Academic Program

NEW JERSEY ACADEMY OF TECHNOLOGY

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English Department

Language mastery not only requires a command of grammar and mechanics, but also the understanding of research methods and clear presentation of complex information. We equip our students with research, thought, writing and analytical skills to prepare them for competitive universities; this rationale also impacts the verbal portion of the SAT. Even, more importantly, we teach students to analyze text and to respond clearly and elegantly in their own voices. We believe the process of writing to be essential to the understanding of all currents of thought; thus our implementation of writing across the curriculum. For example, this might involve explaining a mathematical theorem or biological pathway in words. To write well, one must think and research well. Our composition curriculum begins with short writing assignments that stoke curiosity and inquiry. Asking questions cultivates interesting writing. When it's refined by vigorous revision, this writing evolves into formal essays. Drawing from a selection of relevant poems, prose, essays, and plays, students flourish as independent researchers. By delving into the correspondences between history, art, philosophy, and literature, students tap wellsprings of cultures, ideas, and perspectives. Although reading and writing are paramount to an English education, we also enrich students with discussion and oral presentations. Emphasizing both analysis and creativity, students blaze a path for discovery, not only with respect to literature, but also for their personal development.

9TH GRADE

English I

Our teaching philosophy places freshman in a rigorous continuum that ends with acceptance into a top university. Therefore, we begin developing the research, rhetorical, and composition skills demanded of the best schools. Examining canonical works such as *Macbeth* or *Lord of the Flies,* as well as more contemporary works like *Interpreter of Maladies*, our students learn to bridge themes spanning cultures and periods. "Literature", as it's traditionally known, is expanded in our classrooms. Media such as news articles become artifacts, clues that reflect the culture we wish to investigate. This process fuels analytical engines, producing creative thinkers *and* writers. We believe that sophisticated ideas are not lost to freshman. Guided through a challenging realm of discovery, our pupils probe the mysteries embedded in literature. Building upon techniques of rhetoric and composition, they present their own thoughts through discourse and essays. Fostering these skills in freshman, this course facilitates a smooth initiation into the realm of intellectual discourse.

English I Honors

English I Honors draws on all of the ideas and principles expounded upon in English I, but challenges students even more. Students address an array of literary topics—from the prevalence of certain themes to the cultural context in which the author originally composed his or her work—through both discussion and writing exercises. The use of external sources, like critical essays or primary documents, helps to strengthen student analyses. English I Honors is particularly interested in the relationship between literature and overarching historical trends. We pay close attention to the idea of impact: how literature and world civilizations affect and shape each other.

10TH GRADE

English II

English II looks at the correlation between literature and United States history from the American Revolution through the Civil War. In addition to reading works explicitly about America and by American authors, students are asked to discern what constitutes an "American" theme. What makes certain symbols "American?" Are they uniquely so? Can one find an "American" theme in a text written abroad? If it is possible to find an "American" theme in a piece of global literature, how does the dynamic created by this "juxtaposition" contribute to the readers' perspective? This course helps students to further develop their analytical, writing, and speaking skills, and pushes them to question textual choices with an even keener eye.

English II Honors

Like English I, English II Honors examines the correlation between literature and United States history from the American Revolution through the Civil War. Students read texts explicitly about America and by American authors and focus more on the idea of "Amercanism" and its relation to culture and readership. We develop insights into what, if anything, makes certain symbols and concepts "American." With a special focus on motifs and ideology, the English II Honors class works to understand early U.S. literature using more advanced analytical approaches in writing and discussion.

11TH GRADE

English III

English III picks up where English II leaves off by continuing to examine the evolution of "American" themes. Starting with the American Revolution, and working toward modern society, students further their reading, writing, and speaking skills, while conducting in-depth research. We investigate the ideas of modernism and evolution, in particular, and generate relevant and insightful thoughts and questions.

AP English III

Like English III, AP English III examines the evolution of "American" themes from the American Revolution through modern society. We consider overarching social, economical, and linguistic patterns as we analyze the literature or the period. We thoroughly research views from diverse writers, orators, and theologians. English III Honors emphasizes how contrast and contention contribute to "progress," which, in turn, raises the question of what "progress" truly means.

12TH GRADE

English IV

The government can be seen as an empowering or disempowering force, depending on a person's perspective. English IV looks to this concept and the way in which it is discussed in literature. The students read works from around the world and examine what makes a government "strong" or "weak;" "great" or "poor." We compare and contrast views of different governments with the way in which the government has been written about and spoken of in the United States. Questions such as morality, law, and rights are regarded in depth.

AP English IV

English IV, like AP English IV studies issues of government. This course, however, draws on more philosophical and theological views to supplement the students' understanding of American government in contrast with international governments. We use primary and secondary texts to augment our oral and written analyses. These works aid in our examination of ethics, function and rationale of government. In this class, independent research skills are further refined.

Math Department

The mathematics department at NJAT emphasizes the understanding of mathematics as a universal discipline for logical thinking and problem solving. The philosophy of the mathematics department mandates the building of the necessary abstract and conceptual skills that prepare students for the continuing of mathematics education at the college level. Our approach also provides the necessary background needed for courses where mathematics is a basis for validating hypotheses and developing and supporting new theories. The vision of the school is to integrate mathematics with the natural sciences in order for students to have meaningful and direct

comprehension of the many varied applications of mathematics. Students methodically develop their skills through analysis, logic, reasoning, creativity, and collaboration.

9TH GRADE

Algebra 1

Here, students develop a solid foundation of the language of algebra, including number sense and theory, equation solving, and the application of what is learned through modeling real-world situations. Units of study in this course include: operations with numbers, variable expressions and equations, solving equations, graphing, linear and quadratic functions, exponential functions, radicals, statistics, and probability. Students apply what they have learned in algebra to organize, graph, analyze data, and draw conclusions as part of the scientific method process during laboratory investigations related to their science courses.

Algebra 1 Honors

This course is more rigorous and students develop the art of problem solving. The complexity of the problems being asked is geared towards the development of analytic, logic, and reasoning skills students will need to develop to succeed in their standardized examinations. Class work and homework problems assigned are very challenging and among the most difficult in the text.

9TH/10TH GRADE

Geometry

Units of study in geometry include: validating proofs, triangle congruence, parallel and perpendicular lines, angle sums, quadrilaterals, trigonometry of the right triangle, coordinate geometry, transformations, and probability. Students develop the necessary abstract and conceptual thinking skills, as well as the factual information and knowledge base that will prepare them for higher level mathematical concepts and topics.

Geometry Honors

The course begins with a review of the fundamentals of algebra followed by a rigorous full year of geometry concepts that will prepare them for future courses in mathematics, as well as prepare them for the Scholastic Aptitude Test (SAT). Students will engage in conducting two column proofs that will

develop their analytical ability and their logical reasoning skills. Additional content covered in this course includes: operations with fractions, further work with quadratic equations, logic, and loci.

10TH/11TH GRADE

Algebra II

The year begins with a basic review of fundamental algebra concepts that include equations and inequalities, linear and quadratic functions, and system of equations and inequalities. Units of study in Algebra II include: quadratic, polynomial, and radical equations and inequalities, polynomial functions, radical equations and inequalities, rational expressions and equations, exponential and logarithmic functions, conic sections, sequences and series, and probability and statistics.

Algebra II Honors

This course is designed to present algebra as a system of real and complex numbers. In addition to the content in Algebra II, students investigate concepts of trigonometry, mathematical systems, imaginary numbers, and geometry of the circle. This course will challenge students in many ways and students will acquire novel problem solving skills and strategies. Students will become very proficient in comprehending the abstract nature of mathematical concepts.

Pre-Calculus

This is an introductory course to calculus. Students begin the year with a review of algebra concepts followed by an extensive study of polynomial functions, geometry, trigonometry, matrices, and an overview of derivatives and integrals. This course is designed for students who wish to pursue studies in business, computer science, mathematics, and science. This course is a prerequisite to the AP Calculus course.

Pre-Calculus Honors

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11TH/12TH GRADE

Calculus

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AP Calculus AB, BC

AP Calculus is a full-year advanced placement course that prepares students for college requirements pursuant to other math and science college-level courses. Students receive college credit through meeting certain requirements of the course work and performance on the Advanced Placement Examination in calculus. Pre-requisites for this course include completion of algebra 1, geometry, algebra 2 / pre-calculus, and departmental approval.

Science Department

NJAT provides a rigorous science curriculum that prepares students for university level courses, science-oriented careers, and AP courses for college credits. There is a theoretical as well as laboratory component that ensures students will have a strong foundation and understanding of the scientific method, scientific inquiry, and lab report writing. Students develop the necessary abstract and conceptual processing skills that allow them to grasp the various theoretical models that are the basis of the biological and physical sciences.

9TH GRADE

Biology

Units of study for biology include microscopy, cellular/molecular biology, biochemistry, genetics, DNA technology, evolution, human physiology, plant structure & function, and ecology. Biology is an unfolding of many mysteries in which students begin to see the interrelations not only on a cellular and physiological level of organisms, but also between organisms and their environment. Students begin to

understand and internalize the human impact on the biosphere, and the role their generation will play in dealing with these issues. Students see first-hand that the Earth with its limited resources cannot forever sustain an ever-growing population.

Biology Honors

In addition to the units of study listed under the biology course, students will develop a more cellular and molecular approach to their understanding of biology. Biochemistry students dive more deeply in their exploration of the content in biology, and begin to write formal laboratory reports applying the scientific method to their laboratory investigations. This course is more abstract and challenging and addresses content in greater depth.

10TH GRADE

Chemistry

Units of study for chemistry include matter, atomic structure, nature of electrons, periodic table and periodic trends, elements, compounds, bonding theory, chemical reactions, the mole and stoichiometry, states of matter, gas laws, reaction rates and equilibrium, acids and bases, redox reactions, electrochemistry, and an introduction to organic chemistry (hydrocarbons). The course emphasizes the rigorous and traditional approach to comprehending the foundational principles of physical science. Students' knowledge and understanding of the natural world is broadened, as students' abstract and conceptual thinking . In addition, students develop a greater comprehension of the nature of scientific inquiry through laboratory work.

Chemistry Honors

This course is similar to the basic chemistry course, but will require a deeper analysis of the chemistry core curriculum. It is also a preparatory course for students who wish to enroll in AP chemistry. Students will benefit from the insights they receive in understanding natural phenomena, and the degree to which chemistry plays an important role in their lives.

11TH GRADE

Physics

Units of study for physics include motion (Newtonian physics), work and energy, momentum and collisions, gravitation, solids and fluids, thermodynamics, wave theory (modern physics), light and sound, electricity / magnetism, atomic theory, and nuclear physics. This course emphasizes the laws governing the natural world and the mathematical reasoning supporting the laws. Students are encouraged to question the validity of the laws, and why the realm of the atom and subatomic particles (micro / quantum world) deviates from the laws governing the macroscopic world of phenomena. Laboratory

work involving observations, predictions, data collection, and drawing conclusions enhances understanding of the nature of scientific inquiry.

AP Biology

The AP biology course prepares students for the AP Biology Examination to be taken in May. The quantity of work, level of the content, laboratory requirements, and intellectual rigor of this course will definitely challenge students. The complexities of the lab and content requirements make it essential for students to take extra care to study, review, and complete assignments. Registration for this course requires completion of biology, chemistry, and physics courses, as well as the permission of the teacher.

12TH GRADE

AP Physics

Students use the information and knowledge learned in previous science courses to gain a unified understanding of the various scientific models prevalent today. Students begin to learn to integrate theory with practical real-world problems and solutions. In addition to the content in the Physics course, students explore the topics of special and general relativity, wave and particle physics, and quantum physics. There will be an emphasis for students to inquire into the micro and macro nature of the universe, and the implications these theoretical principles have for shaping the future of humanity. The prerequisites for this course offering include the completion of courses in Algebra I, Geometry, and Algebra II.

AP Physics

This course is designed to prepare students for college chemistry while also granting AP credit. Its objective is to instill the theoretical principles and laboratory practices expected of introductory university chemistry courses. This year long course will cover the relevant topics such as the periodic table, stochiometry, acid-base chemistry, electrochemistry, thermodynamics, gas laws, and much more. This is a course for students who want to enter college ahead of the curve. It therefore requires a considerable time commitment in terms of studying and working through chemical problems. Thus, the math prerequisite is the successful completion of Algebra II.

Social Studies Department

Our school's study of history resists a mere recitation of facts, but insists on presenting history as perspectives and narratives formulated by real people. As such, we teach students not only to understand the factors inducing change throughout time, but also to consider the possibility for bias. Therefore, in addition to a primary textbook, we furnish students with a variety of secondary materials to build a habit of scholarly skepticism. Putting different texts in concert with one another, pupils learn to investigate historical sources and enter the conversation with their own thoughts and ideas. Our courses study the development of particular countries, emphasizing but not limited to the United States for upper classmen, and beginning with a survey of world history for under classmen. Although a chronological study is presented, we also include thematic correspondences between art history and literature to color our study of the past. Generating connections between geographies, religions, governments, and a host of other topics throughout time, our students understand history by concept as well as by time. In keeping with our commitment to writing across the curriculum, history students thread their observations together, generating theses that are later developed into formal essays, projects and other assessments. In our department, we strive to create a space where discussions and presentations provide opportunities for students to craft their thinking, writing and speaking about historical trends.

9TH GRADE

World History I,II

We begin our freshman curriculum with the origins of human peoples, forging a pathway from ancient civilizations to modern history. This course introduces the process of researching historical topics beyond the limits of the world civilizations textbook. Citing secondary sources from contemporary works such as Professor Jared Diamond's *Guns, Germs, and Steel*, pupils learn the fundamentals of scholarship. Entering academic conversations means putting multiple perspectives into play and formulating a hypothesis; testing that, and reaching thesis. Thus, students' scholarly research and writing mature throughout the year. We teach students to ask questions and engage in the process of inquiry. Introducing students to rhetorical standards, they learn not only to craft essays about history, but also to formally cite sources and to hit all bases in proper research. Incorporating these fundamental skills our students emerge ready to advance their research in further years of subsequent study.

World History I,II Honors

Covering more material and requiring more forethought in composing essays, students begin a history curriculum that puts them on pace to earn AP credit by their junior year. This course quickly ingrains fundamentals of research so that students can begin the path to independent work.

10TH GRADE

US History I,II

Our study of U.S. history begins with a study of the political climate leading to the American Revolution and finishes with resolution of the Civil War. Building upon the skills taught in our introductory course on World Civilizations, our students apply research techniques to study the United States in various contexts. Examining the U.S. in multiple stages, students investigate and write about its evolution.

US History I,II Honors

This course is meant to prepare students for the AP course in history, which will place them in good standing for college credit. In this honors course, we ask more of students in the quantity and quality of their writing on historical topics. The essays are more rigorous and graded more stringently. Above all, this course introduces students to sophisticated discourse with the intention of equipping them for the AP curriculum in the following year.

11TH GRADE

US History III,IV

This course begins where History II left off. It trends through modernity into the Industrial Revolution and the World Wars. Progressing into modern times, students research topics such as the interplay between communism and capitalism, or other sociopolitical entities that shaped the world in which we now live. Students also have the opportunity to utilize current events to supplement their research. By this level, students will understand how to use these materials to build sound, scholarly essays.

US History III,IV

This course provides students with the opportunity to research the second tract of U.S. history through highly specialized topics. Students will read and write much more, independently discovering unique pathways for their research. Students will be required to research a variety of scholarly sources and synthesize them for their own inquiry.

12TH GRADE

American Government and Politics

Studying the three branches of government, students learn about the U.S. in an operative format. Moving beyond the three branches to a study of the political forces that structure our

contemporary country, students learn to look objectively at the government. Instead of just memorizing processes, students use that knowledge to develop an original topic on American politics and policy. This is an opportunity for seniors to finish with a sophisticated essay worthy of the university classroom, while gaining a depthful understanding of U.S government, politics and society.

Visual Arts Department

NJAT's Visual Arts department features an integrated study of art history and studio art that extends across the curriculum. This allows students the opportunity to strengthen content learning and understanding in all subject areas. The program offers students comprehensive studio art experiences with detailed explorations in a variety of media. In the classroom and through critiques, students learn the importance, power and responsibility of self-expression. In addition to gaining confidence and proficiency in their studio practice, students learn about the history, analysis, and interpretation of art.

9TH GRADE

Studio Art I

Students in Studio Art I will have the opportunity to work in a broad range of media, including drawing, painting and printmaking. The goal is to expand students' artistic abilities by having them explore a variety of techniques, with emphasis on drawing and 2-D design.

Art History I

This course presents to students the history of art from Prehistoric through Gothic Art and Architecture. Students will learn the necessary tools to knowledgeably view, write and speak about art and its many elements.

10TH GRADE

Studio Art II

Building on the skills and techniques they have mastered in Studio Art I, students will be given the opportunity to expand their exploration into three-dimensional materials. Students will be given the opportunity to work with such materials as clay, wood, fabric and found objects.

Art History II

This course continues the art historical investigation begun in Art History I. Continuing with the Early Renaissance and following through to the present, students will resume their investigation of the history of art.

11TH GRADE

Studio Art III

Here, students are offered greater opportunities to broaden their personal expression and art experiences. Provided with tools and techniques to create their visions, students will be required to complete five high level works of art utilizing at least three fields.

AP Studio Art III

The AP Studio Art Program consists of three portfolios – 2-D Design, 3-D Design and Drawing – corresponding to the most common college foundation courses. In AP Studio Art I students will be required to create six high level works of art working towards the development of a comprehensive portfolio.

Contemporary Art

A study of art and architecture from Impressionism to the present day emphasizing the importance of social, economic, and political influences on the art. This course is designed to relate contemporary artistic expression to modern thought.

12TH GRADE

Studio Art IV

Students in Studio Art IV, after having completed all previous art courses will be given the opportunity to create more specialized works of art. Choosing a single field to focus their efforts, students will be required to complete five high level works.

AP Studio Art IV

Continuing extensive creative pursuits, students will develop portfolios with artworks created in AP Studio Art I as well as six additional works. Students will photograph and submit their portfolios for review.

Art Criticism

In this course, students will study the basic concepts and challenges of modern art as developed and formulated by artists and critics. Students will examine the principal theories of art and criticism from 1900 until 1945 as well as recent approaches to the image in art history and visual culture.

Foreign Language

All students planning to attend college should study a minimum of 2 years of one foreign language. We offer opportunities in Spanish, French, and Korean.

Spanish I CP/Honors

Spanish I begins to develop the language skills of listening, speaking, reading and writing. Cultural aspects of the Spanish speaking countries are presented. Basic vocabulary, grammar, reading selections and oral proficiency exercises are introduced in a context that is culturally authentic and meaningful.

Spanish II CP/Honors

Students will hear, speak, write, read and comprehend basic Spanish. Supplementary readers increase the student's vocabulary and enrich his/her knowledge and appreciation of the Hispanic culture. Placement tests will be given to students with prior course work in Spanish to determine appropriate levels.

Spanish III CP/Honors

Spanish III is to assure that students can read, write and speak the target language at an intermediate level. The study of grammar is further advanced and completed. Much emphasis is placed upon the designation of the different tenses of the language, so that students not only know the language, but also know how it works. The units are divided into vocabulary, grammar, and culture sections. Emphasis

is placed on enhancement of speaking and writing in Spanish. Students will explore current events and global issues of the Spanish-speaking world.

Spanish IV CP/Honors

This course is an elective course for students who have successfully completed Spanish III and wish to continue their pursuit of higher levels of Spanish study. Emphasizing communicative skills(listening, speaking, reading, writing) students will further their development of cultural knowledge.

AP Spanish

This is an elective placement course designed for higher level students who are interested in improving their knowledge of the Spanish language and culture. This course stresses the use of Spanish for active communication (reading, writing, speaking, and listening). It is a preparation for the AP Spanish Language exam.

French Honors

French courses at NJAT are designed to help students better their command of the French language and increase their knowledge of French culture. We focus on both oral and written skills through class discussions, readings, presentations, films, grammar exercises, and papers. Topics range from Francophone countries to renowned French historical figures to syntactically sound sentence formation. La maîtrise est à portée de main!

Korean Honors

Korean Honors focuses on developing the language skills of listening, speaking, reading and writing. This course pursues students' continuous investigation of higher levels of Korean study. Proficiency exercises are introduced in a context that is culturally authentic and meaningful to the study of Korean.

Physical Education

Volleyball, Tennis, Wrestling, Yoga

We strongly believe in the maxim “Sound Mind, Sound Body”, and thus offer a range of sports and athletic opportunities for our community. So committed are we to sound health that among our teaching staff is a championship collegiate wrestler, a varsity tennis player, a championship volleyball player and a yoga instructor.

Credit Requirements

NJAT student must receive a passing grade in every subject assigned to him/her in order to advance to the next grade level and to graduate. While NJ state requires 120 credits to graduate, a student at the Dream School must earn at least 120 credits.