

Packer's Advanced Topics Curriculum

The Advanced Topics (AT) Program is defined by the following characteristics: intellectual rigor; authentic real world work; demonstrations of mastery; performance-based learning featuring student-driven design, analysis and synthesis of varied texts, active scholarship, and original research.



Advanced Topics in American Government

This course asks students to explore the philosophical and constitutional underpinnings of the United States political system and examine how they have evolved today. Ongoing attention to current issues helps students to make connections between theory and the real world. The course is designed to equip students to become informed citizens, practiced and poised to engage with their surroundings. The course concludes with a local government project in which every student selects a current issue facing New Yorkers. Then, they conduct scholarly research, engage with local political action organizations and policy experts, and consider different outcomes for a better future.



Advanced Topics in Archival Research

In this course, students will conduct original research to gain insight into history by using materials held in The Packer Collegiate Institute's archives, located at the Brooklyn Historical Society. Students will present their research in two forms: first, in the composition of a scholarly essay suitable for submission to The Concord Review or comparable journals that publish high-quality work by high school students; and, second, in a public presentation at a research seminar held at the end of the year.



Advanced Topics in Biology

In this year-long course, students will develop their understanding of biology by using the framework of Claim, Evidence, and Reasoning (CER) in a collaborative classroom environment. Students will construct and communicate evidence-based models they develop either by examining historical data or by generating their own evidence. The sequence of units will parallel historical scientific thinking to provide students with an opportunity to understand how scientists come to know and build models. Grounded in evolutionary thinking, students will explore experimental methods and statistical analyses common in biology and answer questions such as: how do cells communicate on a molecular basis, how can we use our understanding of cellular communication and gene expression to engineer genes using biotechnology, and how does life use and transfer energy?



Advanced Topics in Chinese Conversation and Culture

Chinese Conversation and Culture is a full-year course intended for qualified students who are interested in completing Chinese language studies equivalent to a level 200 college course. The objectives are to refine and further develop students' abilities to conduct semi-formal or formal discussions about social-cultural issues, to increase vocabulary by making context-based guesses about the meaning of a new word, to write and present fully developed narratives and structured arguments, and to learn to appreciate Chinese literature. This course is conducted entirely in Chinese.



Advanced Topics in Choreography

This course provides the opportunity for the in-depth study of choreography, improvisation, performances skills, and personal creative process through advanced composition assignments and performances. A major focus of the class is the required participation as a choreographer in the Dance Concert and other showcases, which requires a good deal of time leading after-school rehearsals. While learning the craft of composition or "dance-making" is the most obvious element of this course, students also learn about costume design, lighting, leadership, and collaborative concert production.



Advanced Topics in Computer Science

AT Computer Science: Data Science;
AT Computer Science: Web Technologies

Packer offers two advanced Computer Science Courses for students. These courses emphasize student independence, the importance of reading and generating documentation, and growing strong debugging skills. In the Data Science course, students explore the main ideas of data science through project-based explorations. Students develop an understanding of data analysis, sampling, correlation/causation, bias and uncertainty, probability, modeling with data, making and evaluating data-based arguments, and the power of data in society. The course explores this topic through Python coding and specifically the pandas and matplotlib packages. Students engage in algorithm design and object oriented approaches by developing a portfolio of complex student-driven projects. In the Web Technologies course, students learn how to develop a Full Stack Website. They begin with front end development utilizing HTML, CSS and JavaScript to create user friendly, well structured websites. They progress to back end development learning to use databases, web frameworks and REST API approaches to create more complex functional websites. Students engage in an in-depth investigation and a final project website design challenge to showcase their advanced understanding.



Advanced Topics in Calculus I and I/II

AT Calculus I and AT Calculus I/II explore much of the content typically covered in the first semester and first year of college, respectively. Learning will be discovery-based and will emphasize a multi-representational approach to calculus, in which students learn to express concepts graphically, numerically, analytically, and verbally. Abstract thinking, mathematical modeling, and original research will be key components of the class. The accelerated pace of AT Calculus I/II allows students to explore polar and parametric functions, sequences and series, integration by parts, partial fractions, and Euler's Method, in addition to the topics covered in AT Calculus I.



Advanced Topics in European History

Advanced Topics in European History is a discussion-based course that tracks the evolution of Western society from the 16th century to the 21st century. In the first semester, we use primary sources— journals, letters, arts, literature, and physical remains— alongside scholarly secondary works to trace the intellectual and cultural roots of modern Europe from the Renaissance to the era of the Enlightenment and the French Revolution. In the second semester, students will explore the relationship of industrialism, nationalism, and imperialism to the cataclysmic events of the 20th century: World War I, the Russian Revolution, and World War II. As the culminating project of the course, second-semester students will undertake a long-term archive-based research paper. Advanced Topics in European History provides instruction in how to write analytical essays; interpret maps; evaluate statistical data; analyze architecture, sculpture, and painting; and assess the accuracy of literary and cinematic portrayals of historic events.



Advanced Topics in French I/II

These classes are designed to help students build upon the foundational skills they have gained by adding more accuracy and precision to their use of the language, and to help them deepen their understanding of the Francophone world. With a focus on the Maghreb, namely Morocco, Algeria, and Tunisia, the goal of the Maghreb class is to provide a better understanding of a the region through films, texts, podcasts, interviews, and discussions. The Francophone Cinema course builds upon the students' cultural knowledge, and guides them through deepened cultural understanding and plot analysis of films from all over the Francophone world. These classes are taught exclusively in French, and designed to be highly interactive and student-centered.



Advanced Topics in History: The Middle East

This Advanced Topics course explores the history of the Middle East, beginning with an investigation of the term "Middle East" and a discussion of socio-cultural, economic, and political diversity within the region. This historical study will include investigations of imperialism and its lasting effects on the region; the rise of nationalism; understandings of modernity, and social, cultural, and political movements, among other topics. Students will engage with scholarly debates and intellectual frameworks that have informed the study of the region, reading texts that include theory, history, anthropology, and memoir. They will interrogate primary and secondary sources throughout the course, developing their critical reading, writing, and research skills.



Advanced Topics in Imperialism and Resistance

Imperialism is defined as "the practice, the theory, and the attitudes of a dominating metropolitan center ruling a distant territory" (Edward Said). This class will explore the diverse interpretations of this concept and its manifestations, including its relations to the political, economic, social, and cultural. Descending from the realm of the abstract, we will ground these theories in historical case studies, specifically the Japanese in Korea. Lest we forget, imperialism is a dialectic movement not just between theory and practice, but perhaps more importantly, between the imperial subject and subjected.



Advanced Topics in Inorganic Chemistry

AT Inorganic Chemistry is the equivalent of a college-level survey of advanced inorganic chemistry incorporating intensive lab work. Topics will include, among others, kinetics, thermodynamics, and electrochemistry. The course will feature multi-stage labs that culminate in formal reports. Topics will be approached in a way that facilitates a complex array of engagement strategies, involving higher-level mathematics, theoretical modeling, and synthesizing existing knowledge to solve new problems.



Advanced Topics in Latin

AT Latin: Literature of the Roman Empire;
AT Latin: Virgil

In AT Latin: Literature of the Roman Empire, students explore selections from the works of Ovid, Tacitus, Seneca, and others. They investigate the conventions, literary styles, and characteristics associated with these authors and discover the historical, cultural, and political context of the Julio-Claudian and Flavian periods. The course focuses on the various ways that historians, poets, and philosophers questioned the social, economic, and political systems of imperial Rome. In AT Latin: Virgil, students experience the epic Roman poetry of Virgil's Aeneid and discover the conventions, literary styles and characteristics associated with the genre of epic poetry. They explore the cultural and social context within which the literature was created, with an emphasis on the political perspectives and the historical events that accompanied the transition from the end of the Roman Republic to the advent of the Empire. The course is designed to provide students with the guidance, confidence, and skills necessary to read, discuss, and analyze this seminal work of Latin literature.



Advanced Topics in Mathematics: Mathematical Symmetry and Transformations

Students will explore topics in college-level mathematics through problem-solving and proof writing. The class will begin with an overview of proof techniques and mathematical habits of mind before launching into an inquiry-based study of graph theory. Students will also investigate topics in linear algebra, including the theory of matrices, linear transformations, and vector spaces. The course will culminate in a survey of abstract algebra, including groups, rings, and fields. Applications of group theory will be emphasized.



Advanced Topics in Organic Chemistry

In this course, students will develop an understanding of the relationship between chemical structure and function in order to predict and explain patterns of reactivity for organic compounds. The curriculum addresses a range of topics typically found in a college-level organic chemistry course, such as systematic naming, molecular orbital theory, stereochemistry, various reaction mechanisms, and retrosynthetic analysis. Students will come to a better understanding of the chemistry behind physiological processes discussed in biology, learn to apply the fundamental principles of interactions between organic substances to novel situations, and gain fluency with the basic reactions that allow chemists to build new complex molecules in the laboratory. They will also explore the nexus of organic chemistry, industry, economics, politics, and public opinion.



Advanced Topics in Photography

Through their creative efforts and their ability to “read” and analyze photographs orally and in writing, students in AT Photography are encouraged to push the limits of their creativity and conceptual understanding. Portfolios will be reviewed by a panel of professional photographers who will give formative feedback during the year as well as a summative evaluation at the end. Students will learn to read images with a more critical mind and eye by increasing their ability to observe with great care and to follow intuitive leads suggested by the content. The students’ approach to photography will be multifaceted, a melding of the cognitive, visual, and emotional.



Advanced Topics in Physics

This course focuses on the development of quantitative and inductive reasoning skills through the study of physics. Working in small groups, students will conduct hands-on activities, often designing their own investigations. These investigations serve as the foundation from which students develop conceptual and mathematical models to explain a wide range of physical phenomena, from dynamics and wave mechanics to optics and electricity and magnetism. Students will also learn basic coding to generate their own computer models that simulate physical phenomena. An overarching goal for students throughout the curriculum is learning to effectively communicate scientific principles to their peers.



Advanced Topics in Religion, Nationalism, and The Politics of Belonging

Religious narratives, symbols, myths, and rituals do more than reflect cultural traditions—they can be potent elements that define national identity, determine inclusion and exclusion, and bestow political legitimacy on governments. This advanced topics course explores the deep connections between religion, politics, identity, and belonging. We will examine how religion is embedded in nation-building and explore how power operates through social, political, and cultural structures to create and enforce national boundaries. We will use interdisciplinary frames to examine global case studies and identify themes for cross-cultural comparison. We will also explore how religious nationalist movements connect to colonial histories, identity markers, and the spectrum of political values. In the final unit, students will apply what they learned by comparing a country case study we studied with a case study of their choice.



Advanced Topics in Spanish

AT Spanish I: Human Rights; AT Spanish II: Literature and Culture; AT Spanish Seminar

AT Spanish Human Rights is a course in which students work to expand, refine, and put to use their advanced Spanish language skills through the study of a series of thematic units exploring the issues, ideas, and attitudes most compelling to contemporary Spanish speakers in today’s world. Working with an array of authentic texts, audio, and other materials, students will focus on reading critically, investigating and questioning historical context, author bias, influences, and tone when tackling readings of various types. AT Spanish Literature and Culture introduces students to texts such as short stories, novels, poetry, and essays from across the Spanish speaking world, with a special emphasis on Latin America. Literature is examined within the context of its time and place, as students

reflect on the many voices and cultures present in the readings. The course includes a strong focus on cultural connections and comparisons, including exploration of various media such as art, film, articles, and literary criticism. AT Spanish Seminar is based on Community Service, and teaches students how to use their language skills to serve others. Class time focuses on learning about service and student reflections on their work with the Spanish-speaking community. This course includes a strong focus on cultural and personal connections as Spanish is used authentically with native speakers at least once a week. All courses are conducted entirely in Spanish.



Advanced Topics in Statistics

Students will learn how to understand the data and statistics that are pervasive in the world today and to draw their own conclusions. By examining how data and statistics are gathered, how they are analyzed, and what conclusions can and should be made, students will become statistically literate. Students will dissect headlines touting recommendations based on research and dig deeper with careful readings of scientific studies. Students will also study the designs of classic experiments from the field of psychology and behavioral economics, and will design and implement their own statistical studies and experiments.



Advanced Topics in Studio Art

With an emphasis on painting, printmaking, mixed media, and drawing, this course encourages students to discover, develop, and push their creativity. Students will create a portfolio that will place a strong focus on the development of personal voice and encourage creative thinking and problem solving. Using New York City galleries and museums to inspire their own work, students will learn to be self-reflective and make connections with larger audiences.