-level Spanish, World Languages Department*)
2. Area: Pharmacy
  - AP Biology
  - AP Chemistry
  - Organic Chemistry
3. Area: Environmental Studies:
  - AP Environmental Sciences
  - Sustainable Bronx Science/Horticulture
  - Post-AP Advanced Evolution (*prerequisite: AP Biology*)
  - Animal Behavior
  - Marine Biology
  - Biology Research Program

4. Area: Organism-level Biology
  - Animal Behavior
  - Marine Biology
  - AP Biology
  - Biology Research Program
  - Post-AP Advanced Evolution (*prerequisite: AP Biology*)
5. Area: Molecular and Cellular-level Biology
  - Microbiology
  - Organic Chemistry (Physical Science Department)
  - AP Biology
  - Post-AP Genetics (*prerequisite: AP Biology*)
  - Biology Research Program
6. Area: Forensic Science
  - AP Chemistry (Physical Science Department)
  - Forensic Science
  - Post-AP Quantitative Analysis (*prerequisite: AP Chemistry*)
7. Area: Psychology
  - AP Psychology
  - Post-AP Child Psychology / Abnormal Behavior (*prerequisite: AP Psychology*)
  - Animal Behavior
  - Biology or Social Science Research Program

## **REQUIRED COURSES**

### **SQS11QJ - RESEARCH LITERACY**

(5 periods per week for 1 semester. Offered jointly with the Physical Science Department.)

Students will learn the basic skills of scientific investigation and scientific writing by completing a research project. Students research a topic; formulate hypotheses; design and carry out their own experiments; organize, analyze and apply statistics to their data; draw valid conclusions; and communicate their results orally and in writing. The course culminates in writing a term paper in the form of a scientific article.

### **SLS21 - REGENTS BIOLOGY**

(7 periods per week for 1 year – Not a Special Permission course)

This is a general introductory biology course encompassing the New York State Regents Syllabus in the Living Environment. Emphasis is placed on developing concepts through the scientific method and laboratory exercises are stressed. The Living Environment Regents is taken in June.

### **SLS21H – HONORS REGENTS BIOLOGY**

(10 periods per week one year - Special Permission required, taken instead of Regents Biology)

While encompassing the New York State Regents Syllabus in the Living Environment, this course differs from Regents Biology by being more extensive and more intensive. Additional topics and labs are covered and students carry out an original laboratory investigation. The Living Environment Regents is taken in June.

## **ADVANCED COURSES**

### **BIOLOGY RESEARCH PROGRAM**

The research program in the biology department offers students an opportunity to do original research in all areas of biology, ranging from the impact of molecular changes on the functioning of cells to the impact of global changes on living things in our environment. *Interested students apply for sophomore research courses in the spring of their freshman year.* Students who are accepted into the program take a three-year sequence of research courses. During this time, they develop and complete an independent research project and write a scientific paper, which they submit to Regeneron Science Talent Search and other scientific competitions in their senior year. Students are expected to commit to two summers working on their projects as volunteers, usually with an outside mentor at a local university. Complementing this major research project, students also participate in a variety of problem-solving individual and team projects and skill-building activities in the classroom.

#### **SBS61QJ – SOPHOMORE BIOLOGY RESEARCH**

(5 periods per week for 1 year – Special Permission required. Satisfies the Sophomore required minor requirement. See page 47 for list of all options which satisfy this requirement.)

Students will develop an individual independent research project and write a formal research proposal, which they will present and defend during the spring semester. In addition, students will participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. Students will find mentors at local universities working in areas of interest. They will receive individual guidance at every stage of the process: narrowing down the areas of research that interest them, selecting, contacting, and interviewing with potential mentors, discipline-specific training in their area of research, including laboratory skills, writing a research proposal (during sophomore year), completing their research (during Junior year), and entering research competitions (during Senior year). Students are generally expected to devote part of the summer between their sophomore and junior year to working on their research project.

It is expected that students who enroll in the research program will complete the three-year sequence.

#### **SBS63QJ - JUNIOR BIOLOGY RESEARCH**

(2 periods per week in the fall; 3 periods per week in the Spring – Special Permission required – *elective minor*)

Students continue work on their individual independent research projects. They present a research progress report during the fall semester and an updated proposal in the spring. They continue to participate in a variety of individual and team projects, contests, and lab activities that will hone their problem-solving and research skills. Students are expected to devote the summer between their junior and senior year to working full-time as a volunteer on their research project, and to complete a draft of their research paper by the end of the summer.

## **SBS65QJ – SENIOR BIOLOGY RESEARCH**

(3 periods per week in the fall; 2 periods per week in the Spring – Special Permission required – *elective minor*)

Students complete work on their individual independent research projects. The product of the research work is the scientific research paper. Students will submit their papers to Siemens, Regeneron Science Talent Search, NYCSEF, JSHS, and other competitions during the fall semester. Students will present a research seminar during the spring semester and provide assistance to sophomore and junior research students.

## **POST-ADVANCED PLACEMENT COURSES**

### **SBS21CG – POST AP BIOLOGY: ADVANCED GENETICS**

(6 periods per week for 1 year: 4 single recitation periods, 1 double laboratory period – Special Permission - Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> major)

The field of genetics is currently being revolutionized and has been brought to the forefront of biology. This course provides students with a solid understanding of classical and molecular genetics. Topics covered in the course will include the race to discover DNA, DNA replication, gene transcription and translation, regulation of gene expression in prokaryotes and eukaryotes, DNA mutations and repair mechanisms, bacterial genetics, chromosomal structure and function, genome mapping, Mendelian inheritance and exceptions, and population genetics. Students will learn about recent advances in biotechnology that have genetic implications, including the Human Genome Project and advances in genetic engineering technology. Laboratory experiments involve isolating and transforming DNA from bacterial cells. Students will analyze transgenic animals to localize gene expression and protein function. Experiments involve breeding mutant *Drosophila* in order to discover Mendel's classic laws of inheritance. State of the art advances will be introduced through field trips and guest speakers.

Prerequisite: AP Biology

### **SBS21CD – POST AP BIOLOGY: ADVANCED EVOLUTION**

(6 periods per week for 1 year: 4 single recitation periods, 1 double laboratory period – Special Permission - Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> major)

As evolutionary biologist Theodosius Dobzhansky wrote in 1973, "Nothing in biology makes sense except in the light of evolution." This course provides a comprehensive introduction to evolutionary processes starting with the origin of life and progressing through the history of the diversification of life. Topics covered include the history of evolutionary theory, evidence for evolution, natural selection, population genetics, fitness and adaptation, species and speciation, the evolution of sex, how cooperation and conflict drive evolution, co-evolution, trends in macroevolution, mass extinctions and human evolution. Emphasis will be placed on how scientists study evolutionary mechanisms and patterns.

Prerequisite: AP Biology

## **SBS21CP – POST-AP PSYCHOLOGY**

(5 periods a week for 1 year – Special Permission – 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> major but NOT A LAB SCIENCE- This course does not fulfill the “Lab Science” requirement for seniors.)

### **Term One: ABNORMAL PSYCHOLOGY**

This course will focus on the symptoms, etiology, and treatments of a variety of mental illnesses. The course will begin with a discussion of the research techniques used in the study of abnormal psychology. Mental disorders such as anxiety disorders, stress disorders, somatoform disorders, dissociative disorders, mood disorders, sexual disorders, personality disorders and schizophrenia will be examined. The conditions will be analyzed through a variety of theoretical and historical perspectives.

### **Term Two: CHILD DEVELOPMENT**

This course will explore human development from conception to adolescence. Emphasis will be placed on investigating the physical, social, emotional and genetic factors involved in a child's growth. The importance of research methodology for studying child development will be stressed. Theories of development and applications to real world problems will be used to enhance understanding of child development.

Prerequisite: AP Psychology

## **ADVANCED PLACEMENT COURSES**

### **SBS2XB - ADVANCED PLACEMENT BIOLOGY**

(10 periods per week for 1 year– 5 double periods. Special Permission required – Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> major. Open to sophomores who completed chemistry as freshmen.)

This course is equivalent to introductory Biology courses taught in colleges and universities. Fundamental concepts applicable to both plants and animals are selected. In lecture, biochemistry and molecular biology lay the groundwork for understanding all aspects of modern biology, from the cell through the ecosystem. In laboratory work, evolution is the integrating theme that focuses on the relationship of organisms to their environments. Students must have completed at least one year of chemistry. Students may take the Advanced Placement examination in May.

### **SBS21XV – ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE**

(10 periods per week for 1 year: – 5 double periods – Special Permission required – Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, or 6<sup>th</sup> major. Open to sophomores who completed chemistry as freshmen and have passed the Living Environment Regents in middle school.)

This course follows an introductory-level college syllabus. It provides students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and man-made, and to evaluate alternative solutions for resolving them. Students have the opportunity to work on individual and group research projects, use computer technology and Internet resources, and visit natural areas in New York City parks. Laboratory investigations, debates, and simulations are included in the course activities. The course can be taken for college credit and/or Advanced Placement credit. Students may take the Advanced Placement examination in May.

## **SBS21XP - ADVANCED PLACEMENT PSYCHOLOGY**

(5 periods a week for 1 year – 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> major but NOT A LAB SCIENCE- Special Permission required. This course does not fulfill the “Lab Science” requirement for seniors.)

Topics studied include neuroscience and behavior, child development, adolescence and adulthood, sensation, perception, states of consciousness, learning, memory, thinking and language, intelligence, motivation, emotion, personality, psychological disorders, therapy, stress and health, social psychology and statistical reasoning. Students may take the Advanced Placement examination in May.

NOTE:

STUDENTS WHO TAKE ADVANCED PLACEMENT COURSES MAY TAKE CORRESPONDING AP EXAMS IN MAY.

## **COURSES WITH COLLEGE CREDIT AVAILABLE**

### **SBS21UM - MICROBIOLOGY**

(5 periods per week for 1 year: 3 single recitation periods, 1 double laboratory period. Not a Special Permission course. Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, or 6<sup>th</sup> major.)

This level college introduction to microbiology will examine prokaryotic and eukaryotic microorganisms as well as viruses. Lessons focus on microbial anatomy and physiology of bacteria. Focusing on the genetic structure of various microbes, lessons cover bacterial genetics and the use of microbes in biotechnology. Students will learn about how microbes evolve, about their tremendous diversity, their ecology, their unusual habitats, their role in bioremediation, recycling, and food production. Students gain an understanding of host microbe interactions, immunity and human infectious diseases. They explore the development and use of vaccines and learn about immunological deficiencies, transplant conditions, allergic reactions and autoimmune conditions. Laboratory procedures include use of different types of media, staining methods, microscopic identification of organisms, biochemical tests to identify unknown bacteria, bacterial transformation, food and water quality testing.

Upon satisfactory completion of the course, 3 college credits may be granted from the State University of New York at Albany. SUNY Albany will charge a fee (TBD).

### **SBS21UN - NUTRITIONAL SCIENCE**

(5 periods per week for 1 year: 3 single recitation periods, 1 double laboratory period - Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, or 6<sup>th</sup> major - Not a Special Permission course. Open to sophomores who completed chemistry as freshmen and have passed the Living Environment Regents in middle school).

This course explores topics in nutrition and food science. The study of food and nutrients includes discussion of their sources, chemistry, and metabolism. The effects of cooking on food are examined in the laboratory sessions in which basic culinary skills are learned along with "kitchen chemistry." Student interest leads to further investigation of special topics such as the mechanism of hunger, the development of new food products, the management of diet in health and disease, and the global problem of world food shortages. Each student does a personal diet evaluation, and enjoys sharing food projects with classmates.

**NOTE:** This is the only laboratory science in which you eat your experiments! 😊

Upon satisfactory completion of the course, 3 college credits may be granted from The State University of New York at Albany. SUNY Albany will charge a fee (TBD).

## **SBS21UF - FORENSIC SCIENCE**

(5 periods per week for 1 year: 3 single recitation periods, 1 double laboratory period - Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, or 6<sup>th</sup> major - Not a Special Permission course. Open to sophomores who completed chemistry as freshmen and have passed the Living Environment Regents in middle school)

Forensic Science is focused upon the application of scientific methods and the techniques to crime and law. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. This course is intended to provide an introduction to understanding the science behind crime detection. Scientific methods specifically relevant to crime detection and analysis will be presented with emphasis placed upon techniques used in evaluating physical evidence. Topics and laboratory investigations included are : crime scene investigations, fingerprinting, document and handwriting analysis, ballistics, serology, hair and fiber examination, botany, organic and inorganic evidence analysis, entomology, the role of the medical examiner, the forensic autopsy, anthropology, germ warfare, DNA analysis, psychology and profiling, toxicology, paint analysis, glass comparisons and fragmentation, arson investigations, tire and foot impressions and casts. A case study and a current events approach will be used extensively. Guest speakers, videotapes, mock trials, and field trips are used.

Students may receive 4 college credits through Syracuse University for a tuition charge of approximately \$450. Tuition assistance is available for eligible students who are unable to manage the costs.

## **OTHER ADVANCED COURSES**

### **SBS21QA - ANIMAL BEHAVIOR**

(meets 5 periods per week: 1 double lab period, and 3 single periods – Not a Special Permission course - Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> major).

This course develops the thesis that behavior in all animals has evolved as an adaptation of survival of species. Behaviors that are universal among all animal species, including humans, are stressed and the mechanisms that species use to carry out the behaviors common to all are observed. The Bronx Zoo is used as a laboratory. Students develop individual projects. This course is scheduled at the end of the day to allow for field trips. Students take a weekly field trip to the Bronx Zoo and are released unaccompanied directly from the zoo at the end of period 9, making it impossible for students to catch the first Vallo bus. Students who have obligations that would preclude attendance of these weekly trips or suspended privileges cannot take the course.

### **SBS21QH –HORTICULTURE/ SUSTAINABLE BRONX SCIENCE**

(A one-year sequence of two one-semester courses. meets 5 periods per week: 1 double period, and 3 single periods – Not a Special Permission course - Fulfills the Lab Science Requirement for seniors – 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> major. Open to sophomores who completed chemistry as freshmen and have passed the Living Environment Regents in middle school.)

#### **Term One – SUSTAINABLE BRONX SCIENCE**

How can we take an aging public school building, and make it as energy and resource efficient and as healthy for the human occupants and the surrounding ecosystems as possible? This is a course focused on analyzing and improving the energy and resource usage of the school, with the aim at creating sustainable practices that are a positive role model for other public schools in NYC. Gardening, hydroponics, recycling, energy efficiency, water usage and consumption patterns at the personal and school wide level will be examined. Open to all interested and environmentally committed students.

## **Term Two - HORTICULTURE**

Using plants grown from seeds and cuttings in our greenhouse, students will examine plant life cycles, structures, characteristics, requirements and general care. Soil structure, propagation methods, plant diseases and treatments will be discussed, with an emphasis on urban organic farming and hydroponics to augment the environmental initiatives established in the “Sustainability at Bronx Science” course in the Fall semester.

## **SBS21CE – EPIDEMIOLOGY**

(6 periods per week, including one double-period lab – Fulfills the “Lab Science” requirement for seniors – May be taken as a 3rd, 4th, 5th or 6th Major – Not a Special Permission course. Open to sophomores who completed chemistry as freshmen and have passed the Living Environment Regents in middle school.)

This course is designed to introduce students to the field of epidemiology. The course will focus on approaches and activities that are used to study disease distributions (from infectious disease outbreaks to chronic disease surveillance). Students will explore the characteristics of a range of specific disease agents (HIV, Ebola, Cancer, etc.), compare their impact on populations and examine national and global efforts to monitor and control disease. Computer simulations are included.

## **SBS21QC - MARINE BIOLOGY**

(6 periods per week, including one double-period lab – Fulfills the “Lab Science” requirement for seniors – May be taken as a 3rd, 4th, 5th or 6th Major – Not a Special Permission course. Open to sophomores who completed chemistry as freshmen and have passed the Living Environment Regents in middle school.)

Topics covered in this activity and lab centered course include basic oceanography, adaptations of various organisms (microorganisms, invertebrates, fish, marine birds, reptiles, and mammals) to marine life, marine ecosystems, and the human impact on the oceans.

## **THE PHYSICAL SCIENCE DEPARTMENT**

Our primary goal is to teach students to think scientifically. The foundational courses are Research Literacy and Regents (or Honors) Chemistry and Regents Physics or AP Physics 1. Students have the opportunity to explore their interests through the advanced electives offered. Those interested in immersing themselves in the research process and performing an original scientific investigation with the guidance of a university mentor are encouraged to apply to the Research Program.

Regents level Biology, Chemistry and Physics must be completed by the end of the junior year. Students generally take biology freshman year, chemistry sophomore year, and physics junior year. Students who have taken biology and passed the Living Environment Regents in middle school take chemistry freshman year. Physics may not be taken until Intermediate Algebra and Algebra II/ Trigonometry courses have been completed; hence physics is generally taken junior year, unless a student has satisfied the math requirement and qualifies for AP Physics 1.

Students are encouraged to explore their interests and may take any combination of electives that they choose. If they wish to concentrate in a particular area, they can consider taking electives in the following cluster areas. Please note, if you wish to take a post-AP course in your senior year, you must take the AP pre-requisite in your junior year).

1. Area: Chemistry
  - AP Chemistry
  - Post-AP Quantitative Analysis (*pre-requisite: AP Chemistry*)
  - Introduction to Organic Chemistry
  - Everyday Applications of Chemistry
  - Physical Science/Engineering Research Program
2. Area: Physics
  - AP Physics 1
  - AP Physics 2
  - AP Physics C
  - Astronomy and Astrophysics
  - Topics in Modern Physics
  - Physical Science/Engineering Research Program
3. Area: Engineering
  - Introduction to Engineering
  - Green Design and Clean Technology
  - Digital Engineering
  - Experimental Engineering
  - AP Physics 1, AP Physics 2, or AP Physics C (All areas of Engineering)
  - AP Chemistry (if interested in Chemical Engineering)
  - AP Environmental Science (if interested in Environmental Engineering; Biology Department.)
  - AP Biology (if interested in Biomedical Engineering; Biology Department)
  - Physical Science/Engineering Research Program
4. Area: Pharmacy
  - AP Biology (Biology Department)

- AP Chemistry
- Organic Chemistry
- 5. Area: Forensic Science
  - AP Chemistry
  - Forensic Science (Biology)
  - Post-AP Quantitative Analysis (*pre-requisite: AP Chemistry*)

## **CORE COURSES**

All students will take one Chemistry and one Physical class culminating in a Regents exam to satisfy the requirement.

### **SQS11QJ - RESEARCH LITERACY**

(5 periods per week for 1 semester. Offered jointly with the Biology Science Department.)

Students will learn the basic skills of scientific investigation and scientific writing by completing a research project. Students research a topic; formulate hypotheses; design and carry out their own experiments; organize, analyze and apply statistics to their data; draw valid conclusions; and communicate their results orally and in writing. The course culminates in writing a term paper in the form of a scientific article.

### **SCS21- REGENTS CHEMISTRY**

(7 periods per week for 1 year – Not a Special Permission course)

This is a general introductory chemistry course encompassing the New York State Regents syllabus in Chemistry: The Physical Setting. Emphasis is placed on developing concepts through the scientific method and laboratory exercises. The Chemistry Regents exam is taken in June.

### **SCS21XS - ADVANCED PLACEMENT CHEMISTRY (WITH REGENTS)**

(10 periods per week: 5 double periods, including lab for 1 year – Special Permission required; taken instead of Regents Chemistry)

This is a course in chemical concepts and their applications. The course will cover both Regents Chemistry and AP chemistry curricula. It is geared toward outstanding students planning careers in medicine, science, and engineering. It will provide invaluable adjustments to the rigors and sophistication of university work through a laboratory and problem-solving program, with individual attention. Successful completion of this course may enable students to claim credit for an entire year of college chemistry. The AP exam may be taken in May. The Chemistry Regents exam is taken in June.

### **SCS21QF- FRESHMAN REGENTS CHEMISTRY**

(7 periods per week for 1 year – Not a Special Permission course)

This is a general introductory chemistry course encompassing the New York State Regents syllabus in Chemistry: The Physical Setting. Emphasis is placed on developing concepts through the scientific method and laboratory exercises. Review of math skills and additional activities are included. The Chemistry Regents exam is taken in June.

## **SCS21H –HONORS REGENTS CHEMISTRY**

(7 periods per week one year - Special Permission required, taken instead of Regents Chemistry)

While encompassing the New York State Regents Syllabus in Chemistry: The Physical Setting, this course differs from Regents Chemistry by being more extensive and more intensive. Additional topics and advanced labs are included. The Chemistry Regents exam is taken in June.

## **SCS21HF – FRESHMAN HONORS REGENTS CHEMISTRY**

(10 periods per week one year - Special Permission required; taken instead of Regents Chemistry)

While encompassing the New York State Regents Syllabus in Chemistry: The Physical Setting, this course differs from Regents Chemistry by being more extensive and more intensive. Additional topics, activities and advanced labs are included. The Chemistry Regents exam is taken in June.

## **SPS21 - REGENTS PHYSICS**

(7 periods per week for 1 year.)

This is a general introductory physics course encompassing the New York State Regents syllabus in Physics: The Physical Setting. Emphasis is placed on developing concepts through the scientific method and laboratory exercises are stressed. The Physics Regents exam is taken in June.

Pre-requisite: Algebra II and Trigonometry

## **SPS21X1 - AP PHYSICS 1**

(10 periods per week for 1 year; Special Permission required; taken instead of Regents Physics.)

While encompassing the New York State Regents Syllabus in Physics: The Physical Setting, this algebra-based course is more intensive and extensive. It includes more hands-on explorations of physics content and inquiry-based labs. It covers Newtonian mechanics, including rotational dynamics and angular momentum, work, energy, power, and mechanical waves and sound. It will also introduce electric circuits and modern Physics. The Physics Regents exam is taken in June. The AP exam may be taken in May. Students may continue, if they desire, to AP Physics 2, AP Physics C, or another science course.

Pre-requisite: Algebra II and Trigonometry

## **ADVANCED COURSES**

### **PHYSICAL SCIENCE/ENGINEERING RESEARCH PROGRAM**

The research program in the Physical Science department offers students an opportunity to do original research in all areas of physical science such as material science, engineering, computer science, earth science, chemistry, physics, and astrophysics. *Interested students apply for sophomore research courses in the spring of their freshman year.* Students who are accepted into the program take a three-year sequence of research courses. During this time, they develop and complete an independent research project and write a scientific paper, which they submit to Regeneron Science Talent Search and other scientific competitions in their senior year. Students generally spend two summers working on their projects as volunteers, usually with an outside mentor at a local university. Complementing this major research project, students also participate in a variety of problem-solving individual and team projects and skill-building activities in the classroom.

### **SPS61QJ – SOPHOMORE PHYSICAL SCIENCE/ENGINEERING RESEARCH**

(5 periods per week for 1 year – Special Permission required) After completion of this course, students will satisfy the sophomore required minor requirement. See page 47 for list of all options which satisfy this requirement.

Students will develop an individual independent research project and write a formal research proposal, which they will present and defend during the spring semester. In addition, students will participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. Students will find mentors at local universities working in areas of interest. They will receive individual guidance at every stage of the process: narrowing down the areas of research that interest them, selecting, contacting, and interviewing with potential mentors, discipline-specific training in their area of research, including laboratory skills, writing a research proposal (during sophomore year), completing their research (during Junior year), and entering research competitions (during Senior year). Students are generally expected to devote part of the summer between their sophomore and junior year to working on their research project.

It is expected that students who enroll in the sophomore research class will complete the three-year research sequence.

### **SPS63QJ - JUNIOR PHYSICAL SCIENCE/ENGINEERING RESEARCH**

(2 periods per week in the fall; 3 periods per week in the Spring– Special Permission required – *elective minor*)

Students continue work on their individual independent research projects. They present a research progress report during the fall semester and write a draft of their research paper in the spring semester. They continue to participate in a variety of individual and team projects, contests, and lab activities that will hone their problem-solving and research skills. Students are expected to devote the summer between their junior and senior year to working full-time as a volunteer on their research project.

### **SPS65QJ – SENIOR PHYSICAL SCIENCE/ENGINEERING RESEARCH**

(3 periods per week in the fall; 2 periods per week in the Spring– Special Permission required – *elective minor*)

Students complete work on their individual independent research projects. The product of the research work is the scientific research paper. Students will submit their papers to Siemens-Westinghouse, Regeneron STS, NYCSEF, JSHS, and other competitions during the fall semester. Students will present a research seminar during the spring semester and provide assistance to sophomore and junior research students.

## **ENGINEERING PROGRAM**

### **SKS11 - ELEMENTS OF ENGINEERING DESIGN**

(5 periods per week for 1 semester)

This academically challenging course provides an introduction to the fundamental approaches within engineering. Topics include environmental, electrical and mechanical engineering, emphasizing principles of and applications in circuitry, pneumatics, and kinematics. Using Computer Aided Design, students translate their ideas into physical models. A collection of practical build projects focuses students on a variety of engineering and scientific concepts, drawing from prior scientific knowledge and extending that knowledge. Hands-on problem solving and practicing a variety of communication techniques form the core of this course.

### **SKS21QG – GREEN DESIGN AND CLEAN TECHNOLOGY**

(5 periods per week for one-year - fulfills the “Lab Science” requirement for Seniors – May be taken as a 6th Major for sophomores or 3rd, 4th, 5th or 6th Major for Juniors and Seniors.)

This project-based course explores environmental and sustainability issues through the lens of engineering. The goal of the course is to help students develop the tools and reasoning needed to design solutions to real world sustainability challenges. Students will primarily explore the challenges of systems that involve energy production, food production, waste management, and access to water. The yearlong course will culminate in a capstone project, identifying and proposing a more sustainable solution to a problem within their community.

### **SKS21QE – DIGITAL ENGINEERING**

(5 periods per week for one-year - Special Permission required - fulfills the “Lab Science” requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major.)

The second course in the engineering stream, Digital Engineering focuses on the fundamentals of modern engineering and technology in the information and communications age. Engineering and design examples are drawn from wireless and traditional telecommunications, the Internet, electronic music, and other multimedia technologies popular in today’s culture. The focus is on big-picture practical applications of electronics with a sound background in applicable theory. Topics include digitization techniques, storage methods, processing and transmission of music, speech and image media. Signal encryption techniques and network design are also covered.

### **SKS21QD – EXPERIMENTAL ENGINEERING**

(5 periods per week: 2 double periods, and 1 single period - Special Permission required - fulfills the “Lab Science” requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major. Seniors only.)

A research project based course on engineering design within the traditional fields of engineering: mechanical, civil, industrial/manufacturing, materials, automotive, aeronautical and electrical. Topics covered will include simple/complex machines, statics, dynamics; civil infrastructure construction and repair, building codes; fabrication, modern materials, process optimization and assembly; automotive history & fundamentals, thermodynamics and economics; flight fundamentals, fluids analysis, electrical fundamentals, advanced electronics, instrumentation and use, modern integrated circuits and microcontrollers, software programming. Modern software drafting and modeling and physical fabrication techniques will be used to realize and build design prototypes, including the use of laser cutters and 3D printers. The student will design and build out real solutions in hardware, using micro-platforms and embedded control systems such as the Arduino. The course will conclude in a class-wide, faculty/student-body judged *Innovation Challenge*.

## **ELECTIVES IN PHYSICAL SCIENCE**

### **SCS21QE – EVERYDAY APPLICATIONS OF CHEMISTRY**

(6 periods per week, including– fulfills the Lab Science requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major.)

The goal of this class is to illustrate the importance of chemistry in our daily life. A broad range of topics including environmental, industrial, consumer, medicinal, nutritional, and biochemical aspects of chemistry will be examined. The class models an introductory college chemistry lab class which means labs only. Students that enjoy practical lab work will appreciate this

class. Students work in pairs on ongoing lab projects that take 1-2 weeks. This is a full year course that is open to sophomores, juniors and seniors who have taken the Chemistry Regents. Prerequisite: Chemistry Regents exam

### **SCS21QC - INTRODUCTION TO ORGANIC CHEMISTRY**

(6 periods per week, including lab – fulfills the Lab Science requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major – Not a Special Permission course.)

Basic principles of organic chemistry, with applications to medical sciences and engineering, will be discussed. Laboratories will include distillation, extraction, thin layer chromatography, column chromatography, recrystallization, and synthesis of an ester.

Prerequisite: Regents Chemistry

## **POST-ADVANCED PLACEMENT COURSES**

### **SCS21CA – POST-AP CHEMISTRY: QUANTITATIVE ANALYSIS**

(6 periods per week, including lab – Special Permission required – fulfills the Lab Science requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major.)

This course emphasizes analytical techniques used in the scientific field. Students interested in medicine, environmental engineering/science, chemistry, biochemistry, pharmacy and forensic science are strongly encouraged to take this course. Students will be introduced to wet methods including titration and instrumental methods of analysis. Students will learn how statistical analysis plays a role in the laboratory collection of experimental data.

Prerequisite: AP Chemistry

### **SPS21CP: POST-AP PHYSICS : TOPICS IN MODERN PHYSICS**

(6 periods per week, including lab - Special permission required - Fulfills the Lab Science requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major.)

The high school physics curriculum only covers physics concepts up to the early 1900s. In this lab science course, students will learn the basics of relativity and quantum mechanics and how they apply to topics ranging from cosmology, particle physics and the origin of mass to semiconductors and lasers. These topics will challenge students' preconceptions of space, time, and reality itself, foster an open mind and build critical thinking skills. Students who are curious about the nature of the physical world will benefit greatly from taking this course, whether or not they intend to pursue a career in physics. The course is primarily algebra-based, but limited elements of calculus, differential equations and linear algebra will be introduced as needed.

Corequisites: AP Calculus AB or BC

## **ADVANCED PLACEMENT COURSES**

### **SCS21X - ADVANCED PLACEMENT CHEMISTRY**

(10 periods per week: 5 double periods, including lab –one year - fulfills the “Lab Science” requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major – Special Permission required.)

This is a course in chemical concepts and their applications. The syllabus is geared toward outstanding students planning careers in medicine, science, and engineering. It will provide invaluable adjustments to the rigors and sophistication of university work through a laboratory and problem-solving program, with individual attention. Successful completion of this course may enable students to claim credit for an entire year of college chemistry. The AP exam may be taken in May.

## **PS21X1 - AP PHYSICS 1**

(10 periods per week for 1 year; special permission required; taken instead of Regents Physics.)

While encompassing the New York State Regents Syllabus in Physics: The Physical Setting, this algebra-based course is more intensive and extensive. It includes more hands-on explorations of physics content and inquiry-based labs. It covers Newtonian mechanics, including rotational dynamics and angular momentum, work, energy, power, and mechanical waves and sound. It will also introduce electric circuits and modern Physics. The Physics Regents is taken in June. The AP exam may be taken in May. Students may continue, if they desire, to AP Physics 2, AP Physics C, or another science course.

Pre-requisite: Algebra II and Trigonometry

## **SPS21X2 - AP PHYSICS 2**

(7 periods per week for one year - fulfills the "Lab Science" requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major – Special Permission required)

This is an algebra-based physics course that covers fluid mechanics, thermodynamics, electricity and magnetism, optics, and atomic and nuclear physics. The AP exam may be taken in May.

Pre-requisite: Regents Physics or AP Physics 1. Pre or corequisite: Precalculus

## **SPS21X3 - ADVANCED PLACEMENT PHYSICS WITH CALCULUS (C)**

(10 periods per week: 5 double periods, including lab – one year - fulfills the "Lab Science" requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major – Special Permission required.)

This course covers two major areas for freshman college physics: "mechanics" (forces, energy, etc.) and "electricity and magnetism" as well as "thermodynamics" and other selected topics. Those planning a future in the physical sciences or engineering should apply for this course.

Prerequisites: Regents Physics or AP Physics 1. Pre or co-requisite: Calculus

NOTE: STUDENTS WHO TAKE ADVANCED PLACEMENT COURSES MAY TAKE CORRESPONDING AP EXAMS IN MAY.

## **COURSE WITH COLLEGE CREDIT AVAILABLE**

### **SRS21U - ASTRONOMY AND ASTROPHYSICS**

(6 periods per week: 1 double laboratory period, 4 single recitation periods fulfills the Lab Science requirement for Seniors – May be taken as a 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> Major – Not a Special Permission course)

This is a college level introduction to astronomy, stressing changing ideas of the universe and humanity's place in it. It provides a clear example of the growth and use of THEORY in science. The first term of the course deals with the history of our knowledge of the solar system-Sun, Moon, Earth, and the other planets-from the earliest watchers and simple fables to the magnificent success of Newton's gravitational theory. The second term is an introduction to the stellar astronomy: nature of light and matter, characteristics of stars, birth, evolution and death of stars, neutron stars, black holes, galaxies, the Big Bang, and cosmology and the principles of Einstein's theory of relativity. The school planetarium is used to demonstrate the observed phenomena that any theory of the universe must explain. Students will be able to identify seasonal star patterns and locate planets.

Upon satisfactory completion of this yearlong course, 3 college credits may be granted from the New York State University at Albany. A fee is required for college credit.

Prerequisite or corequisite: Regents Physics

## **THE WORLD LANGUAGES DEPARTMENT**

Language is our connection to our community and to the world. Through language, we identify the world around us, express our concerns and dreams, and share our experiences and ideas.

The ability to communicate in a second language increases the opportunities to interact with other peoples and to understand other cultures. As the world becomes increasingly interdependent, it is important for every person to acquire the skills for communication with others and for cross-cultural understanding.

In addition to the practical application of communication skills, the benefits derived from the study of a second language are many. Empirical findings indicate that second language study is an asset to many careers and to professional advancement in the Sciences as well as the Humanities. Second language study:

- prepares students for a world in which nations and peoples are increasingly interdependent
- fosters a sense of humanity and friendship
- increases students' adaptability to different environments and modes of acting and thinking
- furnishes the key to thinking patterns, cultures and social institutions of other peoples
- provides insights into the human mind and language itself
- develops the skills and habits essential to the learning process, creative inquiry and critical thinking
- helps students to increase their sensitivity to and understanding of the language, values, customs and traditions of others
- leads students to discover and examine their own personal values and civic responsibilities
- provides insight into America's values and an appreciation of national responsibilities in the world community

\*The above findings appear in the New York State Syllabus: MODERN LANGUAGES FOR COMMUNICATION

In light of these benefits, the study of a second language should be an integral part of every student's educational experience. Bronx High School of Science's Language Department offers students more enrichment opportunities to study other languages than any other secondary school in the country. Our students are best prepared as informed and productive citizens in an increasingly multi-diverse and inter-dependent world.

Any Language Class may be taken as a 5<sup>th</sup> (elective 2) or 6<sup>th</sup> Major for all students who have completed their Regents requirement (2 years of a world language at Bronx Science and passing a Regents exam).

## **WORLD LANGUAGES BASIC COURSES**

### **FMS61 - FIRST YEAR CHINESE**

### **FFS61 - FIRST YEAR FRENCH**

### **FJS61 - FIRST YEAR JAPANESE**

### **FLS61 - FIRST YEAR LATIN**

### **FSS61 - FIRST YEAR SPANISH**

### **FTS61 - FIRST YEAR ITALIAN**

(5 single periods per week for one year – May be taken as a 5th or 6th Major)

Students who have native/heritage background may NOT enroll in these courses. Level one courses are designed for students with no prior background in the language. Students with native background must declare this fact during the Elective period.

### **FMS63 - SECOND YEAR CHINESE**

### **FFS63 - SECOND YEAR FRENCH**

### **FJS63 - SECOND YEAR JAPANESE**

### **FLS63 - SECOND YEAR LATIN**

### **FSS63 - SECOND YEAR SPANISH**

### **FTS63 - SECOND YEAR ITALIAN**

(5 single periods per week for one year – May be taken as a 5th or 6th Major)

Students who have taken a minimum of two years of the language in junior high school and who have received an average grade of 85 qualify. A Proficiency examination is preferable when available but it is not mandatory. Native/heritage speakers can be placed in this level after taking a departmental examination.

Prerequisite: First Year of the language at Bronx Science or the equivalent from junior high.

### **FMS65- REGENTS LEVEL CHINESE**

### **FFS65- REGENTS LEVEL FRENCH**

### **FJS65 – REGENTS LEVEL JAPANESE**

### **FLS65- REGENTS LEVEL LATIN**

### **FSS65- REGENTS LEVEL SPANISH**

### **FTS65 – REGENTS LEVEL ITALIAN**

(5 single periods per week for one year – May be taken as a 5th or 6th Major)

Native/heritage speakers can be placed in this level after taking a departmental examination.

Prerequisite: First and Second Year of the language at Bronx Science or the equivalent from another school.

### **FSS65H – HONORS REGENTS SPANISH**

(5 single periods per week for one year – May be taken as a 5th or 6th Major Special Permission required)

This course is taught as an Advanced Placement preparatory course.

## **WORLD LANGUAGES ADVANCED COURSES**

### **FSS21XT - ADVANCED PLACEMENT SPANISH LITERATURE**

(5 single periods per week for one year - May be taken as a 5<sup>th</sup> or 6<sup>th</sup> Major – Special Permission required)

These are college level courses and a grade of 4 or 5 on the exam may give students an opportunity to receive college credit or advanced placement status. Students must submit a writing sample and complete an interview with instructor prior to admission into the course. Recommended prerequisites are Advanced Placement Language courses. Students should be prepared to complete one hour of reading per evening and work independently to improve their vocabulary.

These literature courses prepare students to:

- Understand a lecture in the world language and participate in discussion on a literary topic.
- Read literary works in all genres of the language.
- Critically analyze outstanding literary works.

### **FMS21X - ADVANCED PLACEMENT CHINESE**

### **FJS21X - ADVANCED PLACEMENT JAPANESE**

### **FFS21X - ADVANCED PLACEMENT FRENCH LANGUAGE**

### **FSS21XA - ADVANCED PLACEMENT SPANISH LANGUAGE**

### **FTS21X - ADVANCED PLACEMENT ITALIAN LANGUAGE AND CULTURE**

(5 single periods per week for one year - May be taken as a 5<sup>th</sup> or 6<sup>th</sup> Major – Special Permission required)

The Advanced Placement Chinese, Spanish, French, Italian and Japanese Language courses are open to juniors and seniors. They are intended for responsible, highly motivated students who wish to complete studies in secondary school comparable in difficulty to advanced-level college courses in Composition and Conversation. Students who enroll should already have a basic knowledge of the language and culture and should have attained a reasonable proficiency in listening comprehension, speaking, reading and writing. Extensive training in aural/oral skill, reading comprehension, grammar, organization, and writing of compositions, and essays are an integral part of these courses. Students must submit a writing sample and complete an interview with the instructor prior to admission. Students should expect projects and are expected to work independently to improve their vocabulary.

### **FSS21QP -- SPANISH FOR PROFESSIONS:**

(5 single periods per week for one year – May be taken as a 5<sup>th</sup> or 6<sup>th</sup> Major — Special Permission required)

This course is designed for motivated students of Spanish who have completed a Regents sequence. Students will study Spanish for practical, professional use in four general fields: business, finance, medicine and social services. This course will focus on all four skills of Spanish study – listening, reading, speaking and writing. Students should expect a rigorous course load as this course can prepare students for Advanced Placement Spanish Language.

### **FSS21QN - SPANISH NARRATIVE & FILM**

(5 single periods per week for one year – May be taken as a 5<sup>th</sup> or 6<sup>th</sup> Major – Special Permission required)

This course is designed for motivated students of Spanish who have completed a Regents sequence. The main purpose of the course is to enhance oral and written skills in Spanish while increasing their familiarity with Hispanic cultures through their manifestation in cinema based on literature. Grammar exercises and essay writing related to the content of the literature and films will be combined with oral discussion. This course can prepare students for Advanced Placement Spanish Language and/or Literature. The course load involves rigorous projects and presentations.

**FFS21QC - ADVANCED FOURTH-YEAR FRENCH CONVERSATION**

**FJS21QC - ADVANCED FOURTH-YEAR JAPANESE CONVERSATION**

**FMS21QC - ADVANCED FOURTH-YEAR CHINESE CONVERSATION**

**FTS21QC - ADVANCED FOURTH-YEAR ITALIAN CONVERSATION**

**FSS21QC - ADVANCED FOURTH-YEAR SPANISH CONVERSATION**

(5 single periods per week for one year - May be taken as a 5<sup>th</sup> or 6<sup>th</sup> Major – Special Permission course)

These courses are designed to help students maintain and improve their conversational reading and writing skills developed in the first three years. Emphasis is placed on the active use of the spoken language. Extensive use of a variety of texts, newspaper articles, and web-based materials will provide the basis for lively class discussions, dramatizations, and original presentations.

**FLS21X - ADVANCED PLACEMENT LATIN: VERGIL/CAESAR**

(5 single periods per week for one year - May be taken as a 5<sup>th</sup> or 6<sup>th</sup> Major – Special Permission required)

This course will follow the syllabus for the Latin Literature: Vergil as outlined by The College Board. The aim of this course is in general conformity with college Latin studies in the fourth through sixth semesters and will allow students to apply virtually all of his/her prior studies of Latin morphology, syntax, vocabulary, culture, and word study. The specific objectives of this course, closely related to the AP Curriculum goals, include:

- Develop a highly advanced Latin vocabulary
- Translate literally and poetically continuous passages of original Latin
- Analyze and evaluate original Latin texts
- Appreciate and evaluate original Latin texts within the Western literary tradition
- Study original Latin texts in their specific literary and historic contexts
- Understand and identify rhetorical and literary devices
- Identify and scan the meter of original Latin passages
- Compare and contrast modern translations of Latin texts

**FLS21Q7 – ADVANCED FOURTH YEAR LATIN SELECTED READINGS**

(5 single periods per week for one year - May be taken as a 5<sup>th</sup> or 6<sup>th</sup> Major –Special Permission required)

This course is designed for the student who wants to continue his studies of Latin beyond the Regents level but not take Advanced Placement. Less commonly taught authors like Martial, Juvenal and Catullus will be covered.

## **THE ARTS**

Any of the following courses satisfy the arts requirements needed for graduation.

### **Drama**

#### **CJS21 – BASIC ACTING – IMPROVISATION AND PERFORMANCE**

(5 periods per week for 1 year - Not a Special Permission course – Elective Minor, satisfies the arts requirement)

This course is an introduction to acting techniques, staging, and performance. The course begins with theater games and exercises, followed by work on improvisation, which will include evolving student-generated ideas. Students will be encouraged to develop their acting skills through techniques stressing relaxation, focus, sensory recall, mime, and improvisation. Scene study from professional plays will be included, as well as elements of Readers' Theatre. The basics of stage makeup will be demonstrated.

#### **CJS21QA – ADVANCED ACTING: PLAY PRODUCTION**

(5 periods per week for 1 year - Special Permission required – Elective minor, satisfies the arts requirement)

Do you have a yearning to be a star? Although we can't guarantee Broadway, this class may be for you. Students rehearse, stage, and perform a full-length drama. They also write, rehearse, and direct original one-act plays. Successful completion of Basic Acting (EPT1) is a requirement for admission. Admission by audition only.

### **Fine Arts**

Our program of fine arts and visual communication is designed to help students develop their creative ability and talent while simultaneously understanding those factors in our culture that add beauty, stimulation, and enrichment to our lives. The arts engage a student's imagination, ideas, and abilities, and inspire them to more richly appreciate the world around them.

#### **ANS21 – STUDIO IN ART**

(5 periods per week for 1 year - May be a 5th or 6th major)

Students develop an appreciation of visual art through experimentation with a variety of media, in both two-and three-dimensional forms. They are exposed to the rewards of seeing the elements and principles of Art evolve into an attractive and creative finished product.

#### **ACS21 – PHOTOGRAPHY**

(5 periods per week for 1 year - May be a 5th or 6th major)

The emphasis of this class is on digital image capture, editing and manipulation. Students are given creative assignments inspired by the work of well-known photographers. They use professional software to improve, modify or combine the work with other pieces. The elements and principles of art are explored through the preparation of "electronic" images. Completed projects may become part of Gallery exhibits or other public displays. Access to a personal digital camera is recommended.

## **APS21 – STUDIO IN PAINTING**

(5 periods per week for 1 year - May be a 5th or 6th major)

This course will help students find their own unique approach for artistic expression through the use of paint. Students will also develop a vocabulary for intelligently discussing and critiquing art. Through various projects students will develop painting techniques, improve their visual perception, and learn about their own work in the context of art history. Students will experiment with a variety of styles and paint from both life experience and imagination. This course will also assist in the development of a high quality art portfolio.

## **ADS21 – 3D DESIGN**

(5 periods per week for 1 year - May be a 5th or 6th major)

The three-dimensional design course is for students who are interested in the practical experience of art and who wish to develop mastery in the concept, composition, and execution of their ideas. Work will include traditional as well as experimental approaches to three dimensional art, writing assignments and group critiques. The Course Objectives: To encourage creative as well as systematic investigation of formal and conceptual issues in three-dimensional design. Students will use a variety of three-dimensional materials, techniques, processes and concepts to make sculptural objects. To emphasize making art as an on-going process that involves the student in informed decision making. Students will create sculptures by using the additive, subtractive, and/or replacement and manipulative methods of construction. To develop technical versatility and skills while utilizing the elements and principles of art. Students will use the formal elements and principles of three-dimensional space (including line, shape, mass and volume, light and shade, texture, color and organizations of forms in space) as well as kinetics, to make sculptural objects. To encourage students to become independent thinkers. Students will plan a path utilizing problem solving steps, including stating initial intentions, defining and analyzing the problems and clarifying the main issues and goals. Students will then evaluate the success of their work.

## **AHS21 – HOLOCAUST THROUGH THE ARTS**

(5 periods per week for 1 year.- May be a 5th or 6th major)

Students will study and analyze the Holocaust through the arts. Students will explore, among others, the art of the ghettos and camps, artists such as Marc Chagall or Wassily Kandinsky condemned by the Nazis, artwork created in response to the Holocaust, songs of the camps, Partisan songs, the music and people of Terezín, A Survivor From Warsaw, a work for narrator, mens chorus, and orchestra written by Arnold Schoenberg, the symphony Baby Yar by Demetri Shostakovich, movies such as Night and Fog by Alain Resnais, Shoah by Claude Lanzmann, Life is Beautiful by Roberto Benigni, Playing for Time, written for TV by Arthur Miller and Fania Fénelon, Schindler's List by Steven Spielberg, The Son of Saul by László Nemes (winner of the 2016 Golden Globe for Best Foreign Language Film), The Diary of a Young Girl by Anne Frank, Hannah Senesh's life, Survival in Auschwitz by Primo Levi, poems by Paul Celan and Nelly Sachs, first-person stories of persecuted peoples, the play Bent by Martin Sherman, and so on. All documents will be presented in their original languages (French, German, Hebrew, Hungarian, Italian, Romanian, Russian, Spanish, etc.), and their English translations. Students will be trained to give museum tours of the school's Holocaust museum.

## **AGS21 - COMPUTER GRAPHICS**

(5 periods per week for 1 year - May be taken as either a 5<sup>th</sup> or a 6<sup>th</sup> major)

Computer-generated graphics and imagery is among the most creative areas of computer science. Fine arts, publishing, business, advertising, television and film production are areas increasingly in need of people with a scientific background coupled with graphics expertise. Students will have hands-on experience in our modern graphics lab in creating, capturing, modifying, and then printing original work. Outstanding work will be displayed in exhibits and shows, or on the “web”.

## **ADVANCED PLACEMENT COURSES**

### **AHS21X - ADVANCED PLACEMENT ART HISTORY**

(5 periods per week for 1 year – Special Permission Required – May be a 5<sup>th</sup> or 6<sup>th</sup> major)

AP Art History is a college level survey course that places art in an historical context. It covers art, sculpture, architecture and other visual forms from the Age of the Pyramids to Banksy and Ai Weiwei. It is global in perspective and is an excellent supplement to Social Studies, History, English, Math, Technology and Engineering programs. It is the course that ties these disciplines together and solves the DaVinci Code and the riddle of the “girl with the pearl earring”. While challenging, it is student friendly. No prerequisite study of art is required.

NOTE:

STUDENTS WHO TAKE ADVANCED PLACEMENT COURSES MAY TAKE CORRESPONDING AP EXAMS IN MAY.

# Music

## **UHS21 – INTRODUCTION TO MUSIC**

(5 periods per week for 1 year - May be a 5<sup>th</sup> or 6<sup>th</sup> major)

Introduction to Music is a comprehensive full year class that connects the fundamentals of all the major musical fields: Theory, History, Technology, Performance, and Composition. Students will study music from different historical periods and genres. A major emphasis is placed on critical listening, basic analysis of pieces, and composing music using the Digital Music Lab.

## **ULS21 - DIGITAL MUSIC LAB**

(5 periods per week for one year – May be a 5<sup>th</sup> or 6<sup>th</sup> major)

Learn the techniques that top producers use to create hit songs: Create electronic music by making your own beats, basslines, chords, and melodies, in styles such as Hip-Hop, EDM, Rock, Pop, Chiptunes, and more. Additional topics include basic acoustics, synthesis/sound design, loop-based recording, sampling, remixing, mashups, film scoring, and music for video games. Applications covered: GarageBand, Logic Pro, Ableton Live, and Reason. All work is done in class and no homework is assigned. No prerequisite skills required. Students do not need to read music.

## **ADVANCED PLACEMENT COURSE IN MUSIC**

### **UUS21X – AP MUSIC THEORY**

(5 periods per week for 1 year. Special Permission required – May be taken as a 5<sup>th</sup> or 6<sup>th</sup> major)

Advanced Placement Music Theory is intended for highly motivated students who are interested in the intense study of music, and possibly the pursuit of Music Education beyond high school. The curriculum includes, but is not limited to, four-part harmonic writing, Roman numeral analysis, figured bass, dictation, and sight singing. Students must pass a placement exam (typically offered in February) to qualify for this course.

## **PERFORMING MUSIC COURSES**

All students may apply for admission to Performing Music classes.

### **IMPORTANT NOTES:**

- **AUDITIONS ARE REQUIRED**
- These courses satisfy the music requirement for graduation.
- Students may remain in performing music for four years.
- These courses are elective minors and may be taken as an extra class.
- Students may be dropped from performance groups if their privileges do not remain active, or if they do not satisfy the requirements of the class.

**Performances include winter and spring concerts, which take place after school.**

### **UDS21 - BEGINNER ENSEMBLE**

(5 periods per week for 1 year. No audition required. Elective Minor – NOT a 5<sup>th</sup> Major)

This course is designed for beginners and students with no previous instrumental experience. Students will learn the mechanics of various instruments (brass, woodwinds, strings, and percussion), how to read music, and how to perform music of various styles. Instruments will be provided by the school, but students are required to bring their own mouthpieces.

### **UDS11 - CONCERT BAND**

(5 periods per week for 1 year. Audition required. Elective Minor – NOT a 5<sup>th</sup> Major)

This group, a major showcase group, consists of full band instrumentation and has a large repertoire. The Concert Band has a full sound that must be heard to be believed. Their repertoire may include classical, popular, rock, movie, TV, holiday marches, and show tunes. Audition and performance commitments are required.

### **UJS11 - JAZZ BAND**

(5 periods per week for 1 year. Audition Required. Elective Minor – NOT a 5<sup>th</sup> Major)

Jazz, the distinctly American musical idiom, in its many forms and varieties, is the essential element in Stage Band performance. This band plays selections from the 30s, 40s and 50s "Big Band" era right through the present time. Audition and performance commitments are required.

### **UDS11QB - INTERMEDIATE BAND**

(5 periods per week for 1 year. Audition required. Elective Minor – NOT a 5<sup>th</sup> Major)

Musicians in this course will work on pieces that will help them increase their proficiency level in their particular instrument. Selections are chosen based upon the individualized assessment of the group's performers. Students in Intermediate Band often go on to join either Jazz or Concert Band.

### **UYS11 – ORCHESTRA**

(5 periods per week for 1 year. Audition Required. Elective Minor – NOT a 5<sup>th</sup> Major)

This instrumental ensemble is designed for students who desire the experience of learning and performing symphonic music. It is open to all students by audition. An emphasis is placed on Classical music, film music, and, on occasion jazz and popular music. Orchestra members include many of the most talented string, wind, brass, and percussion players at Bronx Science.

### **UVS11 – CHORUS**

(5 periods per week for 1 year. Audition required. Elective Minor – NOT a 5<sup>th</sup> Major)

Chorus is intended for students who have an interest in and ability to sing. Students will study and perform music from a variety of different genres, including Classical, Jazz, Broadway, and Pop. Performance commitments, audition, and approval of choral director are required.

# **THE PHYSICAL EDUCATION DEPARTMENT**

The Physical Education department provides a wide range of instruction in sports and team activities, making it possible for our students to develop healthy, life-long physical and athletic ability.

Our department's goal is to provide the necessary opportunities to establish and maintain physical fitness and good personal health. These goals are addressed to support both the social enjoyment of organized sports and to provide a competitive atmosphere that will benefit all students.

As part of our physical education curriculum, we offer the following units:

Aerobics	Handball	Team Handball
Badminton	Pickleball	Ultimate Frisbee
Basketball	Project Adventure	Volleyball
Fitness	Soccer	Weight Training
Flag Football	Softball	Yoga
Floor Hockey	Step Bench	

We encourage the selection of a wide variety of Varsity and Jr. Varsity sports that are available throughout the year.

Students may join the following athletic teams available at Bronx Science:

Badminton	Table Tennis (Boys & Girls)
Baseball Varsity & Jr. Varsity	Flag Football
Basketball Varsity & Jr. Varsity (Boys & Girls)	Handball (Boys & Girls)
Bowling (Boys & Girls)	Indoor Track (Boys & Girls)
Cricket	Soccer (Boys & Girls)
Cross Country (Boys & Girls)	Swimming (Boys & Girls)
Fencing (Boys & Girls)	Tennis (Boys & Girls)
Golf (Boys & Girls)	Volleyball Varsity (Boys)
Outdoor Track (Boys & Girls)	Volleyball Varsity and Jr. Varsity (Girls)
Gymnastics (Boys & Girls)	Softball Girls Varsity & Jr. Varsity
Lacrosse (Boys & Girls)	Wrestling (Boys & Girls)

## **FRESHMAN REQUIRED MINORS**

### **SQS11QJ - RESEARCH LITERACY**

(5 periods per week for 1 semester. Offered jointly with the Physical Science Department.)

Students will learn the basic skills of scientific investigation and scientific writing by doing a research project. Students research a topic; formulate hypotheses; design and carry out their own experiments; organize, analyze and apply statistics to their data; draw valid conclusions; and communicate their results orally and in writing. The course culminates in writing a term paper in the form of a scientific article.

### **SKS11 - ELEMENTS OF ENGINEERING DESIGN**

(5 periods per week for 1 semester)

This academically challenging course provides an introduction to the fundamental approaches within engineering. Topics include environmental, electrical and mechanical engineering, emphasizing principles of and applications in circuitry, pneumatics, and kinematics. Using Computer Aided Design, students translate their ideas into physical models. A collection of practical build projects focuses students on a variety of engineering and scientific concepts, drawing from prior scientific knowledge and extending that knowledge. Hands-on problem solving and practicing a variety of communication techniques form the core of this course.

## **SOPHOMORE REQUIRED MINORS**

### **EWS11 – RHETORIC AND COMPOSITION**

(5 periods per week for 1 term – Not a Special Permission course)

Sophomore Composition is a required one-term course taken in addition to 10th Grade English or Forensics, with the purpose of developing the practical writing and research skills required of challenging colleges and careers. Guided by rubrics and templates, students write argument, informational and narrative essays, and a research paper using MLA style. They identify and internalize rhetorical strategies and logical fallacies, learn to identify and synthesize diverse source material, and gain confidence in using the writing process, visible in their portfolios, to participate in academic discourse.

### **MKS11 - CODING FOR ALL**

(5 periods per week for 1 term – Not a Special Permission course)

This is a project-based course that is designed to introduce students to the study of computer science. Students will learn a high level programming language through a variety of computer science applications such as animation, music, media, games, encryptions, polls, and text analysis. Students will utilize Alice, an interactive programming environment, in which they will learn the basics of object-oriented and procedural programming by creating animations. Students will learn modular design in PYTHON and apply various programming techniques to top-down and bottom-up project design. Students will be eligible to apply for Computer Science Research and/or AP Computer Science (MKS21X) for their junior year.

**Students who wish to take a three-year sequence of research courses will take one of the sophomore courses below. Students who take one of these courses will not take Rhetoric and Composition/Coding for All. All sophomore research classes incorporate extensive writing.**

### **HQS61QJ – SOPHOMORE SOCIAL SCIENCE RESEARCH**

(5 periods per week for one year –Special Permission required)

Students will develop an individual independent research project and write a formal research proposal, which they will present and defend during the spring semester. In addition, students will participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. They will receive individual guidance at every stage of the process: narrowing down the areas of research that interest them, selecting, contacting, and interviewing with potential mentors, discipline-specific training in their area of research, including, writing a research proposal (during sophomore year), completing their research (during Junior year), and entering research competitions (during Senior year). Students are generally expected to devote part of the summer between their sophomore and junior year to working on their research project.

It is expected that students who enroll in the research program will complete the three-year sequence.

### **MQS61QJ – SOPHOMORE MATHEMATICS/COMPUTER SCIENCE RESEARCH**

(5 periods per week for 1 year – Special Permission required)

Students will develop an individual independent research project and write a formal research proposal, which they will present and defend during the spring semester. Students will also study foundations of applied mathematics and pure mathematics and computer science,

programming (in Python, Matlab, Mathematica, Excel and other languages). In addition, students will participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. Students will find mentors at local universities working in areas of interest to them. They will receive individual guidance at every stage of the process: narrowing down the areas of research that interest them, selecting, contacting, and interviewing with potential mentors, discipline-specific training in their area of research, including laboratory skills, writing a research proposal (during sophomore year), completing their research (during Junior year), and entering research competitions (during Senior year). Students are generally expected to devote part of the summer between their sophomore and junior year to working on their research project.

It is expected that students who enroll in the research program will complete the three-year sequence.

### **SBS61QJ – SOPHOMORE BIOLOGY RESEARCH**

(5 periods per week for 1 year – Special Permission required)

Students will develop an individual independent research project and write a formal research proposal, which they will present and defend during the spring semester. In addition, students will participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. Students will find mentors at local universities working in areas of interest. They will receive individual guidance at every stage of the process: narrowing down the areas of research that interest them, selecting, contacting, and interviewing with potential mentors, discipline-specific training in their area of research, including laboratory skills, writing a research proposal (during sophomore year), completing their research (during Junior year), and entering research competitions (during Senior year). Students are generally expected to devote part of the summer between their sophomore and junior year to working on their research project.

It is expected that students who enroll in the research program will complete the three-year sequence.

### **SPS61QJ – SOPHOMORE PHYSICAL SCIENCE/ENGINEERING RESEARCH**

(5 periods per week for 1 year – Special Permission required)

Students will develop an individual independent research project and write a formal research proposal, which they will present and defend during the spring semester. In addition, students will participate in a variety of individual and team projects and contests that will hone their problem-solving and research skills. Students will find mentors at local universities working in areas of interest. They will receive individual guidance at every stage of the process: narrowing down the areas of research that interest them, selecting, contacting, and interviewing with potential mentors, discipline-specific training in their area of research, including laboratory skills, writing a research proposal (during sophomore year), completing their research (during Junior year), and entering research competitions (during Senior year). Students are generally expected to devote part of the summer between their sophomore and junior year to working on their research project.

It is expected that students who enroll in the sophomore research class will complete the three-year research sequence.

## **GRADUATION REQUIREMENTS**

STUDENTS MUST TAKE 5 MAJORS EACH TERM.

The minimum requirements are listed below. Students may take additional courses.

English	every term at Bronx Science
Social Studies	every term at Bronx Science
Laboratory Science	every term at Bronx Science (Every student must take at least one biology laboratory course at Bronx Science. If a student took biology Living Environment in Junior HS/MS, s/he must take a biology lab science course prior to graduation.)
Mathematics	six terms at Bronx Science
World Languages	four terms at Bronx Science and a LOTE exam (regents) required for graduation. To qualify for an Advanced Regents Diploma must have six credits on transcript.
Sophomore Required Minor*	two terms
Arts Requirement**	two terms
Health	one term
Physical Education	eight terms
Elective 1	two terms (Science or Math)
Elective 2	two terms (Any 5 <sup>th</sup> major)

Regents must be passed in English, Global History, U.S. History, Biology, Chemistry, Physics, Algebra, Geometry, Algebra II/Trig and a World Language.

Grades for accelerated high school classes taken in NYC public middle schools will appear on your transcript and will be averaged into your GPA. They are automatically transferred from your middle school to Bronx Science and we cannot edit them. If there is an error, you need to contact your middle school. All grades for high school classes taken at private and non NYC schools will be added to the transcript with a "CR". These grades will be added by Bronx Science. Please see your guidance counselor if there is an issue with these grades missing on your transcript.

**TRANSCRIPT CHECK:** Students should check that all exams and appropriate course credit are recorded on their transcript.

Students, who fail any subject must pass the course in the following school year. You cannot

receive credit for an academic class twice.

\* Sophomore required minor can be satisfied by the following courses: Rhetoric and Composition/Coding for All (EWS11/MKS11), Sophomore Social Science Research (HQS61QJ), Sophomore Biology Research (SBS61QJ), Physical Science/Engineering Research (SPS61QJ), Sophomore Mathematics/Computer Science Research (MQS61QJ).

\*\* Arts Requirement can be satisfied by any class in the music and/or art department including (but not limited to) performing music, photography as well as the drama class.

## **COURSE SELECTION AND CRITERIA INFORMATION FOR SPECIAL PERMISSION CLASSES**

Students who meet the pre-approved criteria for special permission courses will be able to select these courses from the drop down menu in Naviance. All criteria for special permission classes will be on the department page of the Bronx Science Website. Students who do not meet those criteria may apply directly to the appropriate assistant principal. Information will be on the department webpage. This application must be submitted by the deadline (posted on the Bronx Science calendar).

Students with privileges suspended will not be eligible for special permission classes.

Students' final grades and cuts in June will be considered. Students with privileges suspended at the end of school will be removed from special permission classes. Please check Naviance and Bronx Science websites for important dates and deadlines.

### **Criteria for Automatic Acceptance into Special Permission Courses ENGLISH**

Students must be in good standing academically to be considered for the "special permission" courses in English below. You may wish to download and complete the application on our website if you are close to these requirements and/or have extenuating circumstances you would like us to consider when programming for next year.

10th grade Honors Speech (Course requires 93%+ GPA in English and overall, plus enthusiasm for speech and debate, with two major assessments consisting of an informational speech and an argument speech delivered to the class, as well as a focus on speaking and listening as part of the same units of study described in the department curriculum map for 10th grade.)

11th grade AP Language: American Literature (Course requires 90%+ average in English and overall.)

11th grade AP Language: American Studies (Course requires a 90% + average in English and overall and commitment to enroll in the joint course APUSH: American Studies.)

12th grade AP Literature: Traditions (Course requires 90%+ average in English and overall. This is the traditional AP Literature course NOT focused on creative writing.)

12th grade AP Literature: Creative Writing (Course requires 90%+ average in English and overall. This is a newly designed AP Literature course focused on literary analysis plus creative writing inspired by literature studied.)

'Journalism: Newspaper & Yearbook' and 'Yearbook Graphic Design Studio' (open to 11th and 12th grade students for elective credit, taken in addition to an English course). See Mr. Thorp during Elective Day regarding the placement test required in March for admission to these courses, through which students produce The Science Survey, our award-winning official school newspaper, which appears in both a print edition and online (click here to see the online edition), and The Observatory, our award-winning yearbook.

## Criteria for Automatic Acceptance into Special Permission Courses Social Studies

AP European History	Social Studies average 92	English Average 92 Overall Average 92
AP US History	Social Studies Average 92*	English Average 90 Overall Average 90
AP US Gov w/Eco	Social Studies Average 90	Overall Average 90
AP Comp. Gov w/Eco	Social Studies Average 90	Overall Average 90
AP Economics w/Gov	Social Studies Average 92	Math Average 92 Overall Average 92
AP Micro w/Gov	Social Studies Average 92	Math Average 90 Overall Average 90
AP Macro w/Gov	Social Studies Average 90	Math Average 90 Overall Average 90
Holocaust Leadership	Social Studies Average 88	

\*Students who have earned a grade of 90 or higher in sophomore AP European History or World History may take AP US History if they meet the other requirements.

~~~~~

### Sophomore Social Science Research Projects:

- Regents Biology or Chemistry (SLS21 or SCS21QF) no lower than 93
- OR
- Honors Biology, Honors Chemistry, or Freshman Physics (SLS21H or SCS21QH or SPS21QF) no lower than 90
  - Research Literacy or Engineering (SQS11QJ or SKS11) no lower than 93
  - English (EES81) no lower than 94

\* Note that the Research program is a 3 year course series and students are expected to complete all three years of Research\*\*

\*\*Students who do not pre-qualify for the research course are encouraged to submit an application\*\*

~~~~~

### Application Process

Students interested in a specific course must apply if they do not meet these requirements. Students will be selected based upon grades and a written recommendation from their current Social Studies teacher. Remember to attach a current transcript to your application. The selection process for AP European History and AP US History may include an evaluation of the most recent midyear essay. Please contact Mr. Colchamiro if you have any questions about course selection in Social Studies. [colchami@bxscience.edu](mailto:colchami@bxscience.edu) or visit him in 307d.

## Criteria for Automatic Acceptance into Special Permission Courses Mathematics and Computer Science

Math and Computer Science Elective Course Requirements and Application Forms

Note: Satisfaction of course requirements does not guarantee enrollment in elective courses.

Criteria

### Math Research

Sophomore Mathematics and Computer Science Research Projects:

- Geometry (MGS21) no lower than 93 OR Honors Geometry or higher level math class no lower than 90

- Research Literacy or Engineering (SQS11QJ or SKS11) no lower than 93
- English (EES81) no lower than 94

\* Note that the Research program is a 3 year course series and students are expected to complete all three years of Research\*\*

\*\*Students who do not pre-qualify for the research course are encouraged to submit an application\*\*

### **AP Computer Science (MKS21X)**

- If passed Coding For All course:
- Scored 92 or better in Coding For All course.
- If currently enrolled in Coding For All course:
- Cumulative math grade of 89 or higher.

### **App Development (MKS21CA)**

- Prerequisite of MKS21X/MKS22X, with a score of at least 85
- Game Programming (MKS21CG)
- Prerequisite of MKS21X/MKS22X, with a score of at least 85
- AP Statistics (MSS21X)

### **If currently in Algebra2/Trig:**

- 90 or higher in the first term AND 92 or more in cumulative English average.
  - If student has taken Algebra2/Trig Regents:
  - 90 or higher in Algebra2/Trig Regents AND 92 or more in cumulative English average.
- OR
- Student qualifies for enrollment in Algebra-2 Honors AND has 92 or more in cumulative English average.

### **Honors Algebra 2 / Trigonometry (MRS21H)**

- Already be in Geometry Honors and not have a score of less than 85 in the first term.

OR

- Already be in Geometry and have score of 96 or more in the first term.

### **Honors Precalculus (MPS21H)**

- Already be in Algebra2 Honors and not have score less than 85 in the first term.

OR

- Already be in Algebra 2 and have a cumulative math average of 95 or more.

### **AP Calculus AB**

- Available to students in Precalculus and Precalculus Honors.
- 90 or more in Algebra 2/Trig Regents
- OR
- Cumulative math average of 88 or more.

### **AP Calculus BC**

For Algebra-2 Honors students:

- 95 or better in the first term of Algebra-2 Honors
- OR
- For Precalculus and Precalculus Honors students:
- 90 or more in Algebra2/Trig Regents.

**Multivariable Calculus (MCS21CM)**

- Be in Calculus AB (85 or more) OR be enrolled in Calculus BC
- AND
- Have a Cumulative math average of 93 or more

**Linear Algebra & Differential Equations (MQS21CA/ MQS22CA)**

- Be in Calculus AB (85 or more) OR be enrolled in Calculus BC
- AND
- Have a Cumulative math average of 93 or more

**Math Team**

- Currently in Math Team or by application.

**C++**

Prerequisite of AP-Computer Science with a minimum grade of 90  
Anybody else interested, please apply.

**Applied Engineering Math**

Corequisite of Calculus/Calculus AB/Calculus BC with a minimum Algebra 2 Regents of 85.

**Algorithms**

- If passed Coding For All course:
  - Scored 92 or better in Coding For All course.
  - If currently enrolled in Coding For All course:
  - Cumulative math grade of 89 or higher.
- OR
- By Application [especially for student in Research programs].

**Criteria for Automatic Acceptance into Special Permission Courses Biology**

Please see below and the attached files for the requirements for pre-approval to special permission courses in the Biology Department. If you do not meet the requirements for pre-approval to special permission courses, you are encouraged to submit an application.

Sophomore Research (Biology, Physical Science, Math, and Social Science) have a separate application, also below.

Descriptions of courses are available in the course guide (Bronx Science Homepage in the ACADEMICS tab).

**PRE-APPROVAL GRADES:**

Sophomore Biology Research Projects or Physical Science & Engineering Research Projects (Regeneration):

- First term Regents Biology or Chemistry (SLS21 or SCS21QF) no lower than 93 OR Honors Biology, Honors Chemistry, or Freshman Physics (SLS21H or SCS21QH or SPS21QF) no lower than 90
- Research Literacy or Engineering (SQS11QJ or SKS11) no lower than 93
- English (EES81) no lower than 94

\* Note that the Research program is a 3 year course series and students are expected to complete all three years of Research\*\*

\*\*Students who do not pre-qualify for the research course are encouraged to submit an application\*\*

### **Honors Biology (for students who did not take Living Environment Regents Exam)**

- Current science class no lower than 85
- English average no lower than 85.
- AP Biology to be taken during junior or senior year:

For students who have taken the Living Environment Regents Exam:

Prerequisite: Regents Chemistry or Sophomore AP Chemistry with Regents

- Regents Biology no lower than 88 or Honors Biology no lower than 85
- Regents or Honors Chemistry no lower than 88 OR Sophomore AP Chemistry with Regents no lower than 85
- English average no lower than 88

For students who have not taken the Living Environment Regents Exam:

- Prerequisite: Regents Chemistry or Sophomore AP Chemistry with Regents
- Regents Chemistry no lower than 90 OR Honors Chemistry no lower than 88 OR
- Sophomore AP Chemistry (SCS21XS) no lower than 88
- English average no lower than 88

AP Biology to be taken during sophomore year (current freshmen in Chemistry):

For students who have taken the Living Environment Regents Exam:

- Prerequisite: Regents Chemistry
- Living Environment Regents Exam no lower than 90
- First term of Regents Chemistry or Honors Chemistry no lower than 88
- English (EES81) average no lower than 88

For students who have not taken the Living Environment Regents Exam:

Prerequisite: Regents Chemistry

- Regents Chemistry no lower than 92 or Honors Chemistry no lower than 90
- English (EES81) no lower than 88

AP Environmental Science:

Prerequisite: Living Environment Regents Exam and Regents Chemistry

- Regents or Honors Biology no lower than 85 OR Living Environment Regents Exam no lower than 88 (for students who did not take Regents Biology at Bronx Science)
- Regents or Honors Chemistry no lower than 85
- English average no lower than 88

AP Psychology:

- Regents Biology no lower than 85 OR Living Environment Regents no lower than 85 (for students who did not take Regents Biology at Bronx Science)
- English average no lower than 88

Post AP Biology: Genetics:

- Prerequisite: AP Biology
- AP Biology no lower than 90

Post AP Biology: Evolution:

- Prerequisite: AP Biology
- AP Biology no lower than 90

Post-AP Psychology:

- Prerequisite: AP Psychology
- AP Psychology no lower than 85

## **Criteria for Automatic Acceptance into Special Permission Courses** **PHYSICAL SCIENCE**

These are guidelines for pre-acceptance into these special permission courses. Grade requirements refer only to Bronx Science courses. Students interested in a specific course are encouraged to apply even if they fall short of these requirements; they will be considered. If more students apply for a course than we can accommodate, students will generally be taken based upon grades. We try to run as many sections as needed to accommodate qualified students.

### **Sophomore Biology Research Projects or Physical Science & Engineering Research Projects (Regeneron):**

- First term Regents Biology or Chemistry (SLS21 or SCS21QF) no lower than 93 (includes Research
- Literacy) OR Honors Freshman Biology or Chemistry (SLS21H or SCS21QH) no lower than 90
- English (EES81) no lower than 93

\* Note that the Research program is a 3 year course series and students are expected to complete all three years of Research\*\*

\*\*Students who do not pre-qualify for the research course are encouraged to submit an application\*\*

### **Honors Chemistry:**

- Regents Biology no lower than 90 OR Honors Biology no lower than 88
- Math average no lower than 92.

### **AP Chemistry:**

Prerequisite: Living Environment Regents Exam, Regents Chemistry

Currently in Regents Chemistry

- First term of Regents Chemistry no lower than 90
- Math average no lower than 92
- Completed Regents Chemistry
- Regents Chemistry no lower than 88
- Math average no lower than 90

### **AP Chemistry for Sophomores with Regents Exam**

(Current freshmen in Regents Biology who have not taken the Chemistry Regents Exam)

With no Regents Chemistry and currently in Alg2/Trig or higher:

- Regents Biology no lower than 92 OR Honors Biology no lower than 88
- Math average no lower than 95
- With no Regents Chemistry and currently in Geometry:
- Regents Biology no lower than 94 OR Honors Biology no lower than 92
- Math average no lower than 95

### **Post-AP Chemistry : Quantitative Analysis:**

- AP Chemistry no lower than 85

### **AP Physics 1:**

- Algebra 2 (MRS21) no lower than 91
- OR Honors Algebra 2 (MRS21H) no lower than 88 and no lower than a 91 in Chemistry or 88 in Honors/AP Chemistry

**AP Physics 2:**

Prerequisite: Regents Physics or AP Physics 1

- Algebra 2 no lower than 90 or 88 in Honors Algebra 2 and current math class no lower than 92
- Regents Physics no lower than 92 or AP Physics 1 no lower than 88

**AP Physics C:**

Co-requisite Calculus;

**From Regents Physics:**

- Algebra 2/Trig (MRS21/22 or MRS21H/22H) no lower than 92 and current math class no lower than 94
- Regents Physics no lower than 95.

**From AP Physics 1**

- AP Physics 1 no lower than 92

**Post-AP Physics : Modern Physics (Students with Regents Physics and high interest can apply)**

Prerequisite : AP Physics 1 or AP Physics C

- AP Physics 1 no lower than 90 or AP Physics C no lower than 85

**Digital Engineering**

- Current Juniors: Science average no lower than 90
- Current Freshmen and Sophomores: Research Literacy no lower than 92 or Elements of

**Engineering Design** no lower than 94**Experimental Engineering (Seniors only)**

Prerequisite : Regents Physics or AP Physics 1 or AP Physics C

- Introduction to Engineering no lower than 85
- Chemistry no lower than 85
- Physics no lower than 85 OR AP Physics 1 no lower than 80
- No lower than a 90 in any Engineering class.

## Criteria for Automatic Acceptance into Special Permission Courses World Languages

**CRITERIA FOR SPECIAL PERMISSION COURSES CLASSES:****CHINESE**

AP Chinese 96

Chinese Conversation 88

**FRENCH**

AP French 90

French Conversation 85

**ITALIAN**

Conversation 85

AP Italian 87

**JAPANESE**

Japanese Conversation 85

AP Japanese 90

**LATIN**

Advanced Latin Readings 85

AP Latin 90

**SPANISH**

AP Spanish Language 94

AP Spanish Literature 94

Spanish Conversation 85

Spanish Professions 85

Spanish Narrative &amp; Film 90

Honors Spanish Regents 95 in FSS63

## Criteria for Automatic Acceptance into Special Permission Courses ART

The course explores topics such as the nature of art, its uses, its meanings, art making, and responses to art. Through investigation of diverse artistic traditions of cultures from prehistory to the present, the course fosters in-depth and holistic understanding of the history of art from a global perspective. Students learn and apply skills of visual, contextual and comparative analysis to engage with a variety of art forms, constructing understanding of individual works and interconnections of art-making processes and products throughout history.

### Pre-requisites

Students who have been successful in humanities courses or studio art are especially encouraged to apply since these experiences will likely support and enrich the context of the art history course. \*Taken from the College Board Description

Students who meet the criteria below are automatically approved for AP ART HISTORY  
Freshman/Sophomore/Junior Social Studies average: 88.

Any student interested in AP Art History who has not been accepted automatically should absolutely visit the AP Art History room (322) on Elective Day and speak to Mr. Seoh and/or Ms. Rocchio.

## Technology

Advanced Placement Studio Art Prerequisites:

- Drawing and Design, or Painting, or Studio Art, and/or Photography or substantial classes outside of Bronx Science.
- An Art Portfolio of a minimum of 10 portfolio-quality pieces to be assessed by Ms. Asch, room 009 during SGI period 10, or during periods 4, 5, or 6. (e-mail Ms. Asch at [asch@bxscience.edu](mailto:asch@bxscience.edu) if none of these times work for you)

## Criteria for Automatic Acceptance into Special Permission Courses Music

AP Music Theory Placement Exam Information:

Please be advised that YOU MUST TAKE THE PLACEMENT EXAM to be considered for admission to the class. Exam date will be listed on our website.

Exam Topics:

1. Note identification in treble clef and bass clef.
2. Questions about Music Fundamentals such as scales, intervals, chords, key signatures, time signatures, tempo, etc.
3. Listening assessment:
  - The ability to listen to a simple melody and/or chord progression and then write it down using music notation.
  - The ability to listen to a musical excerpt and then answer a series of questions about it.

## **PROGRAM PLANNING GUIDELINES**

	<u><b>Freshman Program</b></u>	
<b>Period</b>	<u><b>Fall</b></u>	<u><b>Spring</b></u>
1	English	English
2	Social Studies	Social Studies
3	Mathematics	Mathematics
4	Lab Science (usually Biology or Chemistry) 7 periods	Lab Science (usually Biology or Chemistry) 7 periods
5	World Language	World Language
6	Physical Education meshes with Science	Physical Education meshes with Science
7	Research Literacy or Elements Of Engineering Design	Research Literacy or Elements Of Engineering Design
8	Lunch or Math Team	Lunch or Math Team
9	Musical Group (optional)	Musical Group (optional)

\* Honors Science is ten periods and will add on additional periods to your day.

	<u><b>Sophomore Program</b></u>	
<b>Period</b>	<u><b>Fall</b></u>	<u><b>Spring</b></u>
1	English	English
2	Social Studies	Social Studies
3	Mathematics	Mathematics
4	Lab Science (usually Chemistry)	Lab Science (usually Chemistry)
5	World Language	World Language
6	Coding for All/Rhetoric and Composition or Sophomore Research	Coding for All/Rhetoric and Composition or Sophomore Research
7	Arts*	Arts*
8	Physical Education	Physical Education
9	Lunch	Lunch
10	6 <sup>TH</sup> Major (optional)+	6 <sup>TH</sup> Major (optional)+

\* The arts requirement can be satisfied by two terms of any art, music or drama class.

+6<sup>th</sup> major is optional if all requirements have been met. Requests for a sixth major will be added to your program only if the budget permits and subject to your attendance and cut records

The following classes are NOT fifth majors:

- Yearbook
- Journalism
- Debate
- Advanced Acting and Play Production
- Drama Workshop
- Musical Group
- any course listed as an elective minor

	<u>Junior Program</u>	
Period	<u>Fall</u>	<u>Spring</u>
1	English	English
2	Social Studies	Social Studies
3	Mathematics	Mathematics
4	Lab Science	Lab Science
5	World Language or any 5 <sup>th</sup> major elective	World Language or any 5 <sup>th</sup> major elective
6	Health (one term) OR	Health (one term)
7	Physical Education	Physical Education
8	Lunch	Lunch
9	6 <sup>TH</sup> Major (optional)*	6 <sup>TH</sup> Major (optional)*

	<u>Senior Program</u>	
Period	<u>Fall</u>	<u>Spring</u>
1	English	English
2	Social Studies	Social Studies
3	Lab Science	Lab Science
4	Science or Mathematics (Elective 1),	Science or Mathematics (Elective 1)
5	Fifth Major (Elective 2)	Fifth Major (Elective 2)
6	Physical Education	Physical Education
7	Lunch	Lunch
8	6 <sup>TH</sup> Major (optional)*	6 <sup>TH</sup> Major (optional)*

\*6<sup>th</sup> major is optional if all requirements have been met (make-up classes are not 6<sup>th</sup> majors). Requests for a sixth major will be added to your program only if the budget permits and subject to your attendance and cut records.

The following classes are NOT fifth majors:

- Yearbook
- Journalism
- Debate
- Advanced Acting and Play Production
- Drama Workshop
- Musical Group
- any course listed as a elective minor

**NOTE:**

1. Students who have not passed EES81, EES82, EES83, & EES84 AND HGS41, HGS422, HGS43, & HGS44 will not be promoted into grade 11.
2. Students may satisfy the arts and health in Bronx Science summer school. No other academic summer school courses are offered including for failed classes.
3. Requests for a sixth major will be added to your program only if the budget permits and subject to your attendance and cut records.
4. Accelerated course grades, Regents grades, and proficiency exam grades should appear on your transcript. If they do not, please see your Guidance Counselor.
5. Seniors' 1st elective choice must be a science or math course.
6. Seniors' 2<sup>nd</sup> elective choice may be any academic course including Advanced Placement courses or any other course that is NOT designated as either a elective minor.
7. Students who failed an academic class MUST repeat that class the following year. See your guidance counselor for advice.
8. If a student passed a second language proficiency exam by the end of eighth grade and earned two high school credits, the student may continue with the same language at Bronx Science at the second year level. All students need two years of language, minimum at Bronx Science and must pass the Regents examination (LOTE). All students must have credit of World Language in addition to LOTE.
9. You must meet with your guidance counselor as least once a year to review your transcript and to confirm that you are fulfilling your graduation requirements in a timely manner.

Fill in the form below to prepare for elective day and Naviance course registration.

Name \_\_\_\_\_ Official Class \_\_\_\_\_

ID# \_ \_ \_ \_ \_

Counselor \_\_\_\_\_

**NOTES**

Special Permission courses I'd like to take: (Be sure to sign up!)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Courses to visit on Elective Day (Note room numbers)

\_\_\_\_\_      \_\_\_\_\_  
\_\_\_\_\_      \_\_\_\_\_  
\_\_\_\_\_      \_\_\_\_\_

My Five majors (1st choice)

My Five majors (1<sup>st</sup> Alternate)

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

My Five majors (2<sup>nd</sup> Alternate)

My Five majors (3<sup>rd</sup> Alternate)

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_  
5. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Sixth major, extra course (if necessary) or elective minor

6. \_\_\_\_\_  
7. \_\_\_\_\_

## **ON-LINE ELECTRONIC COURSE GUIDE**

An electronic copy of the Course guide has been posted on The Bronx Science World Wide Web page, [www.bxscience.edu](http://www.bxscience.edu).

Questions related to the Course guide on the Internet should be directed to the appropriate department or Mr. Nasser, Assistant Principal, Pupil Personnel Services via E-Mail to [nasser@bxscience.edu](mailto:nasser@bxscience.edu).

---