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Visit [tip.duke.edu/ssp](http://tip.duke.edu/ssp) for program details.
**ALL COURSES**

**SCIENCE**

Aerospace Engineering  
Rollins College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH**  
Grades 78

Explore aviation history, physics, and engineering concepts related to flight, both in the atmosphere and in space. Investigate rocket propulsion, spacecraft launch vehicles, and orbital mechanics, as well as atmospheric conditions, aerodynamics, propulsion systems, aircraft and spacecraft design, performance analysis, stability and control, and helicopter aerodynamics. Apply these principles in a laboratory setting and participate in field trips, guest lectures, workshops, and contests. This course is math- and physics-intensive.

**MATHEMATICS**

Algebra I  
Texas Christian University  
Term 1 (June 7–June 27)

Appalachian State University  
Term 2 (July 5–July 25)

**ACADEMY MATH**  
Grades 78

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course.

**MATHEMATICS**

Algebra II  
Trinity University  
Term 2 (July 5–July 25)

**CENTER MATH**  
Grades 78

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course. Prerequisite: Algebra I or its equivalent. You must mail a school transcript, a copy of a grade report, or a letter from your school to document your successful completion of Algebra I or its equivalent.

**SOCIALL SCIENCE**

American Foreign Policy  
The University of Georgia  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH & VERBAL**  
Grades 8910

How is American foreign policy determined, and who is responsible for shaping it? Explore the history of America’s foreign policy and the current changes and conflicts that challenge it. Examine the theories and philosophy behind various approaches to international relations, and compare America’s driving principles with those of other nations. Identify the role of international law and international organizations in the formation of policy, and strategize ways for the United States to identify and incorporate emerging global powers into a peaceful and comprehensive strategy.

**SCIENCE**

Anatomy, Physiology, and Medical Ethics  
Georgia Institute of Technology  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**  
Grades 8910

Learn the tools to view the human body as a complex and intricate structure. Explore the connection between structure (anatomy) and function (physiology), and analyze this relationship in cells, organs, and organisms as a whole. Examine the different functional systems such as digestive, circulatory, and skeletal and the various building blocks of the body. Participate in hands-on laboratory exercises to visualize and practice principles and ideas. Discuss established medical ethics, and debate circumstances, technologies, and advances that challenge and/or justify ethical standards.

**TECHNOLOGY**

Applications, Algorithms, Computers: Modern Programming  
Rice University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH**  
Grades 8910

How does Google instantly find the relevant websites when you type a word into the search bar? How does a city know the most efficient route that their trash collectors should take? Explore the ways that computer scientists develop algorithms, processes, and programs that allow complicated problems to be addressed in meaningful ways. Go beyond simply understanding how to create computer programs and understand the mathematics that drive the adaptation of these programs to many fields of study, including medical sciences, aerospace, business and physical sciences. Some computer programming experience is beneficial, but not required.

**SOCIAL SCIENCE**

Archaeology and Anthropology: Stones and Bones  
Wake Forest University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**  
Grades 78

Delve into a college-level introduction to anthropology, the holistic study of humans and human societies, both in the classroom and in the field. Explore anthropology’s traditional four fields: archaeology, cultural anthropology, linguistics, and biological (or physical) anthropology. Study some of the major discoveries and theoretical precepts of these disciplines, emphasizing the application of anthropological methods. Identify, plot, and excavate an archaeological site; classify and analyze the fossilized remains of human ancestors, and conduct ethnographic research.
Explore the history and process of designing spaces and structures through a comprehensive examination of the rich world of architecture. Study drafting techniques and buildings of great historical significance and learn the language of architecture, including typology, plan, section, elevation, perspective, axonometric projection, scale, and program. Work collaboratively and independently on creating and building your own projects for various purposes. Explore the macro and micro scales of architecture as you juxtapose the idea that “no building is an island” with the alternative viewpoint that “architecture is in the details.”

Modern architecture represents the intersection of science, technology, engineering, and art. Discover the intricacies of architecture and how it defines the very nature of an urban landscape. Explore the impact of technology and environmental concerns and learn how to create significant and functional space within an urban environment. Explore the global history of metropolitan architecture and how it has evolved to embrace the challenges of designing buildings in these ever-changing settings. Apply drafting techniques to repurpose existing infrastructures, bring nature back to cities, or design dazzling new skyscrapers. Consider the environmental, social, cultural, and artistic impacts of your designs and learn to capture the public’s imagination through hands-on, project-based learning.

While science fiction has a long history of intelligent machines, we now live in a world in which these machines are reality - and you can learn the skills to work in this exciting field. We can hold conversations with Siri on our iPhones, watch computers defeat the world’s greatest chess players, and might soon ride around in driverless cars. These new technologies require artificial intelligence, which is the study and development of technology that can reason, deduct and, basically, act human. Learn the programming necessary to work in machine intelligence development, and explore the origins of AI as well as modern areas of research, including language processing, perception, motion, and manipulation.

I never guess. It is a shocking habit—destructive to the logical faculty. So said Sherlock Holmes, the quintessential fictional detective. Since then, scores of literary sleuths have followed in his footsteps, relying on investigation, scientific analysis, and deduction to pierce the veil of mystery. Join this deductive tradition and learn to spot and interpret clues that elude the less observant. Dissect detective fiction and master current trends in crime scene investigation as you learn to interpret evidence and construct compelling arguments for your case. Conduct your own investigations and reach your own conclusions - elementary or otherwise.
Beyond Science Fiction

Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What can the fantastical, technical worlds created in speculative fiction tell us about how we see our own? Speculative fiction’s use of magical elements intertwines real-world ethical dilemmas with challenges to how we think about human nature. Understand the history of this science fiction subgenre to see how it became one of the most exciting areas of contemporary literature. Critically read contemporary speculative fiction texts and use experimental storytelling techniques to create original writing. Give and receive peer feedback to enhance your own writing and critical reading ability. Students who have taken 7-8 Speculative Fiction: Reading and Writing About Alternate Worlds should not enroll in this course due to overlap in content.

Big Screen, Little Screen: Writing for the Camera

Duke University East Campus
Term 1 (June 7–June 27)

Many of us believe we have the next great movie idea that will take Hollywood by storm, do away with recycled story lines and tired plots, and return us to the golden era of cinema with films that are both challenging and entertaining. Delve into your imagination and explore the outside world to express your creative ideas. Develop a habit of taking notes on anything and everything, learn from and appreciate the writing of talented screenwriters, and fine-tune your knowledge of the written word. Apply these skills to the art of screenwriting - idea development, outlining, treatments, story, character, setting, dialogue, theme, and subplots - and explore new storylines to captivate your audience.

Biomedical Engineering

Georgia Institute of Technology
Term 1 (June 7–June 27)

In the United States, 1.5 million people are diagnosed with cancer each year. Given the prevalence of this disease, much attention and research has been focused on identifying causes and designing treatments to combat it. Examine the historical perspective on the biology of cancer and explore the molecular biology and genetic changes that occur during cancer, including the six hallmarks of cancer, as defined by Robert Weinberg. Discuss the role of genetics, oncogenes, and tumor suppressor genes in the development of the disease. Debate the ethics surrounding genetic testing and cancer treatment. Conduct research using current articles and primary literature on cancer at Duke’s Perkins Library and participate in laboratory activities to illustrate concepts.

Biological & Chemical Sciences

Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Trinity University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College
Term 2 (July 5–July 25)

Science moves forward by generating theories consistent with laboratory observation. Interact directly with natural phenomena and data collected by others as you design investigations, manipulate equipment, and analyze results. Engage in scientific reasoning through laboratory exercises, class discussions and field trips, using the same biology and chemistry procedures scientists use in the field. With experiments in classical and modern genetics, bacteria sampling, anatomy, and chemical reaction, work collaboratively to analyze data, connect outcomes with theory, and draw conclusions from experiments. Explore current scientific research and discuss the societal implications of advancing scientific knowledge.

Business Strategy: Beyond the Lemonade Stand

Rollins College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Trinity University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Study and practice business planning, decision analysis, and management strategies as they relate to the development and implementation of successful companies. Examine the leadership principles and strategies of highly successful entrepreneurs and analyze how a trend becomes firmly entrenched in the marketplace. Identify the microeconomic principles behind decision-making with regard to resources, price, and marketing as you develop and present your own successful business plan.
### HUMANITIES

**Choosing Sides: Debate and Persuasion**

**Appalachian State University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Rollins College**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Texas Christian University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY VERBAL**

Lawyers, politicians, and CEOs use sound arguments to transform public opinion, move people to their feet, or change the course of nations. Explore rhetorical devices, public speaking, and various forms of debate as you study historical debates and learn to construct your own compelling arguments. Practice your debating skills through written and oral performance in a variety of formats while learning to argue multiple sides of a single issue.

### TECHNOLOGY

**Computer Skills for Today’s Scientists and Engineers**

**Duke University East Campus**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**

Physicists use supercomputers to analyze massive collisions in underground particle accelerators. Neuroscientists use artificial neural networks to probe the inner workings of the brain's neurons. Engineers write computer code to control complicated circuitry and robotics. Scientists and engineers in a wide range of disciplines use modern computing technologies to make discoveries, design and develop new technologies and methods, analyze the results of experiments, and solve complex problems. Learn how to program using techniques scientists and engineers employ for data processing, laboratory equipment control, computation, and graphical analysis.

### SOCIAL SCIENCES

**Consumer Psychology and Modern Marketing**

**Rollins College**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Texas Christian University**
Term 2 (July 5–July 25)

**ACADEMY MATH & VERBAL**

Why do people have completely different perceptions about nearly identical products? Why are they so attached to particular brands? How do they actually decide what they're going to buy? Explore these questions and related topics like motivation, perception, consumer judgment, decision making, social influence, and special topics in recent consumer behavior research. Examine the impact of environmental influences (culture, politics, socioeconomics, lifestyle, and beliefs) and better understand the psychology of consumer decision making. Apply business and psychology knowledge to analyze current marketing problems.

### SCIENCES

**Crime Scene Investigations**

**Appalachian State University**
Term 1 (June 7–June 27)

**Rollins College**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Texas Christian University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH**

Go beyond the simplified forensic science that has been popularized in the media; learn the real techniques forensic investigators use to gather and analyze evidence at a crime scene and in the lab. Plot and process a mock crime scene, and discover the science behind DNA analysis, fingerprinting, and facial reconstruction. Discuss the forensic evidence in famous solved and unsolved cases. Explore what it means to be an expert witness and learn about the laws associated with forensic studies.

### SOCIAL SCIENCES

**Criminal Law and Mock Trial**

**The University of Georgia**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Duke University West Campus, Academy**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH & VERBAL**

Survey major topics in criminal law, the criminal justice system, and relevant constitutional law. Study the evolution of our justice system and review criminal trials that have transfixed our nation. Examine the ways in which the Supreme Court interprets constitutional law and debate issues ranging from the death penalty to the insanity plea. Discuss the Supreme Court's role in interpreting constitutional law. Class may visit a courthouse. Practice the use of case method, enhance research and public speaking skills as you argue a case, and simulate the procedures of a typical criminal trial.

### SOCIAL SCIENCES

**Criminal Trial Advocacy**

**Rice University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**

This course is modeled after law school curriculum. Delve into black-letter law and litigation techniques used by trial lawyers through a series of workshop activities and the analysis of criminal procedure cases. Apply legal principles through a series of structured oral arguments and mock trials. Explore the nuances of arrest, indictment, and pretrial discovery from the perspective of both the prosecution and the defense. Work through hypothetical problems in groups, engage in Socratic-style dialogues, and participate in class-wide discussions. Write legal briefs, apply previous court decisions to current controversies, and develop and present a case. Class may visit a courthouse.
Crunching the Numbers: Global Finance
Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Georgia Institute of Technology
Term 2 (July 5–July 25)

In an age when global financial transactions involve millions, billions, and even trillions of dollars, the question arises: Where does all of the money go? Examine finance principles such as the time value of money and the risk-return relationship. Analyze financial instruments both from investors’ and companies’ perspectives. Assess the financial rewards and challenges faced by firms and individuals in a global economy. Consider the role of technology in global finance. Examine the various methods used for financial forecasting. Use “money math” to perform quantitative stock evaluations, data measurement, product costing, and corporate budgeting.

Cryptography, Codebreaking, and the Mathematics of Spying

Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.

Cryptography, Codebreaking, and the Mathematics of Spying

The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

MATHEMATICS

Cryptology and Number Theory
Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The history of cryptology, the art of enciphering and deciphering, is one of the most exciting stories of applied mathematics. It is a story of conspiracies and intrigue, secret societies and intelligence services, war and peace, power and money. Governments and big corporations have been paralyzed by code breakers, and outcomes of wars have been influenced by cryptologists. The ongoing race between encrypters and attackers has led to ingenious and elaborate coding algorithms that make heavy use of classical results from number theory. Approach the subject from a historical point of view, emphasizing the elementary theoretical aspects of number theory, abstract algebra, and cryptology. Study monoalphabetic and polyalphabetic substitution ciphers as well as modular arithmetic and mathematical induction, basic probability theory, and elementary matrix theory. Students who have taken Spy 101: Cryptology and Number Theory should not enroll in this course due to curricular overlap.

Design Challenges: Physics and Engineering
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College
Term 2 (July 5–July 25)

MATHEMATICS

Cryptology and Number Theory

Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

SCIENCE

Force, motion, and energy make up the foundation of physics. Explore these concepts by examining their roles in design and engineering. Learn how engineers determine the design and materials to use before building a structure. Utilize math, physics, and engineering to complete hands-on problem-solving and model-building activities. Explore advances in technology and their effect on design.

Dictators, Kings, and CEOs: The Evolution of Empire
Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center
Term 2 (July 5–July 25)

Empires are perhaps the single most formative phenomenon in history. Survey influential empires through the ages and learn how they impacted the development of the world politically, culturally, socially, and militarily. Follow Augustus as his legions spread the glory of Rome across Europe. Ride with Genghis Khan as he shakes the foundations of the civilized world with terror. Examine the spread of American culture and beliefs across the globe, from McDonald’s to democracy. Engage in literary analysis and historical research at Duke University’s libraries.

CHECK YOUR COURSE ELIGIBILITY AT TIP.DUKE.EDU/CALCULATOR
**HUMANITIES**

**Director’s Cut: From Storyboard to Screen**  
Duke University East Campus  
Term 2 (July 5–July 25)

**CENTER VERBAL**  
Grades 8 9 10

This course is an interactive introduction to film as a form of art and entertainment. Explore the basic history, concepts, and terms associated with the study and production of film, then go beyond the theoretical to apply these concepts to the production of short videos through hands-on assignments and exercises. Examine how films are constructed through the interplay of narrative, technological, and aesthetic systems, then use these basic concepts to bring life to your own creative vision. Note: Students who have taken TIP’s Celluloid Visions: A Critical Study of Film should not enroll in this course due to overlap in content.

**TECHNOLOGY**

**Engineering in the Virtual World**  
Rollins College  
Term 1 (June 7–June 27)

**ACADEMY MATH**  
Grades 7 8

Enter the world of 3-D modeling and build the software knowledge that has become arguably the most important skill in an engineer’s toolbox. Coupled with the recent surge in 3-D printing across industries, digital drafting skills have slashed the design-to-prototype-to-redesign loop from months to hours. Learn the skills and techniques that brought engineering into the digital age. Apply engineering principles to problems and quickly test the limits of your own design solution. Evaluate the trajectory of modeling and manufacturing in three dimensions.

**SCiENCES**

**Electrical Engineering**  
Duke University West Campus, Center  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH**  
Grades 9 10

Electrical engineers are key creators behind many high-tech innovations such as global positioning systems that can pinpoint a car’s location, giant generators that can power entire cities, and new designs for an airplane’s electrical system. Explore the physical basis and mathematical models of electrical components and circuits. Work in teams to design and build electronic circuits and investigate voltage, resistance, amperes, watts, and circuit theorems. Analyze linear circuits, semiconductors, frequency representation, and sequential logic. Determine applications for electrical engineering concepts in other scientific fields and everyday life. *This course is open to current ninth and tenth graders only.

**Engineering Problem Solving**  
Davidson College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Trinity University**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Wake Forest University**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Rollins College**  
Term 2 (July 5–July 25)

**CENTER MATH**  
Grades 7 8

Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.

**Engineering for Fun**  
Georgia Institute of Technology  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Rice University**  
Term 2 (July 5–July 25)

**CENTER MATH**  
Grades 8 9 10

Behind roller coasters, water parks, miniature golf courses, and theme parks are engineers who understand physical forces, the fundamentals of design, and the psychology that goes into the business of fun. Join their ranks and put your knowledge of engineering principles and theory into practice while also learning principles of user experience, collaboration, prototype development, field testing, design adaptation, and the marketing considerations behind a project’s launch. Visit a local amusement park to observe the psychological and engineering principles that go into this field firsthand. Create and model entertainment attractions manually and with 3-D computer-aided design programs while completing both individual and group assignments—all in the name of fun!
helps us understand more about the world in which we live. Informative experiments, but also how to interpret the results in a way that connects their ideas and theories with the practical nature of the real world. Research and conduct experiments in a wide range of scientific fields, including molecular genetics, earth's history, field ecology, alternative energies, physics, and more. Learn not only how to design and conduct informative experiments, but also how to interpret the results in a way that helps us understand more about the world in which we live.

**Environmental Chemistry**  
Duke University West Campus, Center  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**HUMANITIES**  
**Fantasy Worlds and Science Fiction**  
Appalachian State University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**ACADEMY VERBAL**  
Grades 7, 8, 9, 10  

Travel through the minds of writers who have shaped the genre of fantasy literature. Voyage into far and uncharted territories, (re) discover strange yet familiar friends, fight frightening foes, and return (hopefully) in one piece from our journey with a far greater understanding of home. Consider the structure of the fictive world and the significance of children with unusual gifts. Critically debate what these authors are asking us to see, believe, or interpret about their created worlds and about our own. Students who have taken From Wonderland to Hogwarts should not enroll in this course due to curricular overlap.

**SCIENCE**  
**Experiments in Science: Biology, Chemistry, and Physics**  
Appalachian State University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**Texas Christian University**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**Rollins College**  
Term 2 (July 5–July 25)  

**Vehicle:**  
Grades 7, 8, 9, 10  

Investigate science through the process that has driven discovery for centuries: experimentation. Experiments are what allow scientists to connect their ideas and theories with the practical nature of the real world. Research and conduct experiments in a wide range of scientific fields, including molecular genetics, earth's history, field ecology, alternative energies, physics, and more. Learn not only how to design and conduct informative experiments, but also how to interpret the results in a way that helps us understand more about the world in which we live.

**ACADEMY MATH**  
Grades 7, 8, 9, 10  

**Game Theory: Economics**  
Duke University East Campus  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**Center Math**  
Grades 9, 10  

Using complex mathematical concepts, analyze situations in which two or more parties are competing, determine the best course of action for each party, predict the outcome, and then apply these concepts to circumstances across all disciplines. Investigate the foundations of Game Theory, or Formal Decision Theory, and its use as a tool to help people conceptualize and navigate complex decision-making processes in ways that produce optimum benefit. Explore applications in economics that inform mergers, negotiations, marketing and pricing strategies, and contract formation, as well as applications in strategic conflict and warfare, evolutionary systems, psychology, and sociology.  
*This course is open to current ninth and tenth graders only.*  

**ACADEMY MATH**  
Grades 7, 8  

**Forensic Science**  
Duke University West Campus, Center  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**Center Math**  
Grades 8, 9, 10  

Examine evidence collected from local ecosystems through the use of laboratory techniques to identify, analyze, and compare evidence collected from the scene of a crime. Engage in laboratory exercises simulating real-life methods of evidence analysis, and then participate in a mock crime scene, examining the many roles of crime scene investigators. Round out the course with discussion and debate cases and the portrayal of forensic science in popular culture.

**Center Math & Verbal**  
Grades 8, 9, 10  

Are “white lies” ever justified? Ethical dilemmas confront us every day, and the decisions we make refine the ethical lens with which we interpret ourselves and the world. As D. H. Lawrence wrote, “Ethics and equity and the principles of justice do not change with the calendar.” But how do we know what those principles are? What makes an action right or wrong? Explore common ethical theories to gain an understanding of the philosophical issues and concepts of moral reasoning. Consider dilemmas and the ethics implicit in modern media to analyze how those media might influence societal standards.
**SCIENCES**

**Hanging with Lemurs: An Introduction to Primatology**

Duke University West Campus, Center  
Term 1 (June 7–June 27)

Using the world-famous Duke University Lemur Center as your classroom, conduct daily observation, data collection, behavior analysis, and research into lemurs, lorises, bushbabies, and more. The study of these biological relatives helps us understand where we fit into the animal kingdom and why we are so unique. Examine common characteristics of primates, and explore current primate taxonomy, the evolution of the group, and trends and variation in primate subsistence, physiology, locomotion, social structures, and cognition. Consider the impact of a changing society on these creatures. Note: Students who have taken TIP's Primate Biology: Lemurs, Lorises, and Bushbabies should not enroll in this course due to overlap in content.

**SOCIAL SCIENCES**

**Historical Epidemiology**

Duke University East Campus  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Georgia Institute of Technology  
Term 1 (June 7–June 27)

Rice University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

From the Black Death to smallpox to HIV/AIDS and the Ebola virus, infectious diseases have profoundly affected human history and shaped the progress of societies. Evaluate, track, and analyze the impact of major epidemics throughout the ages. Study modern epidemiological techniques in a classroom setting. Learn the basic concepts and techniques behind recognizing and fighting pandemics, then apply this knowledge to historic epidemics as a foundation for developing modeling techniques that fight modern disease. Learn how the media and organizations like the World Health Organization and Center for Disease Control all play a role in fighting these major threats to our survival. Students who have taken Pathogens, Plagues and Patient Zero: Historical Epidemiology should not enroll in this course due to curricular overlap.

**SCIENCES**

**Human Anatomy: The Structure and Function**

Appalachian State University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College  
Term 1 (June 7–June 27)

Texas Christian University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The human body is composed of complex, interrelated systems. Explore the systems of the human body and examine how they work together. Study basic anatomy and physiology as well as the chemical processes that allow body systems to function. Through laboratory activities, research, and debate, become familiar with the complex workings of the body and current issues in medical science. Students who have taken The Human Body should not enroll in this course due to curricular overlap.

**SOCIAL SCIENCES**

**International Relations: Global Conflicts**

Duke University East Campus  
Term 1 (June 7–June 27)

Georgia Institute of Technology  
Term 2 (July 5–July 25)

Why do people go to war, engage in trade, or defend human rights? How do these issues affect the individual, and what difference can one person make? Analyze and debate these theoretical, practical, and ethical questions as they relate to terrorism, the media, Marxism, globalization, weapons of mass destruction, ethnic conflict, nationalism, sovereignty, genocide, and international law. Study current and historical conflicts to analyze and predict outcomes and their ramifications.
Introduction to Veterinary Medicine

The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Modern veterinarians occupy a variety of careers ranging from typical clinical work on domestic or exotic animals to research and academic scholarship. Today’s veterinarians may work in private practice or for a university, an industry, or a government program. Explore the training, rigor, and career opportunities of veterinary medicine through the study of basic anatomy, physiology, histology, biochemistry, pharmacology, toxicology, animal health, public health, and veterinary medical ethics. Participate in laboratory work, veterinary school tours, research, procedures, and discussions. Apply knowledge gained to realistic clinical cases. This course is taught in conjunction with the Georgia School of Veterinary Medicine.

Macroeconomics

Duke University East Campus
Term 2 (July 5–July 25)

Complete an intensive course equivalent to an introductory or principles level college course in macroeconomics. Develop a basic understanding of the theory and practice of macroeconomics, including an understanding of the determinants of the levels of income, output, and employment. Analyze the determinants of consumption, investment, government spending, and net exports, and study the model of international trade that determines exchange rates and the balance of trade. Discuss the economic impact of the federal deficit and debt and the effectiveness of discretionary fiscal and monetary policies under a number of models, and analyze macroeconomic debates to effectively participate in the political process.

Marine Biology: Estuaries and Marshes

Duke University Marine Laboratory
Marine Lab (June 14–July 4)

Survey and explore the structure, function, ecology, and development of marine life found in estuarine and coastal habitats. The unusual nature of these habitats that exist between the land and the open ocean create unique relationships among the plants and animals that live there. Use classroom presentations, laboratory experiments, and field trips to gain hands-on experience with the marine life that exists in coastal habitats.

Marine Biology: Near Shore and Oceans

Duke University Marine Laboratory
Marine Lab (June 14–July 4)

Perform an in-depth examination of the biology of marine life in ocean and inlet habitats. The Duke University Marine Lab provides access to these large bodies of water and the organisms that inhabit them. Examine how life has adapted to the features of these ocean habitats and how that adaptation influences the relationships within the ecological communities. Along with work in the classroom, engage in hands-on fieldwork through dredging, trawling, and towing trips on Duke University’s research vessels at various marine and geological sites.

Materials Science: The Building Blocks of Engineering

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

From the Stone Age to the Computer Age, humans have always sought to identify and engineer materials with the mechanical, electrical, thermal, optical, and magnetic properties that make innovation possible. These discoveries have fueled mankind’s greatest achievements and set the stage for advancing technologies. Develop your own innovative abilities by using hands-on lab work to investigate the relationship between the microscopic structure and the unique properties of metals, polymers, composites, and ceramics. Explore the many applications of these materials and learn how they can be used to better the quality of life for all mankind.

Math, Money, and You

Appalachian State University
Term 1 (June 7–June 27)

Delve into the world of math and money. Why do stores put items on sale and risk making less money? When is the right time to purchase a stock or bond, and what investments make sense? How can you become a millionaire by collecting pennies? Math is fundamental in making wise financial choices. Explore how math affects decisions regarding personal and business finance, and how marketing and innovation have changed in a more socially connected society. Examine direct and indirect variation and arithmetic and geometric growth. Develop a deeper understanding of the stock market, taxes, mortgages, interest-bearing accounts and the effects these have on our financial decisions on a daily basis. Discover behavioral finance strategies through investigative simulations and entrepreneurial projects.
### Mathematics

**Mathematical Models, Analysis, and Applications**

**The University of Georgia**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Academy Math**  
Grades 8, 9, 10

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

**Mathematical Models, Analysis, and Applications**

**Trinity University**  
Term 1 (June 7–June 27)

**Center Math**  
Grades 7, 8

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

**Mathematical Problem Solving**

**Davidson College**  
Term 1 (June 7–June 27)

**Trinity University**  
Term 2 (July 5–July 25)

**Center Math**  
Grades 7, 8

Apply mathematical knowledge and methods in new ways to solve interesting and complicated problems and proofs. Prepare for high school mathematics and beyond by developing critical mathematical thinking. This course also covers common mathematics contest topics and encourages students to delve into more difficult problems using knowledge of these topics. Develop structural knowledge of mathematical proofs, the foundation for all higher-level mathematics. A diagnostic test given at the beginning of the term will ensure you are challenged with new mathematical concepts.

**Social Sciences**

**Microeconomics**

**Duke University East Campus**  
Term 1 (June 7–June 27)

**Center Math**  
Grades 8, 9, 10

Complete an intensive course, roughly equivalent to an introductory or principles level college course in microeconomic theory. Use microeconomics as a model to understand and analyze human behavior. Apply an analytical approach to the study of how individuals and societies deal with the fundamental problem of scarce resources. Understand how these principles affect individuals trying to maximize their utility, businesses trying to maximize their profits, and societies trying to manage resources. Analyze controversial issues such as minimum wage laws, farm subsidies, rent controls, protectionism, pollution, welfare programs, and the tradeoff occurring between equity and efficiency that result from various microeconomic policies.

**Mobius Strips, Klein Bottles, and Fractals: The Mathematics of Distortion**

**Georgia Institute of Technology**  
Term 1 (June 7–June 27)

**Duke University East Campus**  
Term 2 (July 5–July 25)

**Center Math**  
Grades 8, 9, 10

Explore topology, the mathematical study of twisting, bending, and stretching objects. Learn how industrial design, engineering, and theoretical physics employ applications of Möbius strips. Discover mathematical distortion techniques that work on highly complex systems, such as roving sensor networks for security systems. Examine the continuity between shapes and the ways in which seemingly different objects are topologically the same. Study fractals, knots, and manifolds using concepts of points, lines and curves.

**Mock Trial**

**Appalachian State University**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Academy Math & Verbal**  
Grades 7, 8

Examine fundamental topics of law, including the criminal and civil justice system, rules of evidence, eyewitness testimony, civil rights, and challenges to constitutional law. Apply the principles and practices of courtroom trials, experiment with the art of litigation as prosecutors and defenders, and consider challenges inherent in seeking justice. Read and understand precedent-setting decisions made by the Supreme Court and discuss the Court’s role in interpreting constitutional law. Practice using the case method while enhancing research and public speaking skills. Class may visit a courthouse. This course is writing intensive.
**Mock Trial**

Trinity University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Davidson College  
Term 2 (July 5–July 25)

**Modern Medicine: Disease and Immunology**

Duke University West Campus, Academy  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The University of Georgia  
Term 2 (July 5–July 25)

**Myths and Legends**

Davidson College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University  
Term 2 (July 5–July 25)

**Modern Medicine: Disease and Immunology**

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

**Myths and Legends**

From Gilgamesh to the Avengers, the stories we tell are an integral part of every culture around the world. It is a practice that defines who we are and what our societies’ value. Two important kinds of ancient storytelling—creation myths and heroic tales—have proven especially important. Together, they make up a vital part of many cultures and traditions, as well as the central subject matter of this course. Acquire a cross-cultural understanding of the hero’s journey and creation stories through reading, creative writing, drama, and research. Undergo your own hero’s journey as you relate your own life experiences to ancient archetypes and heroic templates.
**Neuropsychology**

Rice University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Academy  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Why are roller coasters thrilling for some and terrifying for others? How does brain development affect perception, judgment, and decision-making? Understanding the intersection and interaction of the human brain and behavior is at the heart of neuropsychology. Study the physiology of the brain and cognitive functions that affect behavior. Investigate how the brain works by also considering neuroscientific, philosophical, neurological, and psychiatric perspectives.

**Neuroscience**

Georgia Institute of Technology  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Humans everywhere are turning to the brain for answers to questions that have plagued our species for centuries: Why do people do evil things? What is love? How do we dream? How do we remember? What is consciousness? Address these questions from the perspectives of physiology, pharmacology, pathology, psychology, and philosophy. After becoming acquainted with the methods and tools that researchers employ in their studies, explore puzzling questions by examining evolving theories and contemporary methodologies in science and philosophy. Examine the basic structural and organizational aspects of neuroanatomy and physiology, study current research regarding sleeping/dreaming, consciousness, behavioral disorders, neuropathology, memory, and artificial intelligence.

**Nuclear Science**

Duke University West Campus, Center  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Nuclear science plays a vital role in the lives of Americans, providing approximately one-fifth of our energy and diagnosing and healing millions of patients with nuclear medical procedures. Nuclear science is used to enhance the food we eat, control pests, track materials flow in industry, date archeological artifacts, and identify chemical compositions. Through hands-on activities, computer simulations, and discussions, learn the science within the atom, study the history of key discoveries in the field, and debate the ethics of nuclear weaponry. Apply Einstein's famous formula E=mc², and learn about atomic structure, isotopes, half-life, radioactivity, nuclear reactions, fission, and fusion.

**Oceanography**

Duke University Marine Laboratory  
Marine Lab (June 14–July 4)

Delve into the fundamental components of studying the global oceans. Investigate the physical, chemical, geological, and biological processes that govern microscopic to macroscopic patterns in the ocean system. Explore general issues on the nature of science, the role of scientific rationalism in modern society, and the development of practical problem-solving skills. Examine oceanography's relationship to social and political issues. Study biotic and abiotic components of the global oceans through engaged discussion, laboratory experiments, and field research. Design and complete a research project to present to your peers.

**Pharmacology**

Duke University West Campus, Academy  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

How do we discover new drugs? How do pharmacologists balance the therapeutic value of a drug with its negative side effects? How do drugs treat pain, cure disease, or alleviate symptoms? How do our genes play a role in the success or failure of drug treatment? Who bears responsibility for the development of life-saving drugs, and what should they cost? Examine the field of pharmacology and its relationship to health, disease, and society. Study how the chemical properties of drugs interact with biological systems and how pharmaceuticals affect our health and behavior. Participate in hands-on laboratory exercises to visualize and practice principles and ideas.

**Philosophy in Literature and Film**

Duke University East Campus  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

In subtle and overt ways, philosophical concepts ranging from nihilism to existentialism shape novels, plays, comic books, pop music, and documentaries. Through critical literary and film analysis, explore the ways in which authors and filmmakers express various philosophical ideas through their media. Investigate the relationship between philosophy and art and develop an understanding of the way in which literature and film present a unique approach to philosophical quandaries regarding self, morality, epistemology, and perception.
For centuries, philosophers have debated the relationship between the mind and the world. What is knowledge? What makes knowledge meaningful? How do we know what we know? Investigate epistemology, the branch of philosophy concerned with the nature, scope, and limitations of knowledge. Study the propositions of truth, beliefs, and knowledge - what are the differences? Delve into theories of knowledge acquisition such as empiricism, rationalism, and constructivism. Consider answers offered to these questions by philosophers throughout the ages, such as Aristotle, Plato, Descartes, Hegel, and Nietzsche.

What is time? How have different cultures throughout history understood and represented it? Does it unfold in a straight line, or is it best represented by a circle of eternal recurrence? Examine how a wide range of thinkers have dealt with the issue of time and temporality. Discuss the phenomenology of Martin Heidegger and the space-time theory of Albert Einstein alongside Native American mythology, Romantic poetry, Buddhist philosophy, and Christian theology. Analyze how television and movies create new visions of the past when depicting historical periods. Consider the theories of dimensions of time to tackle a proposition that has obsessed modern culture: time travel.

Since the beginning of recorded history, politics has been a struggle between two opposing forces: elite and popular power. While elite history is recorded in the actions of kings and the growth of empires, the politics of the lower classes is expressed in an era’s popular culture. Examine grassroots movements and their efforts to subvert political regimes throughout history. Analyze Greek tragedy, Shakespeare’s Elizabethan propaganda, Whitman’s Democratic Romanticism, Beat poetry, 1960s protest music, and the current blogosphere in conversation with political theorists such as Plato, Rousseau, Emerson, and Marx. Follow the transformation of political cultures from the ancient to the modern world by analyzing the development of popular culture from Dionysian festivals to the modern blogosphere.

There is an increasing demand for computer applications to be collaborative, dynamic, and tied to the user instead of a computer or mobile device. As applications move off the computer and into “the cloud,” web application programming is proving to be a critical part of the next computing revolution. Learn about the basic principles of dynamic web application programming and the unique considerations of programming for the web. By the end of the course, develop an original web application. This introductory course requires no prior programming experience.

The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense and perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.
SOCIAL SCIENCES

Psychology of Decision Making: Behavioral Economics
Duke University East Campus
Term 1 (June 7–June 27)

Georgia Institute of Technology
Term 1 (June 7–June 27)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Integrate insights from cognitive psychology, social psychology, and behavioral economics to understand why people make the choices they make. Examine how cognitive processes that help people make sense of complex information can also logically lead them astray in decision making. Investigate how emotion, motivation, and information-processing shortcuts interact with careful, rational weighing of information. As you study the surprising ways that individuals actually make decisions, gain insights about decision making in fields such as healthcare, finance, education, and government.

SOCIAL SCIENCES

Revolution and Terror: Controversial Politics
Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Violence and fear have always been instruments of politics. Rulers and rebels alike have resorted to force (or the threat of it) to try to advance their ends. Since the late eighteenth century, revolutionaries have self-consciously turned to violence and fear as instruments - not just for advancing their own factions, but for refashioning the political system itself. Explore the historical development of modern revolutionaries and terrorist groups ranging from Rousseau to Stalin to Al Qaeda to modern day pirates off the coast of Somalia. Analyze the ways in which society attempts to address such violence.

TECHNOLOGY

Robotics
Trinity University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Study the fields of both robotics and engineering to discover the intersection between theory and interactive, hands-on application. Explore the various fundamental topics behind the exciting field of robotics, participate in interactive lab exercises, then construct and program robots to illustrate the principles you’ve learned. Examine the role of robotics in today’s society and debate the advantages and disadvantages of using robots in various situations.

SCIENCES

Quantum Mechanics and Modern Physics
Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The bizarre world of quantum mechanics seems to contradict our understanding of the everyday natural processes that we observe in the macroscopic world. Yet our understanding of the principles of quantum mechanics is essential to the creation of lasers, microprocessors, electron microscopes, superconductors, and magnetic resonance imaging (MRI) technology, along with countless other devices and scientific processes. Through hands-on labs, examine the foundations of quantum physics and explore modern applications of this fascinating subject, including its impact on diverse fields within engineer and science, including materials science, nanotechnology, electronic devices, and photonics. This course is math-intensive. Completion of Algebra I is preferred.

SCIENCES

Science on the Appalachian Trail
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The southern Appalachian Mountains have a vast history that encompasses hundreds of millions of years. The mountains of Boone, North Carolina and the surrounding area provide a rich environment for investigating the events that have shaped the landscape of this fascinating region. Span the history of Earth and life on it, exploring geology, ecology, and paleontology. See first-hand evidence of the area’s history through interactive laboratory activities and field trips into the mountains.

HUMANITIES

Refining Your Voice Through Creative Writing
Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Experienced writers apply here. No matter your preferred genre, go beyond your writing limits by exploring countless creative ways of crafting and structuring language. Examine various techniques such as chronology, argument, evolving revelation, juxtaposition, and retrospective. Critique works from prominent authors to lesser-known masters. Become a more emboldened writer through the critical peer review process. Novelists, memoirists, poets, and authors of all other genres will be supported and challenged in this course. Students who have taken Literary License without Limits should not enroll in this course due to curricular overlap.
Social Sciences

Social Psychology
Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Social psychology is the formal study of the ways in which individuals affect one another. Examine how people's attitudes, biases, and behaviors are influenced by other people and how these influences affect society as a whole. Explore the ways social psychologists use the scientific method to study people's thoughts and behaviors in social situations and how ethical principles govern their research. Discuss and debate topics such as the self, prejudice, gender, race, conformity, obedience, aggression, group influence, and pro-social behavior. Drawing from examples in the media, law, politics, history, culture, and our own lives, examine how we are affected by social relationships and what a difference these relationships make in the way we live.

Humanities

Speculative Fiction: Reading and Writing About Alternate Worlds
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What do J.R.R. Tolkien's Gollum, Shakespeare's fairies, Stephen King's Cujo, Suzanne Collins' Katniss Everdeen, and Ray Bradbury's Martians all have in common? They each inhabit the highly imaginative world of speculative fiction—a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

Sciences

Sports Medicine
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Examine the diagnosis, treatment, and prevention of common sports injuries from an anatomical, physiological, and psychological perspective. Explore how advances in technology have affected the field of sports medicine, improving both prevention and treatment. Analyze the decision-making used in designing treatment plans for athletes and non-athletes. Learn common injury care techniques used by athletic trainers, and evaluate the implications of sports medicine beyond the training room.

Humanities

That’s Debatable
Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University
Term 1 (June 7–June 27)

State your case! Learn the art of argument used in political debates, courtroom arguments and rebuttals, and effective business presentations. Analyze influential speeches and use research as a central tool in formulating persuasive speeches. Study the logic of argument and the use of words to create an elegant discourse. Learn to develop effective spoken and written arguments by making and supporting claims with evidence, and by paying attention to what constitutes evidence with a particular audience.
**SCiences**

**The Brain, Intelligence, and Creativity**

**Davidson College**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Trinity University**
Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**

8 7 8

Examine the intersection of neuroscience and psychology as you investigate the most complex organ in the human body. Through the framework of brain physiology and development, examine intelligence, creativity, and the way people experience the world. In addition to classroom activities, discussions, and debate, participate in hands-on laboratory work, brain imaging, and academic research.

**Social Sciences**

**The Ethics of Artificial Intelligence**

**Duke University West Campus, Center**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER VERBAL**

8 9 10

What happens when you create an intelligent, autonomous robot and then limit its freedom? The field of artificial intelligence already permeates more aspects of our daily lives than we realize. It drives our cars, flies our planes, manages our money, and protects our safety. Its approach to more human-like thoughts and actions raises predictable complications. Are they to be considered tools or lifeforms? How can we ensure that these machines will respect our ethical and moral principles? Debate the laws by which these thinking machines should abide. Analyze and argue philosophical approaches to AI’s integration into society, and build the ethical foundation and psychological framework necessary to navigate this emerging landscape.

**Humanities**

**The Haunting: Exposing the Mind’s Fear of Myth & Monster**

**Duke University West Campus, Academy**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH & VERBAL**

8 9 10

Through the use of literature and film clips, investigate the psychological roots of ghosts, vampires, and other unexplainable paranormal phenomena. Pair the stories of hauntings that grow from seemingly innocent folk and fairy tales with the works of psychologists such as Jung and Freud to study the deep-seated fears and specters that lie in wait among the shadowy waking and non-waking moments of the human psyche. Then move from analyzing individual human minds to studying how simple ghost stories and urban myths rise to the level of global fear. Delve into why and how myths are created, as well as the psychology involved in their lasting appeal.

**Humanities**

**The Pen as Weapon: The Art of Satire**

**The University of Georgia**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Duke University West Campus, Academy**
Term 1 (June 7–June 27)

**ACADEMY VERBAL**

8 9 10

What do “The Daily Show with Trevor Noah,” Jonathan Swift’s “A Modest Proposal,” Kurt Vonnegut’s “Cat’s Cradle,” Gary Trudeau’s “Doonesbury,” and “The Simpsons” all have in common? In a word: satire. Join your witty peers in an exploration of satire, the art of exposing the foibles and pitfalls of society, institutions, and individuals through wit and comedy. Discuss satire’s role in social and political movements and examine the ways in which pointed humor, irony, and exaggeration can quickly lead to controversy and even violence depending upon political, religious, and geographic contexts. Analyze what constitutes well-written satire, and how authors successfully navigate an ever-changing cultural landscape to create humorous and constructive social criticism.

**Humanities**

**The Personality of Style: Creative Writing**

**Appalachian State University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Texas Christian University**
Term 1 (June 7–June 27)

**ACADEMY VERBAL**

7 8

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.
**The Personality of Style: Creative Writing**

*Davidson College*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Wake Forest University*
Term 1 (June 7–June 27)

*Trinity University*
Term 2 (July 5–July 25)

**CENTER VERBAL**

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

**The Science and Finesse of Entrepreneurship**

*Duke University East Campus*
Term 1 (June 7–June 27)

**CENTER MATH & VERBAL**

As today's technology sector has proven time and again, entrepreneurship is both a science and an art. But how do you move from inspiration to investor? How do you turn a start-up into a company that lasts? Study the success stories of Silicon Valley and learn how to differentiate ideas from opportunities. Examine the fundamentals of e-entrepreneurship as a template for success in other key sectors like information, energy, medical and consumer technologies. Develop the critical thinking skills and processes vital to business success. Learn how to assemble a team and the resources you need. Through research, collaboration, and simulations, develop a plan for a company built on positive impact, sustainable performance, and longevity. Students who have taken Where Great Minds and Big Money Meet should not enroll in this course due to curricular overlap.

**Theater Arts**

*Rollins College*
Term 1 (June 7–June 27)

*Appalachian State University*
Term 2 (July 5–July 25)

**ACADEMY VERBAL**

Unlike other forms of literature, drama is not meant to be read; it is meant to be performed for an audience. Much like a piece of sheet music, a play is merely a blueprint for a performance. Discover how theater is made through the exploration of classic plays. Analyze various texts and experience drama from the point of view of those who create it, those who perform it, and those who make it happen behind the scenes. Experiment with different roles and character choices. Write short dramas and perform short works.

**Understanding Genetics**

*Davidson College*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH**

Genetic technology helps identify and cure diseases, solve crimes, and understand family heritage. Take a hands-on approach to studying deoxyribonucleic acid (DNA) and the way the information within it creates a roadmap for human development and risk of disease. Explore DNA structure, replication, mutations, and how scientists are applying evolving new technologies to treat diseases. Through lab experiments, simulations, discussions, and presentations, learn about the mechanics of DNA and why it is arguably the most important molecule to all life on Earth. Students who have taken DNA: Unlocking the Genetic Code should not enroll in this course due to curricular overlap.

**Words that Matter: Rhetoric and Persuasion**

*Duke University East Campus*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

In a modern economy, mastering your field is not enough. Skills such as creativity, critical thinking, problem solving, resilience, and adaptability are all vital to continuous innovation. Combining technical knowledge with these creative skills has allowed such companies as Disney, Pixar, and Apple to flourish. Unlock your creative, innovative self through hands-on activities, discussions, and assignments that span the fields of mathematics, sciences, and the humanities. Learn about the neuroscience and brain theory behind creativity, its modern applications to entrepreneurship, and develop confidence in your own ideas.
COURSES LISTED BY LOCATION

APPALACHIAN STATE UNIVERSITY

MATHEMATICS

Algebra I
| Term 2 (July 5–July 25)

ACADEMY MATH 7 8

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course.

HUMANITIES

Choosing Sides: Debate and Persuasion
| Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY VERBAL 7 8

Lawyers, politicians, and CEOs use sound arguments to transform public opinion, move people to their feet, or change the course of nations. Explore rhetorical devices, public speaking, and various forms of debate as you study historical debates and learn to construct your own compelling arguments. Practice your debating skills through written and oral performance in a variety of formats while learning to argue multiple sides of a single issue.

SCIENCES

Crime Scene Investigations
| Term 1 (June 7–June 27)

ACADEMY MATH 7 8

Go beyond the simplified forensic science that has been popularized in the media; learn the real techniques forensic investigators use to gather and analyze evidence at a crime scene and in the lab. Plot and process a mock crime scene, and discover the science behind DNA analysis, fingerprinting, and facial reconstruction. Discuss the forensic evidence in famous solved and unsolved cases. Explore what it means to be an expert witness and learn about the laws associated with forensic studies.

SCIENCES

Design Challenges: Physics and Engineering
| Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH 7 8

Force, motion, and energy make up the foundation of physics. Explore these concepts by examining their roles in design and engineering. Learn how engineers determine the design and materials to use before building a structure. Utilize math, physics, and engineering to complete hands-on problem-solving and model-building activities. Explore advances in technology and their effect on design.

SCIENCES

Experiments in Science: Biology, Chemistry, and Physics
| Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH 7 8

Investigate science through the process that has driven discovery for centuries: experimentation. Experiments are what allow scientists to connect their ideas and theories with the practical nature of the real world. Research and conduct experiments in a wide range of scientific fields, including molecular genetics, earth’s history, field ecology, alternative energies, physics, and more. Learn not only how to design and conduct informative experiments, but also how to interpret the results in a way that helps us understand more about the world in which we live.

HUMANITIES

Fantasy Worlds and Science Fiction
| Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY VERBAL 7 8

Travel through the minds of writers who have shaped the genre of fantasy literature. Voyage into far and uncharted territories, (re)discover strange yet familiar friends, fight frightening foes, and return (hopefully) in one piece from our journey with a far greater understanding of home. Consider the structure of the fictive world and the significance of children with unusual gifts. Critically debate what these authors are asking us to see, believe, or interpret about their created worlds and about our own. Students who have taken From Wonderland to Hogwarts should not enroll in this course due to curricular overlap.

SCIENCES

Human Anatomy: The Structure and Function
| Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH 7 8

The human body is composed of complex, interrelated systems. Explore the systems of the human body and examine how they work together. Study basic anatomy and physiology as well as the chemical processes that allow body systems to function. Through laboratory activities, research, and debate, become familiar with the complex workings of the body and current issues in medical science. Students who have taken The Human Body should not enroll in this course due to curricular overlap.
There is an increasing demand for computer applications to be collaborative, dynamic, and tied to the user instead of a computer or mobile device. As applications move off the computer and into “the cloud,” web application programming is proving to be a critical part of the next computing revolution. Learn about the basic principles of dynamic web application programming and the unique considerations of programming for the web. By the end of the course, develop an original web application. This introductory course requires no prior programming experience.

SOCIAL SCIENCES

Psychology

Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH & VERBAL (Grades 7-8)

The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense and perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.

HUMANITIES

The Personality of Style: Creative Writing

Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY VERBAL (Grades 7-8)

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

TECHNOLOGY

Programming for the Web

Term 1 (June 7–June 27)

ACADEMY MATH (Grades 7-8)

There is an increasing demand for computer applications to be collaborative, dynamic, and tied to the user instead of a computer or mobile device. As applications move off the computer and into “the cloud,” web application programming is proving to be a critical part of the next computing revolution. Learn about the basic principles of dynamic web application programming and the unique considerations of programming for the web. By the end of the course, develop an original web application. This introductory course requires no prior programming experience.
discuss the societal implications of advancing scientific knowledge.

draw conclusions from experiments. Explore current scientific research and work collaboratively to analyze data, connect outcomes with theory, and modern genetics, bacteria sampling, anatomy, and chemical reaction, procedures scientists use in the field. With experiments in classical and class discussions and field trips, using the same biology and chemistry analyze results. Engage in scientific reasoning through laboratory exercises, by others as you design investigations, manipulate equipment, and observation. Interact directly with natural phenomena and data collected.

Science moves forward by generating theories consistent with laboratory observation. Interact directly with natural phenomena and data collected by others as you design investigations, manipulate equipment, and analyze results. Engage in scientific reasoning through laboratory exercises, class discussions and field trips, using the same biology and chemistry procedures scientists use in the field. With experiments in classical and modern genetics, bacteria sampling, anatomy, and chemical reaction, work collaboratively to analyze data, connect outcomes with theory, and draw conclusions from experiments. Explore current scientific research and discuss the societal implications of advancing scientific knowledge.

HUMANITIES

Beyond Baker Street: The Detective as Scientist in Literature and Film
Term 1 (June 7–June 27)

I never guess. It is a shocking habit—destructive to the logical faculty. So said Sherlock Holmes, the quintessential fictional detective. Since then, scores of literary sleuths have followed in his footsteps, relying on investigation, scientific analysis, and deduction to pierce the veil of mystery. Join this deductive tradition and learn to spot and interpret clues that elude the less observant. Dissect detective fiction and master current trends in crime scene investigation as you learn to interpret evidence and construct compelling arguments for your case. Conduct your own investigations and reach your own conclusions - elementary or otherwise.

SCIENCE

Biological & Chemical Sciences
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Science moves forward by generating theories consistent with laboratory observation. Interact directly with natural phenomena and data collected by others as you design investigations, manipulate equipment, and analyze results. Engage in scientific reasoning through laboratory exercises, class discussions and field trips, using the same biology and chemistry procedures scientists use in the field. With experiments in classical and modern genetics, bacteria sampling, anatomy, and chemical reaction, work collaboratively to analyze data, connect outcomes with theory, and draw conclusions from experiments. Explore current scientific research and discuss the societal implications of advancing scientific knowledge.

MATH

Mathematical Problem Solving
Term 1 (June 7–June 27)

Apply mathematical knowledge and methods in new ways to solve interesting and complicated problems and proofs. Prepare for high school mathematics and beyond by developing critical mathematical thinking. This course also covers common mathematics contest topics and encourages students to delve into more difficult problems using knowledge of these topics. Develop structural knowledge of mathematical proofs, the foundation for all higher-level mathematics. A diagnostic test given at the beginning of the term will ensure you are challenged with new mathematical concepts.

SOCIAL SCIENCES

Mock Trial
Term 2 (July 5–July 25)

Examine fundamental topics of law, including the criminal and civil justice system, rules of evidence, eyewitness testimony, civil rights, and challenges to constitutional law. Apply the principles and practices of courtroom trials, experiment with the art of litigation as prosecutors and defenders, and consider challenges inherent in seeking justice. Read and understand precedent-setting decisions made by the Supreme Court and discuss the Court’s role in interpreting constitutional law. Practice using the case method while enhancing research and public speaking skills. Class may visit a courthouse. This course is writing intensive.
Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

Genetic technology helps identify and cure diseases, solve crimes, and understand family heritage. Take a hands-on approach to studying deoxyribonucleic acid (DNA) and the way the information within it creates a roadmap for human development and risk of disease. Explore DNA structure, replication, mutations, and how scientists are applying it to understand family heritage. Take a hands-on approach to studying DNA and why it is arguably the most important molecule to all life on Earth. Students who have taken DNA: Unlocking the Genetic Code should not enroll in this course due to curricular overlap.

In a modern economy, mastering your field is not enough. Skills such as creativity, critical thinking, problem solving, resilience, and adaptability are all vital to continuous innovation. Combining technical knowledge with these creative skills has allowed such companies as Disney, Pixar, and Apple to flourish. Unlock your creative, innovative self through hands-on activities, discussions, and assignments that span the fields of mathematics, sciences, and the humanities. Learn about the neuroscience and brain theory behind creativity, its modern applications to entrepreneurship, and develop confidence in your own ideas.
DUKE UNIVERSITY EAST CAMPUS

HUMANITIES

Big Screen, Little Screen: Writing for the Camera
Term 1 (June 7–June 27)

Many of us believe we have the next great movie idea that will take Hollywood by storm, do away with recycled story lines and tired plots, and return us to the golden era of cinema with films that are both challenging and entertaining. Delve into your imagination and explore the outside world to express your creative ideas. Develop a habit of taking notes on anything and everything, learn from and appreciate the writing of talented screenwriters, and fine-tune your knowledge of the written word. Apply these skills to the art of screenwriting - idea development, outlining, treatments, story, character, setting, dialogue, theme, and subplots - and explore new storylines to captivate your audience.

TECHNOLOGY

Computer Skills for Today’s Scientists and Engineers
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Physicists use supercomputers to analyze massive collisions in underground particle accelerators. Neuroscientists use artificial neural networks to probe the inner workings of the brain’s neurons. Engineers write computer code to control complicated circuitry and robotics. Scientists and engineers in a wide range of disciplines use modern computing technologies to make discoveries, design and develop new technologies and methods, analyze the results of experiments, and solve complex problems. Learn how to program using techniques scientists and engineers employ for data processing, laboratory equipment control, computation, and graphical analysis.

SOCIAL SCIENCES

Dictators, Kings, and CEOs: The Evolution of Empire
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Empires are perhaps the single most formative phenomenon in history. Survey influential empires through the ages and learn how they impacted the development of the world politically, culturally, socially, and militarily. Follow Augustus as his legions spread the glory of Rome across Europe. Ride with Genghis Khan as he shakes the foundations of the civilized world with terror. Examine the spread of American culture and beliefs across the globe, from McDonald’s to democracy. Engage in literary analysis and historical research at Duke University’s libraries.

HUMANITIES

Director’s Cut: From Storyboard to Screen
Term 2 (July 5–July 25)

Many of us believe we have the next great movie idea that will take Hollywood by storm, do away with recycled story lines and tired plots, and return us to the golden era of cinema with films that are both challenging and entertaining. Delve into your imagination and explore the outside world to express your creative ideas. Develop a habit of taking notes on anything and everything, learn from and appreciate the writing of talented screenwriters, and fine-tune your knowledge of the written word. Apply these skills to the art of screenwriting - idea development, outlining, treatments, story, character, setting, dialogue, theme, and subplots - and explore new storylines to captivate your audience.

This course is an interactive introduction to film as a form of art and entertainment. Explore the basic history, concepts, and terms associated with the study and production of film, then go beyond the theoretical to apply these concepts to the production of short videos through hands-on assignments and exercises. Examine how films are constructed through the interplay of narrative, technological, and aesthetic systems, then use these basic concepts to bring life to your own creative vision. Note: Students who have taken TIP’s Celluloid Visions: A Critical Study of Film should not enroll in this course due to overlap in content.

HUMANITIES

Ethics and the Little White Lie
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Are “white lies” ever justified? Ethical dilemmas confront us every day, and the decisions we make refine the ethical lens with which we interpret ourselves and the world. As D. H. Lawrence wrote, “Ethics and equity and the principles of justice do not change with the calendar.” But how do we know what those principles are? What makes an action right or wrong? Explore common ethical theories to gain an understanding of the philosophical issues and concepts of moral reasoning. Consider dilemmas and the ethics implicit in modern media to analyze how those media might influence societal standards.

MATHEMATICS

Game Theory: Economics
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Using complex mathematical concepts, analyze situations in which two or more parties are competing, determine the best course of action for each party, predict the outcome, and then apply these concepts to circumstances across all disciplines. Investigate the foundations of Game Theory, or Formal Decision Theory, and its use as a tool to help people conceptualize and navigate complex decision-making processes in ways that produce optimum benefit. Explore applications in economics that inform mergers, negotiations, marketing and pricing strategies, and contract formation, as well as applications in strategic conflict and warfare, evolutionary systems, psychology, and sociology. This course is open to current ninth and tenth graders only.

SOCIAL SCIENCES

Historical Epidemiology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

From the Black Death to smallpox to HIV/AIDS and the Ebola virus, infectious diseases have profoundly affected human history and shaped the progress of societies. Evaluate, track, and analyze the impact of major epidemics throughout the ages. Study modern epidemiological techniques in a classroom setting. Learn the basic concepts and techniques behind recognizing and fighting pandemics, then apply this knowledge to historic
epidemics as a foundation for developing modeling techniques that fight modern disease. Learn how the media and organizations like the World Health Organization and Center for Disease Control all play a role in fighting these major threats to our survival. Students who have taken Pathogens, Plagues and Patient Zero: Historical Epidemiology should not enroll in this course due to curricular overlap.

**SOCIAL SCIENCES**

**International Relations: Global Conflicts**

*Term 1 (June 7–June 27)*

**CENTER VERBAL**

Why do people go to war, engage in trade, or defend human rights? How do these issues affect the individual, and what difference can one person make? Analyze and debate these theoretical, practical, and ethical questions as they relate to terrorism, the media, Marxism, globalization, weapons of mass destruction, ethnic conflict, nationalism, sovereignty, genocide, and international law. Study current and historical conflicts to analyze and predict outcomes and their ramifications.

**SOCIAL SCIENCES**

**Macroeconomics**

*Term 2 (July 5–July 25)*

**CENTER MATH**

Complete an intensive course equivalent to an introductory or principles level college course in macroeconomics. Develop a basic understanding of the theory and practice of macroeconomics, including an understanding of the determinants of the levels of income, output, and employment. Analyze the determinants of consumption, investment, government spending, and net exports, and study the model of international trade that determines exchange rates and the balance of trade. Discuss the economic impact of the federal deficit and debt and the effectiveness of discretionary fiscal and monetary policies under a number of models, and analyze macroeconomic debates to effectively participate in the political process.

**SOCIAL SCIENCES**

**Microeconomics**

*Term 1 (June 7–June 27)*

**CENTER MATH**

Complete an intensive course, roughly equivalent to an introductory or principles level college course in microeconomic theory. Use microeconomics as a model to understand and analyze human behavior. Apply an analytical approach to the study of how individuals and societies deal with the fundamental problem of scarce resources. Understand how these principles affect individuals trying to maximize their utility, businesses trying to maximize their profits, and societies trying to manage resources. Analyze controversial issues such as minimum wage laws, farm subsidies, rent controls, protectionism, pollution, welfare programs, and the tradeoff occurring between equity and efficiency that result from various microeconomic policies.

**MATHEMATICS**

**Mobius Strips, Klein Bottles, and Fractals: The Mathematics of Distortion**

*Term 2 (July 5–July 25)*

**CENTER MATH**

Explore topology, the mathematical study of twisting, bending, and stretching objects. Learn how industrial design, engineering, and theoretical physics employ applications of Möbius strips. Discover mathematical distortion techniques that work on highly complex systems, such as roving sensor networks for security systems. Examine the continuum between shapes and the ways in which seemingly different objects are topologically the same. Study fractals, knots, and manifolds using concepts of points, lines and curves.

**HUMANITIES**

**Philosophy in Literature and Film**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER VERBAL**

In subtle and overt ways, philosophical concepts ranging from nihilism to existentialism shape novels, plays, comic books, pop music, and documentaries. Through critical literary and film analysis, explore the ways in which authors and filmmakers express various philosophical ideas through their media. Investigate the relationship between philosophy and art and develop an understanding of the way in which literature and film present a unique approach to philosophical quandaries regarding self, morality, epistemology, and perception.

**HUMANITIES**

**Philosophy of Time**

*Term 2 (July 5–July 25)*

**CENTER VERBAL**

What is time? How have different cultures throughout history understood and represented it? Does it unfold in a straight line, or is it best represented by a circle of eternal recurrence? Examine how a wide range of thinkers have dealt with the issue of time and temporality. Discuss the phenomenology of Martin Heidegger and the space-time theory of Albert Einstein alongside Native American mythology, Romantic poetry, Buddhist philosophy, and Christian theology. Analyze how television and movies create new visions of the past when depicting historical periods. Consider the theories of dimensions of time to tackle a proposition that has obsessed modern culture: time travel.
**SOCIAL SCIENCES**

**Political Cultures and Countercultures: The Battle for Public Opinion**
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH & VERBAL**

Since the beginning of recorded history, politics has been a struggle between two opposing forces: elite and popular power. While elite history is recorded in the actions of kings and the growth of empires, the politics of the lower classes is expressed in an era's popular culture. Examine grassroots movements and their efforts to subvert political regimes throughout history. Analyze Greek tragedy, Shakespeare's Elizabethan propaganda, Whitman's Democratic Romanticism, Beat poetry, 1960s protest music, and the current blogosphere in conversation with political theorists such as Plato, Rousseau, Emerson, and Marx. Follow the transformation of political cultures from the ancient to the modern world by analyzing the development of popular culture from Dionysian festivals to the modern blogosphere.

**SOCIAL SCIENCES**

**Psychology of Decision Making: Behavioral Economics**
*Term 1 (June 7–June 27)*

**CENTER MATH & VERBAL**

Integrate insights from cognitive psychology, social psychology, and behavioral economics to understand why people make the choices they make. Examine how cognitive processes that help people make sense of complex information can also logically lead them astray in decision making. Investigate how emotion, motivation, and information-processing shortcuts interact with careful, rational weighing of information. As you study the surprising ways that individuals actually make decisions, gain insights about decision making in fields such as healthcare, finance, education, and government.

**SOCIAL SCIENCES**

**Revolution and Terror: Controversial Politics**
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH & VERBAL**

 Violence and fear have always been instruments of politics. Rulers and rebels alike have resorted to force (or the threat of it) to try to advance their ends. Since the late eighteenth century, revolutionaries have self-consciously turned to violence and fear as instruments - not just for advancing their own factions, but for refashioning the political system itself. Explore the historical development of modern revolutionaries and terrorist groups ranging from Rousseau to Stalin to Al Qaeda to modern day pirates off the coast of Somalia. Analyze the ways in which society attempts to address such violence.

**SOCIAL SCIENCES**

**The Science and Finesse of Entrepreneurship**
*Term 1 (June 7–June 27)*

**CENTER MATH & VERBAL**

As today's technology sector has proven time and again, entrepreneurship is both a science and an art. But how do you move from inspiration to investor? How do you turn a start-up into a company that lasts? Study the success stories of Silicon Valley and learn how to differentiate ideas from opportunities. Examine the fundamentals of e-entrepreneurship as a template for success in other key sectors like information, energy, medical and consumer technologies. Develop the critical thinking skills and processes vital to business success. Learn how to assemble a team and the resources you need. Through research, collaboration, and simulations, develop a plan for a company built on positive impact, sustainable performance, and longevity. Students who have taken Where Great Minds and Big Money Meet should not enroll in this course due to curricular overlap.

**HUMANITIES**

**Refining Your Voice Through Creative Writing**
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER VERBAL**

Experienced writers apply here. No matter your preferred genre, go beyond your writing limits by exploring countless creative ways of crafting and structuring language. Examine various techniques such as chronology, argument, evolving revelation, juxtaposition, and retrospective. Critique works from prominent authors to lesser-known masters. Become a more emboldened writer through the critical peer review process. Novelists, memoirists, poets, and authors of all other genres will be supported and challenged in this course. Students who have taken Literary License without Limits should not enroll in this course due to curricular overlap.

**HUMANITIES**

**Words that Matter: Rhetoric and Persuasion**
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER VERBAL**

Delve into an advanced exploration of the power of the spoken word. Examine influential speeches and debates, study the logic and structure of effective arguments, and research the reasoning behind deliberate word choices. Create your own persuasive style, hone your skills of analysis and focus your writing to articulate your message. Refine your speaking skills and debate delivery to illustrate points of divergence instead of mere disagreement. After practicing these skills, apply them by preparing and presenting in-class debates.
### Criminal Law and Mock Trial
**Duke University West Campus, Academy**

**ACADEMY MATH & VERBAL (GRADES 8 9 10)**

Survey major topics in criminal law, the criminal justice system, and relevant constitutional law. Study the evolution of our justice system and review criminal trials that have transfixed our nation. Examine the ways in which the Supreme Court interprets constitutional law and debate issues ranging from the death penalty to the insanity plea. Discuss the Supreme Court's role in interpreting constitutional law. Class may visit a courthouse. Practice the use of case method, enhance research and public speaking skills as you argue a case, and simulate the procedures of a typical criminal trial.

### Cryptography, Codebreaking, and the Mathematics ofSpying
**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

**ACADEMY MATH (GRADES 8 9 10)**

Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.

### Engineering Problem Solving
**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

**ACADEMY MATH (GRADES 8 9 10)**

Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.

### Modern Medicine: Disease and Immunology
**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

**ACADEMY MATH (GRADES 8 9 10)**

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

### Neuropsychology
**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

**ACADEMY MATH & VERBAL (GRADES 8 9 10)**

Why are roller coasters thrilling for some and terrifying for others? How does brain development affect perception, judgment, and decision-making? Understanding the intersection and interaction of the human brain and behavior is at the heart of neuropsychology. Study the physiology of the brain and cognitive functions that affect behavior. Investigate how the brain works by also considering neuroscientific, philosophical, neurological, and psychiatric perspectives.

### Pharmacology
**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

**ACADEMY MATH (GRADES 8 9 10)**

How do we discover new drugs? How do pharmacologists balance the therapeutic value of a drug with its negative side effects? How do drugs treat pain, cure disease, or alleviate symptoms? How do our genes play a role in the success or failure of drug treatment? Who bears responsibility for the development of life-saving drugs, and what should they cost? Examine the field of pharmacology and its relationship to health, disease, and society. Study how the chemical properties of drugs interact with biological systems and how pharmaceuticals affect our health and behavior. Participate in hands-on laboratory exercises to visualize and practice principles and ideas.
**Philosophy of Knowledge**  
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY VERBAL**  
*Grades 8 9 10*

For centuries, philosophers have debated the relationship between the mind and the world. What is knowledge? What makes knowledge meaningful? How do we know what we know? Investigate epistemology, the branch of philosophy concerned with the nature, scope, and limitations of knowledge. Study the propositions of truth, beliefs, and knowledge - what are the differences? Delve into theories of knowledge acquisition such as empiricism, rationalism, and constructivism. Consider answers offered to these questions by philosophers throughout the ages, such as Aristotle, Plato, Descartes, Hegel, and Nietzsche.

**Quantum Mechanics and Modern Physics**  
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY MATH**  
*Grades 8 9 10*

The bizarre world of quantum mechanics seems to contradict our understanding of the everyday natural processes that we observe in the macroscopic world. Yet our understanding of the principles of quantum mechanics is essential to the creation of lasers, microprocessors, electron microscopes, superconductors, and magnetic resonance imaging (MRI) technology, along with countless other devices and scientific processes. Through hands-on labs, examine the foundations of quantum physics and explore modern applications of this fascinating subject, including its impact on diverse fields within engineer and science, including materials science, nanotechnology, electronic devices, and photonics. This course is math-intensive. Completion of Algebra I is preferred.

**Speculative Fiction: Reading and Writing About Alternate Worlds**  
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY VERBAL**  
*Grades 8 9 10*

What do J.R.R. Tolkien’s Gollum, Shakespeare’s fairies, Stephen King’s Cujo, Suzanne Collins’ Katniss Everdeen, and Ray Bradbury’s Martians all have in common? They each inhabit the highly imaginative world of speculative fiction—a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

**The Haunting: Exposing the Mind’s Fear of Myth & Monster**  
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY MATH & VERBAL**  
*Grades 8 9 10*

Through the use of literature and film clips, investigate the psychological roots of ghosts, vampires, and other unexplainable paranormal phenomena. Pair the stories of hauntings that grow from seemingly innocent folk and fairy tales with the works of psychologists such as Jung and Freud to study the deep-seated fears and specters that lie in wait among the shadowy waking and non-waking moments of the human psyche. Then move from analyzing individual human minds to studying how simple ghost stories and urban myths rise to the level of global fear. Delve into why and how myths are created, as well as the psychology involved in their lasting appeal.

**The Pen as Weapon: The Art of Satire**  
*Term 1 (June 7–June 27)*

**ACADEMY VERBAL**  
*Grades 8 9 10*

What do “The Daily Show with Trevor Noah,” Jonathan Swift’s “A Modest Proposal,” Kurt Vonnegut’s “Cat’s Cradle,” Gary Trudeau’s “Doonesbury,” and “The Simpsons” all have in common? In a word: satire. Join your witty peers in an exploration of satire, the art of exposing the foibles and pitfalls of society, institutions, and individuals through wit and comedy. Discuss satire’s role in social and political movements and examine the ways in which pointed humor, irony, and exaggeration can quickly lead to controversy and even violence depending upon political, religious, and geographic contexts. Analyze what constitutes well-written satire, and how authors successfully navigate an ever-changing cultural landscape to create humorous and constructive social criticism.

**Anatomy, Physiology, and Medical Ethics**  
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH & VERBAL**  
*Grades 8 9 10*

Learn the tools to view the human body as a complex and intricate structure. Explore the connection between structure (anatomy) and function (physiology), and analyze this relationship in cells, organs, and organisms as a whole. Examine the different functional systems such as digestive, circulatory, and skeletal and the various building blocks of the body. Participate in hands-on laboratory exercises to visualize and practice principles and ideas. Discuss established medical ethics, and debate circumstances, technologies, and advances that challenge and/or justify ethical standards.
In the United States, 1.5 million people are diagnosed with cancer each year. Given the prevalence of this disease, much attention and research has been focused on identifying causes and designing treatments to combat it. Examine the historical perspective on the biology of cancer and explore the molecular biology and genetic changes that occur during cancer, including the six hallmarks of cancer, as defined by Robert Weinberg. Discuss the role of genetics, oncogenes, and tumor suppressor genes in the development of the disease. Debate the ethics surrounding genetic testing and cancer treatment. Conduct research using current articles and primary literature on cancer at Duke’s Perkins Library and participate in laboratory activities to illustrate concepts.

Biomedical Engineering
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Biomedical engineering applies fundamental science and math principles to improve human health beyond the limits of traditional medicine. Learn the engineering design process used by biomedical engineers and investigate how they create new diagnosis and treatment methods in tissue engineering, genetic engineering, drug delivery, and biomedical instrumentation. Explore principles such as density, hydraulic, and pneumatic systems, Newton's laws of motion, genetics, and electromagnetism. Perform gel electrophoresis, gene expression analysis, circuitry design, and cell staining, techniques routinely used by biomedical engineers to advance the field of medicine.

Crunching the Numbers: Global Finance
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

In an age when global financial transactions involve millions, billions, and even trillions of dollars, the question arises: Where does all of the money go? Examine finance principles such as the time value of money and the risk-return relationship. Analyze financial instruments both from investors' and companies' perspectives. Assess the financial rewards and challenges faced by firms and individuals in a global economy. Consider the role of technology in global finance. Examine the various methods used for financial forecasting. Use “money math” to perform quantitative stock evaluations, data measurement, product costing, and corporate budgeting.

Dictators, Kings, and CEOs: The Evolution of Empire
Term 2 (July 5–July 25)

Empires are perhaps the single most formative phenomenon in history. Survey influential empires through the ages and learn how they impacted the development of the world politically, culturally, socially, and militarily. Follow Augustus as his legions spread the glory of Rome across Europe. Ride with Genghis Khan as he shakes the foundations of the civilized world with terror. Examine the spread of American culture and beliefs across the globe, from McDonald’s to democracy. Engage in literary analysis and historical research at Duke University’s libraries.

Electrical Engineering
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Electrical engineers are key creators behind many high-tech innovations such as global positioning systems that can pinpoint a car's location, giant generators that can power entire cities, and new designs for an airplane's electrical system. Explore the physical basis and mathematical models of electrical components and circuits. Work in teams to design and build electronic circuits and investigate voltage, resistance, amperes, watts, and circuit theorems. Analyze linear circuits, semiconductors, frequency representation, and sequential logic. Determine applications for electrical engineering concepts in other scientific fields and everyday life. *This course is open to current ninth and tenth graders only.

Environmental Chemistry
Term 1 (June 7–June 27)

Working at the intersection of chemistry and toxicology, explore the causes and effects of major classes of pollutant chemicals. Determine how these pollutants enter the air, earth, and water, and how we detect them. Learn about laboratory testing used to identify toxic chemicals and apply those techniques to samples you collect from local ecosystems. Identify ways that toxic chemicals are absorbed and processed by animals, humans, and plants. Discuss and analyze the potential effects of toxins and toxicants on individual organisms, populations, and ecosystems, such as the lead contamination of drinking water in Flint, Michigan. Students who have taken Environmental Toxicology should not enroll in this course due to curricular overlap.
HUMANITIES

Ethics and the Little White Lie
Term 2 (July 5–July 25)

Are “white lies” ever justified? Ethical dilemmas confront us every day, and the decisions we make reflect the ethical lens with which we interpret ourselves and the world. As D. H. Lawrence wrote, “Ethics and equity and the principles of justice do not change with the calendar.” But how do we know what those principles are? What makes an action right or wrong? Explore common ethical theories to gain an understanding of the philosophical issues and concepts of moral reasoning. Consider dilemmas and the ethics implicit in modern media to analyze how those media might influence societal standards.

SCIENCES

Forensic Science
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Forensic science is the scientific analysis of physical evidence. Examine some types of evidence encountered in criminal investigations and the techniques used to analyze that evidence. Analyze fingerprint and trace evidence such as hairs, fibers, glass, and paint. Engage in laboratory exercises simulating real-life methods of evidence analysis, and then participate in a mock crime scene, examining the many roles of crime scene investigators. Round out the course with discussion and debate cases and the portrayal of forensic science in popular culture.

SCIENCES

Hanging with Lemurs: An Introduction to Primatology
Term 1 (June 7–June 27)

Using the world-famous Duke University Lemur Center as your classroom, conduct daily observation, data collection, behavior analysis, and research into lemurs, lorises, bushbabies, and more. The study of these biological relatives helps us understand where we fit into the animal kingdom and why we are so unique. Examine common characteristics of primates, and explore current primate taxonomy, the evolution of the group, and trends and variation in primate subsistence, physiology, locomotion, social structures, and cognition. Consider the impact of a changing society on these creatures. Note: Students who have taken TIP’s Primate Biology: Lemurs, Lorises, and Bushbabies should not enroll in this course due to overlap in content.

SCIENCES

Materials Science: The Building Blocks of Engineering
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

From the Stone Age to the Computer Age, humans have always sought to identify and engineer materials with the mechanical, electrical, thermal, optical, and magnetic properties that make innovation possible. These discoveries have fueled mankind’s greatest achievements and set the stage for advancing technologies. Develop your own innovative abilities by using hands-on lab work to investigate the relationship between the microscopic structure and the unique properties of metals, polymers, composites, and ceramics. Explore the many applications of these materials and learn how they can be used to better the quality of life for all mankind.

SCIENCES

Neuroscience
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Humans everywhere are turning to the brain for answers to questions that have plagued our species for centuries: Why do people do evil things? What is love? Why do we dream? How do we remember? What is consciousness? Address these questions from the perspectives of physiology, pharmacology, pathology, psychology, and philosophy. After becoming acquainted with the methods and tools that researchers employ in their studies, explore puzzling questions by examining evolving theories and contemporary methodologies in science and philosophy. Examine the basic structural and organizational aspects of neuroanatomy and physiology, study current research regarding sleeping/dreaming, consciousness, behavioral disorders, neuropathology, memory, and artificial intelligence.

SCIENCES

Nuclear Science
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Nuclear science plays a vital role in the lives of Americans, providing approximately one-fifth of our energy and diagnosing and healing millions of patients with nuclear medical procedures. Nuclear science is used to enhance the food we eat, control pests, track materials flow in industry, date archeological artifacts, and identify chemical compositions. Through hands-on activities, computer simulations, and discussions, learn the science within the atom, study the history of key discoveries in the field, and debate the ethics of nuclear weaponry. Apply Einstein’s famous formula E=mc², and learn about atomic structure, isotopes, half-life, radioactivity, nuclear reactions, fission, and fusion.
Psychology of Decision Making: Behavioral Economics
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Integrate insights from cognitive psychology, social psychology, and behavioral economics to understand why people make the choices they make. Examine how cognitive processes that help people make sense of complex information can also logically lead them astray in decision making. Investigate how emotion, motivation, and information-processing shortcuts interact with careful, rational weighing of information. As you study the surprising ways that individuals actually make decisions, gain insights about decision making in fields such as healthcare, finance, education, and government.

Social Psychology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Social psychology is the formal study of the ways in which individuals affect one another. Examine how people's attitudes, biases, and behaviors are influenced by other people and how these influences affect society as a whole. Explore the ways social psychologists use the scientific method to study people's thoughts and behaviors in social situations and how ethical principles govern their research. Discuss and debate topics such as the self, prejudice, gender, race, conformity, obedience, aggression, group influence, and pro-social behavior. Drawing from examples in the media, law, politics, history, culture, and our own lives, examine how we are affected by social relationships and what a difference these relationships make in the way we live.

The Ethics of Artificial Intelligence
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What happens when you create an intelligent, autonomous robot and then limit its freedom? The field of artificial intelligence already permeates more aspects of our daily lives than we realize. It drives our cars, flies our planes, manages our money, and protects our safety. Its approach to more human-like thoughts and actions raises predictable complications. Are they to be considered tools or lifeforms? How can we ensure that these machines will respect our ethical and moral principles? Debate the laws by which these thinking machines should abide. Analyze and argue philosophical approaches to AI's integration into society, and build the ethical foundation and psychological framework necessary to navigate this emerging landscape.
GEORGIA INSTITUTE OF TECHNOLOGY

SCIENCES

Anatomy, Physiology, and Medical Ethics
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH & VERBAL

Learn the tools to view the human body as a complex and intricate structure. Explore the connection between structure (anatomy) and function (physiology), and analyze this relationship in cells, organs, and organisms as a whole. Examine the different functional systems such as digestive, circulatory, and skeletal and the various building blocks of the body. Participate in hands-on laboratory exercises to visualize and practice principles and ideas. Discuss established medical ethics, and debate circumstances, technologies, and advances that challenge and/or justify ethical standards.

SCIENCES

Architecture in the Urban Environment
Term 2 (July 5–July 25)

CENTER MATH & VERBAL

Modern architecture represents the intersection of science, technology, engineering, and art. Discover the intricacies of architecture and how it defines the very nature of an urban landscape. Explore the impact of technology and environmental concerns and learn how to create significant and functional space within an urban environment. Explore the global history of metropolitan architecture and how it has evolved to embrace the challenges of designing buildings in these ever-changing settings. Apply drafting techniques to repurpose existing infrastructures, bring nature back to cities, or design dazzling new skyscrapers. Consider the environmental, social, cultural, and artistic impacts of your designs and learn to capture the public's imagination through hands-on, project-based learning.

TECHNOLOGY

Artificial Intelligence
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH

While science fiction has a long history of intelligent machines, we now live in a world in which these machines are reality - and you can learn the skills to work in this exciting field. We can hold conversations with Siri on our iPhones, watch computers defeat the world’s greatest chess players, and might soon ride around in driverless cars. These new technologies require artificial intelligence, which is the study and development of technology that can reason, deduct and, basically, act human. Learn the programming necessary to work in machine intelligence development, and explore the origins of AI as well as modern areas of research, including language processing, perception, motion, and manipulation.

SCIENCE

Astronautical Engineering
Term 1 (June 7–June 27)

CENTER MATH

Explore the history and orbital mechanics of spaceflight from Newton and Kepler through Mercury, Gemini, Apollo, and the space shuttle programs. Learn the engineering behind spaceflight and spacecraft design. Study how objects move through space. Investigate various fields in science related to spaceflight, such as physics, aeronautics, and rocket propulsion. This course is math-intensive. Completion of Algebra I is preferred but not required. Note: Students who have taken TIP’s Spacecraft Mission Design should not enroll in this course due to overlap in content.

SCIENCES

Biology of Cancer
Term 1 (June 7–June 27)

CENTER MATH

In the United States, 1.5 million people are diagnosed with cancer each year. Given the prevalence of this disease, much attention and research has been focused on identifying causes and designing treatments to combat it. Examine the historical perspective on the biology of cancer and explore the molecular biology and genetic changes that occur during cancer, including the six hallmarks of cancer, as defined by Robert Weinberg. Discuss the role of genetics, oncogenes, and tumor suppressor genes in the development of the disease. Debate the ethics surrounding genetic testing and cancer treatment. Conduct research using current articles and primary literature on cancer at Duke’s Perkins Library and participate in laboratory activities to illustrate concepts.

SCIENCES

Biomedical Engineering
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH

Biomedical engineering applies fundamental science and math principles to improve human health beyond the limits of traditional medicine. Learn the engineering design process used by biomedical engineers and investigate how they create new diagnosis and treatment methods in tissue engineering, genetic engineering, drug delivery, and biomedical instrumentation. Explore principles such as density, hydraulic, and pneumatic systems, Newton's laws of motion, genetics, and electromagnetism. Perform gel electrophoresis, gene expression analysis, circuitry design, and cell staining, techniques routinely used by biomedical engineers to advance the field of medicine.
In an age when global financial transactions involve millions, billions, and even trillions of dollars, the question arises: Where does all of the money go? Examine finance principles such as the time value of money and the risk-return relationship. Analyze financial instruments both from investors' and companies' perspectives. Assess the financial rewards and challenges faced by firms and individuals in a global economy. Consider the role of technology in global finance. Examine the various methods used for financial forecasting. Use “money math” to perform quantitative stock evaluations, data measurement, product costing, and corporate budgeting.

Forensic science is the scientific analysis of physical evidence. Examine some types of evidence encountered in criminal investigations and the techniques used to analyze that evidence. Analyze fingerprint and trace evidence such as hairs, fibers, glass, and paint. Engage in laboratory exercises simulating real-life methods of evidence analysis, and then participate in a mock crime scene, examining the many roles of crime scene investigators. Round out the course with discussion and debate cases and the portrayal of forensic science in popular culture.

Are “white lies” ever justified? Ethical dilemmas confront us every day, and the decisions we make refine the ethical lens with which we interpret ourselves and the world. As D. H. Lawrence wrote, “Ethics and equity and the principles of justice do not change with the calendar.” But how do we know what those principles are? What makes an action right or wrong? Explore common ethical theories to gain an understanding of the philosophical issues and concepts of moral reasoning. Consider dilemmas and the ethics implicit in modern media to analyze how those media might influence societal standards.

Why do people go to war, engage in trade, or defend human rights? How do these issues affect the individual, and what difference can one person make? Analyze and debate these theoretical, practical, and ethical questions as they relate to terrorism, the media, Marxism, globalization, weapons of mass destruction, ethnic conflict, nationalism, sovereignty, genocide, and international law. Study current and historical conflicts to analyze and predict outcomes and their ramifications.
**MATHEMATICS**

**Mobius Strips, Klein Bottles, and Fractals: The Mathematics of Distortion**

*Term 1 (June 7–June 27)*

**CENTER MATH**

8 9 10

Explore topology, the mathematical study of twisting, bending, and stretching objects. Learn how industrial design, engineering, and theoretical physics employ applications of Möbius strips. Discover mathematical distortion techniques that work on highly complex systems, such as roving sensor networks for security systems. Examine the continuity between shapes and the ways in which seemingly different objects are topologically the same. Study fractals, knots, and manifolds using concepts of points, lines and curves.

**SCIENCES**

**Neuroscience**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH**

8 9 10

Humans everywhere are turning to the brain for answers to questions that have plagued our species for centuries: Why do people do evil things? What is love? Why do we dream? How do we remember? What is consciousness? Address these questions from the perspectives of physiology, pharmacology, pathology, psychology, and philosophy. After becoming acquainted with the methods and tools that researchers employ in their studies, explore puzzling questions by examining evolving theories and contemporary methodologies in science and philosophy. Examine the basic structural and organizational aspects of neuroanatomy and physiology, study current research regarding sleeping/dreaming, consciousness, behavioral disorders, neuropathology, memory, and artificial intelligence.

**SOCIAL SCIENCES**

**Psychology of Decision Making: Behavioral Economics**

*Term 1 (June 7–June 27)*

**CENTER MATH & VERBAL**

8 9 10

Integrate insights from cognitive psychology, social psychology, and behavioral economics to understand why people make the choices they make. Examine how cognitive processes that help people make sense of complex information can also logically lead them astray in decision making. Investigate how emotion, motivation, and information-processing shortcuts interact with careful, rational weighing of information. As you study the surprising ways that individuals actually make decisions, gain insights about decision making in fields such as healthcare, finance, education, and government.

**RICE UNIVERSITY ACADEMY**

**SCIENCES**

**Engineering Problem Solving**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY MATH**

8 9 10

Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.

**SCIENCES**

**Neuropsychology**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY MATH & VERBAL**

8 9 10

Why are roller coasters thrilling for some and terrifying for others? How does brain development affect perception, judgment, and decision-making? Understanding the intersection and interaction of the human brain and behavior is at the heart of neuropsychology. Study the physiology of the brain and cognitive functions that affect behavior. Investigate how the brain works by also considering neuroscientific, philosophical, neurological, and psychiatric perspectives.

**SCIENCES**

**Sports Medicine**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY MATH & VERBAL**

8 9 10

Examine the diagnosis, treatment, and prevention of common sports injuries from an anatomical, physiological, and psychological perspective. Explore how advances in technology have affected the field of sports medicine, improving both prevention and treatment. Analyze the decision-making used in designing treatment plans for athletes and non-athletes. Learn common injury care techniques used by athletic trainers, and evaluate the implications of sports medicine beyond the training room.

**RICE UNIVERSITY CENTER**

**TECHNOLOGY**

**Applications, Algorithms, Computers: Modern Programming**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH**

8 9 10

How does Google instantly find the relevant websites when you type a word into the search bar? How does a city know the most efficient route that their trash collectors should take? Explore the ways that computer scientists develop algorithms, processes, and programs that allow complicated problems to be addressed in meaningful ways. Go beyond simply understanding how to create computer programs and understand the mathematics that drive the adaptation of these programs.
to many fields of study, including medical sciences, aerospace, business and physical sciences. Some computer programming experience is beneficial, but not required.

**SCIENCE**

**Architecture in the Urban Environment**

*Term 1 (June 7–June 27)*

**CENTER MATH & VERBAL**

Modern architecture represents the intersection of science, technology, engineering, and art. Discover the intricacies of architecture and how it defines the very nature of an urban landscape. Explore the impact of technology and environmental concerns and learn how to create significant and functional space within an urban environment. Explore the global history of metropolitan architecture and how it has evolved to challenge the designs of buildings in these ever-changing settings. Apply drafting techniques to repurpose existing infrastructures, bring nature back to cities, or design dazzling new skyscrapers. Consider the environmental, social, cultural, and artistic impacts of your designs and learn to capture the public's imagination through hands-on, project-based learning.

**Astronautical Engineering**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH**

Explore the history and orbital mechanics of spaceflight from Newton and Kepler through Mercury, Gemini, Apollo, and the space shuttle programs. Learn the engineering behind spaceflight and spacecraft design. Study how objects move through space. Investigate various fields in science related to spaceflight, such as physics, aeronautics, and rocket propulsion. This course is math-intensive. Completion of Algebra I is preferred but not required. Note: Students who have taken TIP's Spacecraft Mission Design should not enroll in this course due to overlap in content.

**HUMANITIES**

**Beyond Science Fiction**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER VERBAL**

What can the fantastical, technical worlds created in speculative fiction tell us about how we see our own? Speculative fiction's use of magical elements intertwines real-world ethical dilemmas with challenges to how we think about human nature. Understand the history of this science fiction subgenre to see how it became one of the most exciting areas of contemporary literature. Critically read contemporary speculative fiction texts and use experimental storytelling techniques to create original writing. Give and receive peer feedback to enhance your own writing and critical reading ability. Students who have taken 7-8 Speculative Fiction: Reading and Writing About Alternate Worlds should not enroll in this course due to overlap in content.

**SOCIAL SCIENCES**

**Criminal Trial Advocacy**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH & VERBAL**

This course is modeled after law school curriculum. Delve into black-letter law and litigation techniques used by trial lawyers through a series of workshop activities and the analysis of criminal procedure cases. Apply legal principles through a series of structured oral arguments and mock trials. Explore the nuances of arrest, indictment, and pretrial discovery from the perspective of both the prosecution and the defense. Work through hypothetical problems in groups, engage in Socratic-style dialogues, and participate in class-wide discussions. Write legal briefs, apply previous court decisions to current controversies, and develop and present a case. Class may visit a courthouse.

**MATHEMATICS**

**Cryptology and Number Theory**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH**

The history of cryptography, the art of enciphering and deciphering, is one of the most exciting stories of applied mathematics. It is a story of conspiracies and intrigue, secret societies and intelligence services, war and peace, power and money. Governments and big corporations have been paralyzed by code breakers, and outcomes of wars have been influenced by cryptologists. The ongoing race between encryptions and attackers has led to ingenious and elaborate coding algorithms that make heavy use of classical results from number theory. Approach the subject from a historical point of view, emphasizing the elementary theoretical aspects of number theory, abstract algebra, and cryptology. Study monoalphabetic and polyalphabetic substitution ciphers as well as modular arithmetic and mathematical induction, basic probability theory, and elementary matrix theory. Students who have taken Spy 101: Cryptology and Number Theory should not enroll in this course due to curricular overlap.

**ENGINEERING FOR FUN**

*Term 2 (July 5–July 25)*

**CENTER MATH**

Behind roller coasters, water parks, miniature golf courses, and theme parks are engineers who understand physical forces, the fundamentals of design, and the psychology that goes into the business of fun. Join their ranks and put your knowledge of engineering principles and theory into practice while also learning principles of user experience, collaboration, prototype development, field testing, design adaptation, and the marketing considerations behind a project’s launch. Visit a local amusement park to observe the psychological and engineering principles that go into this field firsthand. Create and model entertainment attractions manually and with 3-D computer-aided design programs while completing both individual and group assignments—all in the name of fun!
Aerospace Engineering
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Explore aviation history, physics, and engineering concepts related to flight, both in the atmosphere and in space. Investigate rocket propulsion, spacecraft launch vehicles, and orbital mechanics, as well as atmospheric conditions, aerodynamics, propulsion systems, aircraft and spacecraft design, performance analysis, stability and control, and helicopter aerodynamics. Apply these principles in a laboratory setting and participate in field trips, guest lectures, workshops, and contests. This course is math- and physics-intensive.

Social Psychology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Social psychology is the formal study of the ways in which individuals affect one another. Examine how people’s attitudes, biases, and behaviors are influenced by other people and how these influences affect society as a whole. Explore the ways social psychologists use the scientific method to study people’s thoughts and behaviors in social situations and how ethical principles govern their research. Discuss and debate topics such as the self, prejudice, gender, race, conformity, obedience, aggression, group influence, and pro-social behavior. Drawing from examples in the media, law, politics, history, culture, and our own lives, examine how we are affected by social relationships and what a difference these relationships make in the way we live.

Historical Epidemiology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

From the Black Death to smallpox to HIV/AIDS and the Ebola virus, infectious diseases have profoundly affected human history and shaped the progress of societies. Evaluate, track, and analyze the impact of major epidemics throughout the ages. Study modern epidemiological techniques in a classroom setting. Learn the basic concepts and techniques behind recognizing and fighting pandemics, then apply this knowledge to historic epidemics as a foundation for developing modeling techniques that fight modern disease. Learn how the media and organizations like the World Health Organization and Center for Disease Control all play a role in fighting these major threats to our survival. Students who have taken Pathogens, Plagues and Patient Zero: Historical Epidemiology should not enroll in this course due to curricular overlap.

Choosing Sides: Debate and Persuasion
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Lawyers, politicians, and CEOs use sound arguments to transform public opinion, move people to their feet, or change the course of nations. Explore rhetorical devices, public speaking, and various forms of debate as you study historical debates and learn to construct your own compelling arguments. Practice your debating skills through written and oral performance in a variety of formats while learning to argue multiple sides of a single issue.

Consumer Psychology and Modern Marketing
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Why do people have completely different perceptions about nearly identical products? Why are they so attached to particular brands? How do they actually decide what they’re going to buy? Explore these questions and related topics like motivation, perception, consumer judgment, decision making, social influence, and special topics in recent consumer behavior research. Examine the impact of environmental influences (culture, politics, socioeconomic, lifestyle, and beliefs) and better understand the psychology of consumer decision making. Apply business and psychology knowledge to analyze current marketing problems.

Crime Scene Investigations
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Go beyond the simplified forensic science that has been popularized in the media; learn the real techniques forensic investigators use to gather and analyze evidence at a crime scene and in the lab. Plot and process a mock crime scene, and discover the science behind DNA analysis, fingerprinting, and facial reconstruction. Discuss the forensic evidence in famous solved and unsolved cases. Explore what it means to be an expert witness and learn about the laws associated with forensic studies.
**Design Challenges: Physics and Engineering**  
Term 2 (July 5–July 25)  

**TECHNOLOGY**  

**Engineering in the Virtual World**  
Term 1 (June 7–June 27)  

**SCIENCE**  

**Experiments in Science: Biology, Chemistry, and Physics**  
Term 2 (July 5–July 25)  

**SCIENCE**  

**Human Anatomy: The Structure and Function**  
Term 1 (June 7–June 27)  

**SCIENCE**  

**Rollins College Center**  

**Biological & Chemical Sciences**  
Term 2 (July 5–July 25)  

**SOCIAL SCIENCES**  

**Business Strategy: Beyond the Lemonade Stand**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

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**FINE ARTS**  

**Theater Arts**  
Term 1 (June 7–June 27)  

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For more information, visit our website at [TIP.DUKE.EDU/CALCULATOR](http://TIP.DUKE.EDU/CALCULATOR).
**Engineering Problem Solving**
Term 2 (July 5–July 25)

Center Math & Verbal (Grades: 7-8)

Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.

**Modern Medicine: Disease and Immunology**
Term 1 (June 7–June 27)

Center Math & Verbal (Grades: 7-8)

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

**Universal Innovation: Unlocking the Future**
Term 1 (June 7–June 27)

Center Math & Verbal (Grades: 7-8)

In a modern economy, mastering your field is not enough. Skills such as creativity, critical thinking, problem solving, resilience, and adaptability are all vital to continuous innovation. Combining technical knowledge with these creative skills has allowed such companies as Disney, Pixar, and Apple to flourish. Unlock your creative, innovative self through hands-on activities, discussions, and assignments that span the fields of mathematics, sciences, and the humanities. Learn about the neuroscience and brain theory behind creativity, its modern applications to entrepreneurship, and develop confidence in your own ideas.

**Algebra I**
Term 1 (June 7–June 27)

Academy Math (Grades: 7-8)

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course.

**Architecture**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Academy Math & Verbal (Grades: 7-8)

Explore the history and process of designing spaces and structures through a comprehensive examination of the rich world of architecture. Study drafting techniques and buildings of great historical significance and learn the language of architecture, including typology, plan, section, elevation, perspective, axonometric projection, scale, and program. Work collaboratively and independently on creating and building your own projects for various purposes. Explore the macro and micro scales of architecture as you juxtapose the idea that “no building is an island” with the alternative viewpoint that “architecture is in the details.”

**Choosing Sides: Debate and Persuasion**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Academy Verbal (Grades: 7-8)

Lawyers, politicians, and CEOs use sound arguments to transform public opinion, move people to their feet, or change the course of nations. Explore rhetorical devices, public speaking, and various forms of debate as you study historical debates and learn to construct your own compelling arguments. Practice your debating skills through written and oral performance in a variety of formats while learning to argue multiple sides of a single issue.

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Term 2 (July 5–July 25)

Academy Math & Verbal (Grades: 7-8)

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Design Challenges: Physics and Engineering
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Force, motion, and energy make up the foundation of physics. Explore these concepts by examining their roles in design and engineering. Learn how engineers determine the design and materials to use before building a structure. Utilize math, physics, and engineering to complete hands-on problem-solving and model-building activities. Explore advances in technology and their effect on design.

Experiments in Science: Biology, Chemistry, and Physics
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Investigate science through the process that has driven discovery for centuries: experimentation. Experiments are what allow scientists to connect their ideas and theories with the practical nature of the real world. Research and conduct experiments in a wide range of scientific fields, including molecular genetics, earth’s history, field ecology, alternative energies, physics, and more. Learn not only how to design and conduct informative experiments, but also how to interpret the results in a way that helps us understand more about the world in which we live.

Human Anatomy: The Structure and Function
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The human body is composed of complex, interrelated systems. Explore the systems of the human body and examine how they work together. Study basic anatomy and physiology as well as the chemical processes that allow body systems to function. Through laboratory activities, research, and debate, become familiar with the complex workings of the body and current issues in medical science. Students who have taken The Human Body should not enroll in this course due to curricular overlap.

Myths and Legends
Term 2 (July 5–July 25)

From Gilgamesh to the Avengers, the stories we tell are an integral part of every culture around the world. It is a practice that defines who we are and what our societies’ value. Two important kinds of ancient storytelling—creation myths and heroic tales - have proven especially important. Together, they make up a vital part of many cultures and traditions, as well as the central subject matter of this course. Acquire a cross-cultural understanding of the hero's journey and creation stories through reading, creative writing, drama, and research. Undergo your own hero’s journey as you relate your own life experiences to ancient archetypes and heroic templates.

Programming for the Web
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

There is an increasing demand for computer applications to be collaborative, dynamic, and tied to the user instead of a computer or mobile device. As applications move off the computer and into “the cloud,” web application programming is proving to be a critical part of the next computing revolution. Learn about the basic principles of dynamic web application programming and the unique considerations of programming for the web. By the end of the course, develop an original web application. This introductory course requires no prior programming experience.

Psychology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense and perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.
**HUMANITIES**

**The Personality of Style: Creative Writing**  
Term 1 (June 7–June 27)  

**ACADEMY VERBAL**  

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

**TRINITY UNIVERSITY**

**MATHEMATICS**

**Algebra II**  
Term 2 (July 5–July 25)  

**CENTER MATH**  

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course. Prerequisite: Algebra I or its equivalent. You must mail a school transcript, a copy of a grade report, or a letter from your school to document your successful completion of Algebra I or its equivalent.

**HUMANITIES**

**Beyond Baker Street: The Detective as Scientist in Literature and Film**  
Term 1 (June 7–June 27)  

**CENTER MATH & VERBAL**  

I never guess. It is a shocking habit—destructive to the logical faculty. So said Sherlock Holmes, the quintessential fictional detective. Since then, scores of literary sleuths have followed in his footsteps, relying on investigation, scientific analysis, and deduction to pierce the veil of mystery. Join this deductive tradition and learn to spot and interpret clues that elude the less observant. Dissect detective fiction and master current trends in crime scene investigation as you learn to interpret evidence and construct compelling arguments for your case. Conduct your own investigations and reach your own conclusions - elementary or otherwise.

**SCIENCES**

**Biological & Chemical Sciences**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**CENTER MATH**  

Science moves forward by generating theories consistent with laboratory observation. Interact directly with natural phenomena and data collected by others as you design investigations, manipulate equipment, and analyze results. Engage in scientific reasoning through laboratory exercises, class discussions and field trips, using the same biology and chemistry procedures scientists use in the field. With experiments in classical and modern genetics, bacteria sampling, anatomy, and chemical reaction, work collaboratively to analyze data, connect outcomes with theory, and draw conclusions from experiments. Explore current scientific research and discuss the societal implications of advancing scientific knowledge.

**SOCIAL SCIENCES**

**Business Strategy: Beyond the Lemonade Stand**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**CENTER MATH & VERBAL**  

Study and practice business planning, decision analysis, and management strategies as they relate to the development and implementation of successful companies. Examine the leadership principles and strategies of highly successful entrepreneurs and analyze how a trend becomes firmly entrenched in the marketplace. Identify the microeconomic principles behind decision-making with regard to resources, price, and marketing as you develop and present your own successful business plan.

**SCIENCES**

**Engineering Problem Solving**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)  

**CENTER MATH**  

Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.
MATHEMATICS

Mathematical Models, Analysis, and Applications
Term 1 (June 7–June 27)

CENTER MATH Grades 7-8

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

MATHEMATICS

Mathematical Problem Solving
Term 2 (July 5–July 25)

CENTER MATH Grades 7-8

Apply mathematical knowledge and methods in new ways to solve interesting and complicated problems and proofs. Prepare for high school mathematics and beyond by developing critical mathematical thinking. This course also covers common mathematics contest topics and encourages students to delve into more difficult problems using knowledge of these topics. Develop structural knowledge of mathematical proofs, the foundation for all higher-level mathematics. A diagnostic test given at the beginning of the term will ensure you are challenged with new mathematical concepts.

SOCIAL SCIENCES

Mock Trial
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH & VERBAL Grades 7-8

Examine fundamental topics of law, including the criminal and civil justice system, rules of evidence, eyewitness testimony, civil rights, and challenges to constitutional law. Apply the principles and practices of courtroom trials, experiment with the art of litigation as prosecutors and defenders, and consider challenges inherent in seeking justice. Read and understand precedent-setting decisions made by the Supreme Court and discuss the Court’s role in interpreting constitutional law. Practice using the case method while enhancing research and public speaking skills. Class may visit a courthouse. This course is writing intensive.

SCIENCES

Modern Medicine: Disease and Immunology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH Grades 7-8

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

SOCIAL SCIENCES

Psychology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH & VERBAL Grades 7-8

The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense and perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.

TECHNOLOGY

Robotics
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH Grades 7-8

Study the fields of both robotics and engineering to discover the intersection between theory and interactive, hands-on application. Explore the various fundamental topics behind the exciting field of robotics, participate in interactive lab exercises, then construct and program robots to illustrate the principles you’ve learned. Examine the role of robotics in today’s society and debate the advantages and disadvantages of using robots in various situations.
**Speculative Fiction: Reading and Writing About Alternate Worlds**

*Term 1 (June 7–June 27)*

**CENTER VERBAL**

What do J.R.R. Tolkien's Gollum, Shakespeare’s fairies, Stephen King's Cujo, Suzanne Collins' Katniss Everdeen, and Ray Bradbury's Martians all have in common? They each inhabit the highly imaginative world of speculative fiction - a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

**The Brain, Intelligence, and Creativity**

*Term 2 (July 5–July 25)*

**CENTER MATH & VERBAL**

Examine the intersection of neuroscience and psychology as you investigate the most complex organ in the human body. Through the framework of brain physiology and development, examine intelligence, creativity, and the way people experience the world. In addition to classroom activities, discussions, and debate, participate in hands-on laboratory work, brain imaging, and academic research.

**The Personality of Style: Creative Writing**

*Term 2 (July 5–July 25)*

**CENTER VERBAL**

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

**Universal Innovation: Unlocking the Future**

*Term 1 (June 7–June 27)*

**CENTER MATH & VERBAL**

In a modern economy, mastering your field is not enough. Skills such as creativity, critical thinking, problem solving, resilience, and adaptability are all vital to continuous innovation. Combining technical knowledge with these creative skills has allowed such companies as Disney, Pixar, and Apple to flourish. Unlock your creative, innovative self through hands-on activities, discussions, and assignments that span the fields of mathematics, sciences, and the humanities. Learn about the neuroscience and brain theory behind creativity, its modern applications to entrepreneurship, and develop confidence in your own ideas.

**American Foreign Policy**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY MATH & VERBAL**

How is American foreign policy determined, and who is responsible for shaping it? Explore the history of America's foreign policy and the current changes and conflicts that challenge it. Examine the theories and philosophy behind various approaches to international relations, and compare America's driving principles with those of other nations. Identify the role of international law and international organizations in the formation of policy, and strategize ways for the United States to identify and incorporate emerging global powers into a peaceful and comprehensive strategy.

**Criminal Law and Mock Trial**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY MATH & VERBAL**

Survey major topics in criminal law, the criminal justice system, and relevant constitutional law. Study the evolution of our justice system and review criminal trials that have transfixed our nation. Examine the ways in which the Supreme Court interprets constitutional law and debate issues ranging from the death penalty to the insanity plea. Discuss the Supreme Court's role in interpreting constitutional law. Class may visit a courthouse. Practice the use of case method, enhance research and public speaking skills as you argue a case, and simulate the procedures of a typical criminal trial.

**Cryptography, Codebreaking, and the Mathematics of Spying**

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**ACADEMY MATH**

Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.
Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.

**Infectious Diseases**
**Term 1 (June 7–June 27)**

From the Ebola virus to smallpox to anthrax, disease and the risk of epidemics has been a common topic in news reports and a growing concern for many people. How then do we understand the nature of these diseases, the way they spread, how they can be controlled, and the true risk they may pose? Take a multi-disciplinary approach to studying epidemics, pandemics, and the infectious agents that can cause them. Focus primarily on the viruses, bacteria, and other infectious agents, including how they evade the immune system and cause their respective diseases. Explore the fields of genetics, biochemistry, public health, epidemiology, pharmacology, history, and anthropology to better understand the full effect of these diseases. While not a lab-based class, activities will include discussions, literature review, research projects, and interactive, hands-on simulations, some of which may take place in a lab.

**Introduction to Veterinary Medicine**
**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

Modern veterinarians occupy a variety of careers ranging from typical clinical work on domestic or exotic animals to research and academic scholarship. Today’s veterinarians may work in private practice or for a university, an industry, or a government program. Explore the training, rigor, and career opportunities of veterinary medicine through the study of basic anatomy, physiology, histology, biochemistry, pharmacology, toxicology, animal health, public health, and veterinary medical ethics. Participate in laboratory work, veterinary school tours, research, procedures, and discussions. Apply knowledge gained to realistic clinical cases. This course is taught in conjunction with the Georgia School of Veterinary Medicine.

**Mathematical Models, Analysis, and Applications**
**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

**Modern Medicine: Disease and Immunology**
**Term 2 (July 5–July 25)**

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

**Philosophy of Knowledge**
**Term 2 (July 5–July 25)**

For centuries, philosophers have debated the relationship between the mind and the world. What is knowledge? What makes knowledge meaningful? How do we know what we know? Investigate epistemology, the branch of philosophy concerned with the nature, scope, and limitations of knowledge. Study the propositions of truth, beliefs, and knowledge - what are the differences? Delve into theories of knowledge acquisition such as empiricism, rationalism, and constructivism. Consider answers offered to these questions by philosophers throughout the ages, such as Aristotle, Plato, Descartes, Hegel, and Nietzsche.
Speculative Fiction: Reading and Writing About Alternate Worlds
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What do J.R.R. Tolkien’s Gollum, Shakespeare’s fairies, Stephen King’s Cujo, Suzanne Collins’ Katniss Everdeen, and Ray Bradbury’s Martians all have in common? They each inhabit the highly imaginative world of speculative fiction—a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

Sports Medicine
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Examine the diagnosis, treatment, and prevention of common sports injuries from an anatomical, physiological, and psychological perspective. Explore how advances in technology have affected the field of sports medicine, improving both prevention and treatment. Analyze the decision-making used in designing treatment plans for athletes and non-athletes. Learn common injury care techniques used by athletic trainers, and evaluate the implications of sports medicine beyond the training room.

The Brain, Intelligence, and Creativity
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Examine the intersection of neuroscience and psychology as you investigate the most complex organ in the human body. Through the framework of brain physiology and development, examine intelligence, creativity, and the way people experience the world. In addition to classroom activities, discussions, and debate, participate in hands-on laboratory work, brain imaging, and academic research.

The Pen as Weapon: The Art of Satire
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What do “The Daily Show with Trevor Noah,” Jonathan Swift’s “A Modest Proposal,” Kurt Vonnegut’s “Cat’s Cradle,” Gary Trudeau’s “Doonesbury,” and “The Simpsons” all have in common? In a word: satire. Join your witty peers in an exploration of satire, the art of exposing the foibles and pitfalls of society, institutions, and individuals through wit and comedy. Discuss satire’s role in social and political movements and examine the ways in which pointed humor, irony, and exaggeration can quickly lead to controversy and even violence depending upon political, religious, and geographic contexts. Analyze what constitutes well-written satire, and how authors successfully navigate an ever-changing cultural landscape to create humorous and constructive social criticism.

Archaeology and Anthropology: Stones and Bones
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Delve into a college-level introduction to anthropology, the holistic study of humans and human societies, both in the classroom and in the field. Explore anthropology’s traditional four fields: archaeology, cultural anthropology, linguistics, and biological (or physical) anthropology. Study some of the major discoveries and theoretical precepts of these disciplines, emphasizing the application of anthropological methods. Identify, plot, and excavate an archaeological site, classify and analyze the fossilized remains of human ancestors, and conduct ethnographic research.

Beyond Baker Street: The Detective as Scientist in Literature and Film
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

I never guess. It is a shocking habit—destructive to the logical faculty. So said Sherlock Holmes, the quintessential fictional detective. Since then, scores of literary sleuths have followed in his footsteps, relying on investigation, scientific analysis, and deduction to pierce the veil of mystery. Join this deductive tradition and learn to spot and interpret clues that elude the less observant. Dissect detective fiction and master current trends in crime scene investigation as you learn to interpret evidence and construct compelling arguments for your case. Conduct your own investigations and reach your own conclusions—elementary or otherwise.

Business Strategy: Beyond the Lemonade Stand
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Study and practice business planning, decision analysis, and management strategies as they relate to the development and implementation of successful companies. Examine the leadership principles and strategies of highly successful entrepreneurs and analyze how a trend becomes firmly entrenched in the marketplace. Identify the microeconomic principles behind decision-making with regard to resources, price, and marketing as you develop and present your own successful business plan.
### MATHEMATICS

**Cryptography, Codebreaking, and the Mathematics of Spying**
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH | GRADES 7-8**

Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.

### SCIENCES

**Modern Medicine: Disease and Immunology**
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH | GRADES 7-8**

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

### HUMANITIES

**Myths and Legends**
*Term 2 (July 5–July 25)*

**CENTER MATH & VERBAL | GRADES 7-8**

From Gilgamesh to the Avengers, the stories we tell are an integral part of every culture around the world. It is a practice that defines who we are and what our societies’ value. Two important kinds of ancient storytelling - creation myths and heroic tales - have proven especially important. Together, they make up a vital part of many cultures and traditions, as well as the central subject matter of this course. Acquire a cross-cultural understanding of the hero’s journey and creation stories through reading, creative writing, drama, and research. Undergo your own hero’s journey as you relate your own life experiences to ancient archetypes and heroic templates.

### SOCIAL SCIENCES

**Psychology**
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

**CENTER MATH & VERBAL | GRADES 7-8**

The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense and perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.
**TECHNOLOGY**

**Robotics**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Study the fields of both robotics and engineering to discover the intersection between theory and interactive, hands-on application. Explore the various fundamental topics behind the exciting field of robotics, participate in interactive lab exercises, then construct and program robots to illustrate the principles you’ve learned. Examine the role of robotics in today’s society and debate the advantages and disadvantages of using robots in various situations.

**HUMANITIES**

**Speculative Fiction: Reading and Writing About Alternate Worlds**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What do J.R.R. Tolkien's Gollum, Shakespeare’s fairies, Stephen King’s Cujo, Suzanne Collins’ Katniss Everdeen, and Ray Bradbury’s Martians all have in common? They each inhabit the highly imaginative world of speculative fiction - a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

**HUMANITIES**

**That’s Debatable**
Term 1 (June 7–June 27)

State your case! Learn the art of argument used in political debates, courtroom arguments and rebuttals, and effective business presentations. Analyze influential speeches and use research as a central tool in formulating persuasive speeches. Study the logic of argument and the use of words to create an elegant discourse. Learn to develop effective spoken and written arguments by making and supporting claims with evidence, and by paying attention to what constitutes evidence with a particular audience.

**HUMANITIES**

**The Personality of Style: Creative Writing**
Term 1 (June 7–June 27)

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.
COURSES LISTED BY GRADE

COURSES FOR SEVENTH AND EIGHTH GRADERS

SCIENCEs

Aerospace Engineering
Rollins College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH [GRADeS 7 8]

Explore aviation history, physics, and engineering concepts related to flight, both in the atmosphere and in space. Investigate rocket propulsion, spacecraft launch vehicles, and orbital mechanics, as well as atmospheric conditions, aerodynamics, propulsion systems, aircraft and spacecraft design, performance analysis, stability and control, and helicopter aerodynamics. Apply these principles in a laboratory setting and participate in field trips, guest lectures, workshops, and contests.

This course is math- and physics-intensive.

MATHEMATICS

Algebra I
Texas Christian University
Term 1 (June 7–June 27)

Appalachian State University
| Term 2 (July 5–July 25)

ACADEMY MATH [GRADeS 7 8]

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course.

Algebra II
Trinity University
Term 2 (July 5–July 25)

CENTER MATH & VERBAL [GRADeS 7 8]

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course. Prerequisite: Algebra I or its equivalent. You must mail a school transcript, a copy of a grade report, or a letter from your school to document your successful completion of Algebra I or its equivalent.

SOCIAL SCIENCES

Archaeology and Anthropology: Stones and Bones
Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH & VERBAL [GRADeS 7 8]

Delve into a college-level introduction to anthropology, the holistic study of humans and human societies, both in the classroom and in the field. Explore anthropology’s traditional four fields: archaeology, cultural anthropology, linguistics, and biological (or physical) anthropology. Study some of the major discoveries and theoretical precepts of these disciplines, emphasizing the application of anthropological methods. Identify, plot, and excavate an archaeological site, classify and analyze the fossilized remains of human ancestors, and conduct ethnographic research.

FINE ARTS

Architecture
Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH & VERBAL [GRADeS 7 8]

Explore the history and process of designing spaces and structures through a comprehensive examination of the rich world of architecture. Study drafting techniques and buildings of great historical significance and learn the language of architecture, including typology, plan, section, elevation, perspective, axonometric projection, scale, and program. Work collaboratively and independently on creating and building your own projects for various purposes. Explore the macro and micro scales of architecture as you juxtapose the idea that “no building is an island” with the alternative viewpoint that “architecture is in the details.”

Architecture
Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College
Term 2 (July 5–July 25)

ACADEMY MATH & VERBAL [GRADeS 7 8]

Explore the history and process of designing spaces and structures through a comprehensive examination of the rich world of architecture. Study drafting techniques and buildings of great historical significance and learn the language of architecture, including typology, plan, section, elevation, perspective, axonometric projection, scale, and program. Work collaboratively and independently on creating and building your own projects for various purposes. Explore the macro and micro scales of architecture as you juxtapose the idea that “no building is an island” with the alternative viewpoint that “architecture is in the details.”
**HUMANITIES**

**Beyond Baker Street: The Detective as Scientist in Literature and Film**

Davidson College  
Term 1 (June 7–June 27)

Trinity University  
Term 1 (June 7–June 27)

Wake Forest University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

I never guess. It is a shocking habit—destructive to the logical faculty. So said Sherlock Holmes, the quintessential fictional detective. Since then, scores of literary sleuths have followed in his footsteps, relying on investigation, scientific analysis, and deduction to pierce the veil of mystery. Join this deductive tradition and learn to spot and interpret clues that elude the less observant. Dissect detective fiction and master current trends in crime scene investigation as you learn to interpret evidence and construct compelling arguments for your case. Conduct your own investigations and reach your own conclusions - elementary or otherwise.

**SCIENCES**

**Biological & Chemical Sciences**

Davidson College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Trinity University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College  
Term 2 (July 5–July 25)

Science moves forward by generating theories consistent with laboratory observation. Interact directly with natural phenomena and data collected by others as you design investigations, manipulate equipment, and analyze results. Engage in scientific reasoning through laboratory exercises, class discussions and field trips, using the same biology and chemistry procedures scientists use in the field. With experiments in classical and modern genetics, bacteria sampling, anatomy, and chemical reaction, work collaboratively to analyze data, connect outcomes with theory, and draw conclusions from experiments. Explore current scientific research and discuss the societal implications of advancing scientific knowledge.

**SOCIAL SCIENCES**

**Business Strategy: Beyond the Lemonade Stand**

Rollins College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Trinity University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Study and practice business planning, decision analysis, and management strategies as they relate to the development and implementation of successful companies. Examine the leadership principles and strategies of highly successful entrepreneurs and analyze how a trend becomes firmly entrenched in the marketplace. Identify the microeconomic principles behind decision-making with regard to resources, price, and marketing as you develop and present your own successful business plan.

**HUMANITIES**

**Choosing Sides: Debate and Persuasion**

Appalachian State University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Lawyers, politicians, and CEOs use sound arguments to transform public opinion, move people to their feet, or change the course of nations. Explore rhetorical devices, public speaking, and various forms of debate as you study historical debates and learn to construct your own compelling arguments. Practice your debating skills through written and oral performance in a variety of formats while learning to argue multiple sides of a single issue.

**SOCIAL SCIENCES**

**Consumer Psychology and Modern Marketing**

Rollins College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University  
Term 2 (July 5–July 25)

Why do people have completely different perceptions about nearly identical products? Why are they so attached to particular brands? How do they actually decide what they’re going to buy? Explore these questions and related topics like motivation, perception, consumer judgment, decision making, social influence, and special topics in recent consumer behavior research. Examine the impact of environmental influences (culture, politics, socioeconomic, lifestyle, and beliefs) and better understand the psychology of consumer decision making. Apply business and psychology knowledge to analyze current marketing problems.
SCIENCE

Crime Scene Investigations
Appalachian State University
Term 1 (June 7–June 27)
Rollins College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Go beyond the simplified forensic science that has been popularized in the media; learn the real techniques forensic investigators use to gather and analyze evidence at a crime scene and in the lab. Plot and process a mock crime scene, and discover the science behind DNA analysis, fingerprinting, and facial reconstruction. Discuss the forensic evidence in famous solved and unsolved cases. Explore what it means to be an expert witness and learn about the laws associated with forensic studies.

MATH

Cryptography, Codebreaking, and the Mathematics of Spying
Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.

SCIENCE

Design Challenges: Physics and Engineering
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Rollins College
Term 2 (July 5–July 25)

Force, motion, and energy make up the foundation of physics. Explore these concepts by examining their roles in design and engineering. Learn how engineers determine the design and materials to use before building a structure. Utilize math, physics, and engineering to complete hands-on problem-solving and model-building activities. Explore advances in technology and their effect on design.

TECHNOLOGY

Engineering in the Virtual World
Rollins College
Term 1 (June 7–June 27)

Enter the world of 3-D modeling and build the software knowledge that has become arguably the most important skill in an engineer’s toolbox. Coupled with the recent surge in 3-D printing across industries, digital drafting skills have slashed the design-to-prototype-to-redesign loop from months to hours. Learn the skills and techniques that brought engineering into the digital age. Apply engineering principles to problems and quickly test the limits of your own design solution. Evaluate the trajectory of modeling and manufacturing in three dimensions.

SCIENCE

Engineering Problem Solving
Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Trinity University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Rollins College
Term 2 (July 5–July 25)

Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.

SCIENCE

Experiments in Science: Biology, Chemistry, and Physics
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Rollins College
Term 2 (July 5–July 25)

Investigate science through the process that has driven discovery for centuries: experimentation. Experiments are what allow scientists to connect their ideas and theories with the practical nature of the real world. Research and conduct experiments in a wide range of scientific fields, including molecular genetics, earth’s history, field ecology, alternative energies, physics, and more. Learn not only how to design and conduct informative experiments, but also how to interpret the results in a way that helps us understand more about the world in which we live.
HUMANITIES

Fantasy Worlds and Science Fiction
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Travel through the minds of writers who have shaped the genre of fantasy literature. Voyage into far and uncharted territories, (re)discover strange yet familiar friends, fight frightening foes, and return (hopefully) in one piece from our journey with a far greater understanding of home. Consider the structure of the fictive world and the significance of children with unusual gifts. Critically debate what these authors are asking us to see, believe, or interpret about their created worlds and about our own. Students who have taken From Wonderland to Hogwarts should not enroll in this course due to curricular overlap.

SCIENCES

Human Anatomy: The Structure and Function
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The human body is composed of complex, interrelated systems. Explore the systems of the human body and examine how they work together. Study basic anatomy and physiology as well as the chemical processes that allow body systems to function. Through laboratory activities, research, and debate, become familiar with the complex workings of the body and current issues in medical science. Students who have taken The Human Body should not enroll in this course due to curricular overlap.

MATHEMATICS

Math, Money, and You
Appalachian State University
Term 1 (June 7–June 27)

Delve into the world of math and money. Why do stores put items on sale and risk making less money? When is the right time to purchase a stock or bond, and what investments make sense? How can you become a millionaire by collecting pennies? Math is fundamental in making wise financial choices. Explore how math affects decisions regarding personal and business finance, and how marketing and innovation have changed in a more socially connected society. Examine direct and indirect variation and arithmetic and geometric growth. Develop a deeper understanding of the stock market, taxes, mortgages, interest-bearing accounts and the effects these have on our financial decisions on a daily basis. Discover behavioral finance strategies through investigative simulations and entrepreneurial projects.

MATHEMATICS

Mathematical Models, Analysis, and Applications
Trinity University
Term 1 (June 7–June 27)

Absorbed in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

SOCIAL SCIENCES

Mock Trial
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Examine fundamental topics of law, including the criminal and civil justice system, rules of evidence, eyewitness testimony, civil rights, and challenges to constitutional law. Apply the principles and practices of courtroom trials, experiment with the art of litigation as prosecutors and defenders, and consider challenges inherent in seeking justice. Read and understand precedent-setting decisions made by the Supreme Court and discuss the Court’s role in interpreting constitutional law. Practice using the case method while enhancing research and public speaking skills. Class may visit a courthouse. This course is writing intensive.
### SOCIAL SCIENCES

**Mock Trial**

- **Trinity University**
  Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
- **Wake Forest University**
  Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
- **Davidson College**
  Term 2 (July 5–July 25)

**Center Math & Verbal**

Examine fundamental topics of law, including the criminal and civil justice system, rules of evidence, eyewitness testimony, civil rights, and challenges to constitutional law. Apply the principles and practices of courtroom trials, experiment with the art of litigation as prosecutors and defenders, and consider challenges inherent in seeking justice. Read and understand precedent-setting decisions made by the Supreme Court and discuss the Court's role in interpreting constitutional law. Practice using the case method while enhancing research and public speaking skills. Class may visit a courthouse. This course is writing intensive.

### SCIENCES

**Modern Medicine: Disease and Immunology**

- **Davidson College**
  Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
- **Rollins College**
  Term 1 (June 7–June 27)
- **Trinity University**
  Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
- **Wake Forest University**
  Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Center Math**

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

### HUMANITIES

**Myths and Legends**

- **Davidson College**
  Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
- **Wake Forest University**
  Term 2 (July 5–July 25)

**Center Math & Verbal**

From Gilgamesh to the Avengers, the stories we tell are an integral part of every culture around the world. It is a practice that defines who we are and what our societies’ value. Two important kinds of ancient storytelling - creation myths and heroic tales - have proven especially important. Together, they make up a vital part of many cultures and traditions, as well as the central subject matter of this course. Acquire a cross-cultural understanding of the hero's journey and creation stories through reading, creative writing, drama, and research. Undergo your own hero’s journey as you relate your own life experiences to ancient archetypes and heroic templates.

### TECHNOLOGY

**Programming for the Web**

- **Appalachian State University**
  Term 1 (June 7–June 27)
- **Texas Christian University**
  Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Academy Math & Verbal**

There is an increasing demand for computer applications to be collaborative, dynamic, and tied to the user instead of a computer or mobile device. As applications move off the computer and into “the cloud,” web application programming is proving to be a critical part of the next computing revolution. Learn about the basic principles of dynamic web application programming and the unique considerations of programming for the web. By the end of the course, develop an original web application. This introductory course requires no prior programming experience.
The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense and perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.

Study the fields of both robotics and engineering to discover the intersection between theory and interactive, hands-on application. Explore the various fundamental topics behind the exciting field of robotics, participate in interactive lab exercises, then construct and program robots to illustrate the principles you’ve learned. Examine the role of robotics in today’s society and debate the advantages and disadvantages of using robots in various situations.
The Brain, Intelligence, and Creativity

Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Trinity University
Term 2 (July 5–July 25)

Center Math & Verbal
Grades 7 & 8

Examine the intersection of neuroscience and psychology as you investigate the most complex organ in the human body. Through the framework of brain physiology and development, examine intelligence, creativity, and the way people experience the world. In addition to classroom activities, discussions, and debate, participate in hands-on laboratory work, brain imaging, and academic research.

The Personality of Style: Creative Writing

Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University
Term 1 (June 7–June 27)

Academy Verbal
Grades 7 & 8

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

Understanding Genetics

Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Center Math
Grades 7 & 8

Genetic technology helps identify and cure diseases, solve crimes, and understand family heritage. Take a hands-on approach to studying deoxyribonucleic acid (DNA) and the way the information within it creates a roadmap for human development and risk of disease. Explore DNA structure, replication, mutations, and how scientists are applying evolving new technologies to treat diseases. Through lab experiments, simulations, discussions, and presentations, learn about the mechanics of DNA and why it is arguably the most important molecule to all life on Earth. Students who have taken DNA: Unlocking the Genetic Code should not enroll in this course due to curricular overlap.

Universal Innovation: Unlocking the Future

Rollins College
Term 1 (June 7–June 27)

Trinity University
Term 1 (June 7–June 27)

Davidson College
Term 2 (July 5–July 25)

Center Math & Verbal
Grades 7 & 8

In a modern economy, mastering your field is not enough. Skills such as creativity, critical thinking, problem solving, resilience, and adaptability are all vital to continuous innovation. Combining technical knowledge with these creative skills has allowed such companies as Disney, Pixar, and Apple to flourish. Unlock your creative, innovative self through hands-on activities, discussions, and assignments that span the fields of mathematics, sciences, and the humanities. Learn about the neuroscience and brain theory behind creativity, its modern applications to entrepreneurship, and develop confidence in your own ideas.
COURSES FOR EIGHTH THROUGH TENTH GRADERS*

*Please note that some courses in this section are for ninth and tenth graders only

SOCIAL SCIENCES

**American Foreign Policy**

The University of Georgia  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Georgia Institute of Technology**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Duke University West Campus, Center**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

How is American foreign policy determined, and who is responsible for shaping it? Explore the history of America’s foreign policy and the current changes and conflicts that challenge it. Examine the theories and philosophy behind various approaches to international relations, and compare America’s driving principles with those of other nations. Identify the role of international law and international organizations in the formation of policy, and strategize ways for the United States to identify and incorporate emerging global powers into a peaceful and comprehensive strategy.

**Anatomy, Physiology, and Medical Ethics**

Georgia Institute of Technology  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Learn the tools to view the human body as a complex and intricate structure. Explore the connection between structure (anatomy) and function (physiology), and analyze this relationship in cells, organs, and organisms as a whole. Examine the different functional systems such as digestive, circulatory, and skeletal and the various building blocks of the body. Participate in hands-on laboratory exercises to visualize and practice principles and ideas. Discuss established medical ethics, and debate circumstances, technologies, and advances that challenge and/or justify ethical standards.

TECHNOLOGY

**Applications, Algorithms, Computers: Modern Programming**

Rice University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

How does Google instantly find the relevant websites when you type a word into the search bar? How does a city know the most efficient route that their trash collectors should take? Explore the ways that computer scientists develop algorithms, processes, and programs that allow complicated problems to be addressed in meaningful ways. Go beyond simply understanding how to create computer programs and understand the mathematics that drive the adaptation of these programs to many fields of study, including medical sciences, aerospace, business and physical sciences. Some computer programming experience is beneficial, but not required.

**Architecture in the Urban Environment**

Rice University  
Term 1 (June 7–June 27)

**Georgia Institute of Technology**  
Term 2 (July 5–July 25)

Modern architecture represents the intersection of science, technology, engineering, and art. Discover the intricacies of architecture and how it defines the very nature of an urban landscape. Explore the impact of technology and environmental concerns and learn how to create significant and functional space within an urban environment. Explore the global history of metropolitan architecture and how it has evolved to embrace the challenges of designing buildings in these ever-changing settings. Apply drafting techniques to repurpose existing infrastructures, bring nature back to cities, or design dazzling new skyscrapers. Consider the environmental, social, cultural, and artistic impacts of your designs and learn to capture the public’s imagination through hands-on, project-based learning.

**Artificial Intelligence**

Georgia Institute of Technology  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

While science fiction has a long history of intelligent machines, we now live in a world in which these machines are reality - and you can learn the skills to work in this exciting field. We can hold conversations with Siri on our iPhones, watch computers defeat the world’s greatest chess players, and might soon ride around in driverless cars. These new technologies require artificial intelligence, which is the study and development of technology that can reason, deduct and, basically, act human. Learn the programming necessary to work in machine intelligence development, and explore the origins of AI as well as modern areas of research, including language processing, perception, motion, and manipulation.

**Astronautical Engineering**

Georgia Institute of Technology  
Term 1 (June 7–June 27)

Rice University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Explore the history and orbital mechanics of spaceflight from Newton and Kepler through Mercury, Gemini, Apollo, and the space shuttle programs. Learn the engineering behind spaceflight and spacecraft design. Study how objects move through space. Investigate various fields in science related to spaceflight, such as physics, aeronautics, and rocket propulsion. This course is math-intensive. Completion of Algebra I is preferred but not required. Note: Students who have taken TIP’s Spacecraft Mission Design should not enroll in this course due to overlap in content.
Beyond Science Fiction

Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What can the fantastical, technical worlds created in speculative fiction tell us about how we see our own? Speculative fiction’s use of magical elements intertwines real-world ethical dilemmas with challenges to how we think about human nature. Understand the history of this science fiction subgenre to see how it became one of the most exciting areas of contemporary literature. Critically read contemporary speculative fiction texts and use experimental storytelling techniques to create original writing. Give and receive peer feedback to enhance your own writing and critical reading ability. Students who have taken 7-8 Speculative Fiction: Reading and Writing About Alternate Worlds should not enroll in this course due to overlap in content.

Big Screen, Little Screen: Writing for the Camera

Duke University East Campus
Term 1 (June 7–June 27)

Many of us believe we have the next great movie idea that will take Hollywood by storm, do away with recycled story lines and tired plots, and return us to the golden era of cinema with films that are both challenging and entertaining. Delve into your imagination and explore the outside world to express your creative ideas. Develop a habit of taking notes on anything and everything, learn from and appreciate the writing of talented screenwriters, and fine-tune your knowledge of the written word. Apply these skills to the art of screenwriting - idea development, outlining, treatments, story, character, setting, dialogue, theme, and subplots - and explore new storylines to captivate your audience.

Biology of Cancer

Georgia Institute of Technology
Term 1 (June 7–June 27)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

In the United States, 1.5 million people are diagnosed with cancer each year. Given the prevalence of this disease, much attention and research has been focused on identifying causes and designing treatments to combat it. Examine the historical perspective on the biology of cancer and explore the molecular biology and genetic changes that occur during cancer, including the six hallmarks of cancer, as defined by Robert Weinberg. Discuss the role of genetics, oncogenes, and tumor suppressor genes in the development of the disease. Debate the ethics surrounding genetic testing and cancer treatment. Conduct research using current articles and primary literature on cancer at Duke’s Perkins Library and participate in laboratory activities to illustrate concepts.

Biomedical Engineering

Georgia Institute of Technology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Biomedical engineering applies fundamental science and math principles to improve human health beyond the limits of traditional medicine. Learn the engineering design process used by biomedical engineers and investigate how they create new diagnosis and treatment methods in tissue engineering, genetic engineering, drug delivery, and biomedical instrumentation. Explore principles such as density, hydraulics, and pneumatic systems, Newton’s laws of motion, genetics, and electromagnetism. Perform gel electrophoresis, gene expression analysis, circuitry design, and cell staining, techniques routinely used by biomedical engineers to advance the field of medicine.

Computer Skills for Today’s Scientists and Engineers

Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Physicists use supercomputers to analyze massive collisions in underground particle accelerators. Neuroscientists use artificial neural networks to probe the inner workings of the brain’s neurons. Engineers write computer code to control complicated circuitry and robotics. Scientists and engineers in a wide range of disciplines use modern computing technologies to make discoveries, design and develop new technologies and methods, analyze the results of experiments, and solve complex problems. Learn how to program using techniques scientists and engineers employ for data processing, laboratory equipment control, computation, and graphical analysis.

Criminal Law and Mock Trial

The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Survey major topics in criminal law, the criminal justice system, and relevant constitutional law. Study the evolution of our justice system and review criminal trials that have transfixed our nation. Examine the ways in which the Supreme Court interprets constitutional law and debate issues ranging from the death penalty to the insanity plea. Discuss the Supreme Court’s role in interpreting constitutional law. Class may visit a courthouse. Practice the use of case method, enhance research and public speaking skills as you argue a case, and simulate the procedures of a typical criminal trial.
This course is modeled after law school curriculum. Delve into black-letter law and litigation techniques used by trial lawyers through a series of workshop activities and the analysis of criminal procedure cases. Apply legal principles through a series of structured oral arguments and mock trials. Explore the nuances of arrest, indictment, and pretrial discovery from the perspective of both the prosecution and the defense. Work through hypothetical problems in groups, engage in Socratic-style dialogues, and participate in class-wide discussions. Write legal briefs, apply previous court decisions to current controversies, and develop and present a case. Class may visit a courthouse.

Crunching the Numbers: Global Finance
Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

In an age when global financial transactions involve millions, billions, and even trillions of dollars, the question arises: Where does all of the money go? Examine finance principles such as the time value of money and the risk-return relationship. Analyze financial instruments both from investors’ and companies’ perspectives. Assess the financial rewards and challenges faced by firms and individuals in a global economy. Consider the role of technology in global finance. Examine the various methods used for financial forecasting. Use “money math” to perform quantitative stock evaluations, data measurement, product costing, and corporate budgeting.

Cryptography, Codebreaking, and the Mathematics of Spying
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.

Dictators, Kings, and CEOs: The Evolution of Empire
Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Empires are perhaps the single most formative phenomenon in history. Survey influential empires through the ages and learn how they impacted the development of the world politically, culturally, socially, and militarily. Follow Augustus as his legions spread the glory of Rome across Europe. Ride with Genghis Khan as he shakes the foundations of the civilized world with terror. Examine the spread of American culture and beliefs across the globe, from McDonald’s to democracy. Engage in literary analysis and historical research at Duke University’s libraries.
**Electrical Engineering**

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH**

Electrical engineers are key creators behind many high-tech innovations such as global positioning systems that can pinpoint a car’s location, giant generators that can power entire cities, and new designs for an airplane’s electrical system. Explore the physical basis and mathematical models of electrical components and circuits. Work in teams to design and build electronic circuits and investigate voltage, resistance, amperes, watts, and circuit theorems. Analyze linear circuits, semiconductors, frequency representation, and sequential logic. Determine applications for electrical engineering concepts in other scientific fields and everyday life. *This course is open to current ninth and tenth graders only.*

**Environmental Chemistry**

Duke University West Campus, Center
Term 1 (June 7–June 27)

**CENTER MATH (Grades 8 9 10)**

Working at the intersection of chemistry and toxicology, explore the causes and effects of major classes of pollutant chemicals. Determine how these pollutants enter the air, earth, and water, and how we detect them. Learn about laboratory testing used to identify toxic chemicals and apply those techniques to samples you collect from local ecosystems. Identify ways that toxic chemicals are absorbed and processed by animals, humans, and plants. Discuss and analyze the potential effects of toxins and toxicants on individual organisms, populations, and ecosystems, such as the lead contamination of drinking water in Flint, Michigan. Students who have taken Environmental Toxicology should not enroll in this course due to curricular overlap.

**Engineering for Fun**

Georgia Institute of Technology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rice University
Term 2 (July 5–July 25)

**CENTER MATH (Grades 8 9 10)**

Behind roller coasters, water parks, miniature golf courses, and theme parks are engineers who understand physical forces, the fundamentals of design, and the psychology that goes into the business of fun. Join their ranks and put your knowledge of engineering principles and theory into practice while also learning principles of user experience, collaboration, prototype development, field testing, design adaptation, and the marketing considerations behind a project’s launch. Visit a local amusement park to observe the psychological and engineering principles that go into this field firsthand. Create and model entertainment attractions manually and with 3-D computer-aided design programs while completing both individual and group assignments—all in the name of fun!

**Engineering Problem Solving**

The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH (Grades 8 9 10)**

Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.
Epidemiology should not enroll in this course due to curricular overlap. Students who have taken Pathogens, Plagues and Patient Zero: Historical for Disease Control all play a role in fighting these major threats to our survival. The media and organizations like the World Health Organization and Center for developing modeling techniques that fight modern disease. Learn how pandemics, then apply this knowledge to historic epidemics as a foundation. Learn the basic concepts and techniques behind recognizing and fighting the ages. Study modern epidemiological techniques in a classroom setting. Societies. Evaluate, track, and analyze the impact of major epidemics throughout diseases have profoundly affected human history and shaped the progress of societies. Evaluate, track, and analyze the impact of major epidemics throughout the ages. Study modern epidemiological techniques in a classroom setting. Learn the basic concepts and techniques behind recognizing and fighting pandemics, then apply this knowledge to historic epidemics as a foundation for developing modeling techniques that fight modern disease. Learn how the media and organizations like the World Health Organization and Center for Disease Control all play a role in fighting these major threats to our survival. Students who have taken Pathogens, Plagues and Patient Zero: Historical Epidemiology should not enroll in this course due to curricular overlap.

**SCIENCE**

**Infectious Diseases**

The University of Georgia

Term 1 (June 7–June 27)

From the Ebola virus to smallpox to anthrax, disease and the risk of epidemics has been a common topic in news reports and a growing concern for many people. How then do we understand the nature of these diseases, the way they spread, how they can be controlled, and the true risk they may pose? Take a multi-disciplinary approach to studying epidemics, pandemics, and the infectious agents that can cause them. Focus primarily on the viruses, bacteria, and other infectious agents, including how they evade the immune system and cause their respective diseases. Explore the fields of genetics, biochemistry, public health, epidemiology, pharmacology, history, and anthropology to better understand the full effect of these diseases. While not a lab-based class, activities will include discussions, literature review, research projects, and interactive, hands-on simulations, some of which may take place in a lab.

**SOCIAL SCIENCES**

**International Relations: Global Conflicts**

Duke University East Campus

Term 1 (June 7–June 27)

Georgia Institute of Technology

Term 2 (July 5–July 25)

Why do people go to war, engage in trade, or defend human rights? How do these issues affect the individual, and what difference can one person make? Analyze and debate these theoretical, practical, and ethical questions as they relate to terrorism, the media, Marxism, globalization, weapons of mass destruction, ethnic conflict, nationalism, sovereignty, genocide, and international law. Study current and historical conflicts to analyze and predict outcomes and their ramifications.

**ACADEMY MATH**

**Infectious Diseases**

The University of Georgia

Term 1 (June 7–June 27)

From the Ebola virus to smallpox to anthrax, disease and the risk of epidemics has been a common topic in news reports and a growing concern for many people. How then do we understand the nature of these diseases, the way they spread, how they can be controlled, and the true risk they may pose? Take a multi-disciplinary approach to studying epidemics, pandemics, and the infectious agents that can cause them. Focus primarily on the viruses, bacteria, and other infectious agents, including how they evade the immune system and cause their respective diseases. Explore the fields of genetics, biochemistry, public health, epidemiology, pharmacology, history, and anthropology to better understand the full effect of these diseases. While not a lab-based class, activities will include discussions, literature review, research projects, and interactive, hands-on simulations, some of which may take place in a lab.

**SOCIAL SCIENCES**

**International Relations: Global Conflicts**

Duke University East Campus

Term 1 (June 7–June 27)

Georgia Institute of Technology

Term 2 (July 5–July 25)

Why do people go to war, engage in trade, or defend human rights? How do these issues affect the individual, and what difference can one person make? Analyze and debate these theoretical, practical, and ethical questions as they relate to terrorism, the media, Marxism, globalization, weapons of mass destruction, ethnic conflict, nationalism, sovereignty, genocide, and international law. Study current and historical conflicts to analyze and predict outcomes and their ramifications.

**ACADEMY MATH**

**Infectious Diseases**

The University of Georgia

Term 1 (June 7–June 27)

From the Ebola virus to smallpox to anthrax, disease and the risk of epidemics has been a common topic in news reports and a growing concern for many people. How then do we understand the nature of these diseases, the way they spread, how they can be controlled, and the true risk they may pose? Take a multi-disciplinary approach to studying epidemics, pandemics, and the infectious agents that can cause them. Focus primarily on the viruses, bacteria, and other infectious agents, including how they evade the immune system and cause their respective diseases. Explore the fields of genetics, biochemistry, public health, epidemiology, pharmacology, history, and anthropology to better understand the full effect of these diseases. While not a lab-based class, activities will include discussions, literature review, research projects, and interactive, hands-on simulations, some of which may take place in a lab.

**SOCIAL SCIENCES**

**International Relations: Global Conflicts**

Duke University East Campus

Term 1 (June 7–June 27)

Georgia Institute of Technology

Term 2 (July 5–July 25)

Why do people go to war, engage in trade, or defend human rights? How do these issues affect the individual, and what difference can one person make? Analyze and debate these theoretical, practical, and ethical questions as they relate to terrorism, the media, Marxism, globalization, weapons of mass destruction, ethnic conflict, nationalism, sovereignty, genocide, and international law. Study current and historical conflicts to analyze and predict outcomes and their ramifications.

**ACADEMY MATH**

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**SOCIAL SCIENCES**

**International Relations: Global Conflicts**

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Complete an intensive course equivalent to an introductory or principles level college course in macroeconomics. Develop a basic understanding of the theory and practice of macroeconomics, including an understanding of the determinants of the levels of income, output, and employment. Analyze the determinants of consumption, investment, government spending, and net exports, and study the model of international trade that determines exchange rates and the balance of trade. Discuss the economic impact of the federal deficit and debt and the effectiveness of discretionary fiscal and monetary policies under a number of models, and analyze macroeconomic debates to effectively participate in the political process.

Mathematical Models, Analysis, and Applications
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

Microeconomics
Duke University East Campus
Term 1 (June 7–June 27)

Complete an intensive course, roughly equivalent to an introductory or principles level college course in microeconomic theory. Use microeconomics as a model to understand and analyze human behavior. Apply an analytical approach to the study of how individuals and societies deal with the fundamental problem of scarce resources. Understand how these principles affect individuals trying to maximize their utility, businesses trying to maximize their profits, and societies trying to manage resources. Analyze controversial issues such as minimum wage laws, farm subsidies, rent controls, protectionism, pollution, welfare programs, and the tradeoff occurring between equity and efficiency that result from various microeconomic policies.
# Mathematics

**Mobius Strips, Klein Bottles, and Fractals: The Mathematics of Distortion**

*Georgia Institute of Technology*

**Term 1 (June 7–June 27)**

**Duke University East Campus**

**Term 2 (July 5–July 25)**

Explore topology, the mathematical study of twisting, bending, and stretching objects. Learn how industrial design, engineering, and theoretical physics employ applications of Möbius strips. Discover mathematical distortion techniques that work on highly complex systems, such as roving sensor networks for security systems. Examine the continuity between shapes and the ways in which seemingly different objects are topologically the same. Study fractals, knots, and manifolds using concepts of points, lines and curves.

# Sciences

**Modern Medicine: Disease and Immunology**

*Georgia Institute of Technology*

**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

**The University of Georgia**

**Term 2 (July 5–July 25)**

Disease can change the course of a single life or the course of human history. Today's medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

# Sciences

**Neuropsychology**

*Rice University*

**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

**Duke University West Campus, Academy**

**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

Why are roller coasters thrilling for some and terrifying for others? How does brain development affect perception, judgment, and decision-making? Understanding the intersection and interaction of the human brain and behavior is at the heart of neuropsychology. Study the physiology of the brain and cognitive functions that affect behavior. Investigate how the brain works by also considering neuroscientific, philosophical, neurological, and psychiatric perspectives.

# Sciences

**Neuroscience**

*Georgia Institute of Technology*

**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

**Duke University West Campus, Center**

**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

Humans everywhere are turning to the brain for answers to questions that have plagued our species for centuries: Why do people do evil things? What is love? Why do we dream? How do we remember? What is consciousness? Address these questions from the perspectives of physiology, pharmacology, pathology, psychology, and philosophy. After becoming acquainted with the methods and tools that researchers employ in their studies, explore puzzling questions by examining evolving theories and contemporary methodologies in science and philosophy. Examine the basic structural and organizational aspects of neuroanatomy and physiology, study current research regarding sleeping/dreaming, consciousness, behavioral disorders, neuropathology, memory, and artificial intelligence.

# Sciences

**Oceanography**

*Duke University Marine Laboratory*

**Marine Lab (June 14–July 4)**

**Duke University West Campus, Academy**

**Term 1 (June 7–June 27) | Term 2 (July 5–July 25)**

Delve into the fundamental components of studying the global oceans. Investigate the physical, chemical, geological, and biological processes that govern microscopic to macroscopic patterns in the ocean system. Explore general issues on the nature of science, the role of scientific rationalism in modern society, and the development of practical problem-solving skills. Examine oceanography's relationship to social and political issues. Study biotic and abiotic components of the global oceans through engaged discussion, laboratory experiments, and field research. Design and complete a research project to present to your peers.
Pharmacology

Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH | GRADES 8 9 10

How do we discover new drugs? How do pharmacologists balance the therapeutic value of a drug with its negative side effects? How do drugs treat pain, cure disease, or alleviate symptoms? How do our genes play a role in the success or failure of drug treatment? Who bears responsibility for the development of life-saving drugs, and what should they cost? Examine the field of pharmacology and its relationship to health, disease, and society. Study how the chemical properties of drugs interact with biological systems and how pharmaceuticals affect our health and behavior. Participate in hands-on laboratory exercises to visualize and practice principles and ideas.

Philosophy of Time

Duke University East Campus
Term 2 (July 5–July 25)

CENTER VERBAL | GRADES 8 9 10

What is time? How have different cultures throughout history understood and represented it? Does it unfold in a straight line, or is it best represented by a circle of eternal recurrence? Examine how a wide range of thinkers have dealt with the issue of time and temporality. Discuss the phenomenology of Martin Heidegger and the space-time theory of Albert Einstein alongside Native American mythology, Romantic poetry, Buddhist philosophy, and Christian theology. Analyze how television and movies create new visions of the past when depicting historical periods. Consider the theories of dimensions of time to tackle a proposition that has obsessed modern culture: time travel.

Philosophy of Knowledge

Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY VERBAL | GRADES 8 9 10

For centuries, philosophers have debated the relationship between the mind and the world. What is knowledge? What makes knowledge meaningful? How do we know what we know? Investigate epistemology, the branch of philosophy concerned with the nature, scope, and limitations of knowledge. Study the propositions of truth, beliefs, and knowledge - what are the differences? Delve into theories of knowledge acquisition such as empiricism, rationalism, and constructivism. Consider answers offered to these questions by philosophers throughout the ages, such as Aristotle, Plato, Descartes, Hegel, and Nietzsche.

Social Sciences

Psychology of Decision Making: Behavioral Economics

Duke University East Campus
Term 1 (June 7–June 27)

Georgia Institute of Technology
Term 1 (June 7–June 27)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH & VERBAL | GRADES 8 9 10

Integrate insights from cognitive psychology, social psychology, and behavioral economics to understand why people make the choices they make. Examine how cognitive processes that help people make sense of complex information can also logically lead them astray in decision making. Investigate how emotion, motivation, and information-processing shortcuts interact with careful, rational weighing of information. As you study the surprising ways that individuals actually make decisions, gain insights about decision making in fields such as healthcare, finance, education, and government.
Revolution and Terror: Controversial Politics

Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Violence and fear have always been instruments of politics. Rulers and rebels alike have resorted to force (or the threat of it) to try to advance their ends. Since the late eighteenth century, revolutionaries have self-consciously turned to violence and fear as instruments - not just for advancing their own factions, but for refashioning the political system itself. Explore the historical development of modern revolutionaries and terrorist groups ranging from Rousseau to Stalin to Al Qaeda to modern day pirates off the coast of Somalia. Analyze the ways in which society attempts to address such violence.

Social Psychology

Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Social psychology is the formal study of the ways in which individuals affect one another. Examine how people's attitudes, biases, and behaviors are influenced by other people and how these influences affect society as a whole. Explore the ways social psychologists use the scientific method to study people's thoughts and behaviors in social situations and how ethical principles govern their research. Discuss and debate topics such as the self, prejudice, gender, race, conformity, obedience, aggression, group influence, and pro-social behavior. Drawing from examples in the media, law, politics, history, culture, and our own lives, examine how we are affected by social relationships and what a difference these relationships make in the way we live.

Speculative Fiction: Reading and Writing About Alternate Worlds

The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What do J.R.R. Tolkien's Gollum, Shakespeare's fairies, Stephen King's Cujo, Suzanne Collins' Katniss Everdeen, and Ray Bradbury's Martians all have in common? They each inhabit the highly imaginative world of speculative fiction—a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

Sports Medicine

The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Examine the diagnosis, treatment, and prevention of common sports injuries from an anatomical, physiological, and psychological perspective. Explore how advances in technology have affected the field of sports medicine, improving both prevention and treatment. Analyze the decision-making used in designing treatment plans for athletes and non-athletes. Learn common injury care techniques used by athletic trainers, and evaluate the implications of sports medicine beyond the training room.
Examining the interaction between neuroscience and psychology as you explore the complex organ in the human body. Through the framework of brain physiology and development, examine intelligence, creativity, and how people experience the world. In addition to classroom activities, discussions, and debate, participate in hands-on laboratory work, brain imaging, and academic research.

**The Ethics of Artificial Intelligence**
**Duke University West Campus, Center**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What happens when you create an intelligent, autonomous robot and then limit its freedom? The field of artificial intelligence already permeates more aspects of our daily lives than we realize. It drives our cars, flies our planes, manages our money, and protects our safety. Its approach to more human-like thoughts and actions raises predictable complications. Are they to be considered tools or lifeforms? How can we ensure that these machines will respect our ethical and moral principles? Debate the laws by which these thinking machines should abide. Analyze and argue philosophical approaches to AI's integration into society, and build the ethical foundation and psychological framework necessary to navigate this emerging landscape.

**The Haunting: Exposing the Mind's Fear of Myth & Monster**
**Duke University West Campus, Academy**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Through the use of literature and film clips, investigate the psychological roots of ghosts, vampires, and other unexplainable paranormal phenomena. Pair the stories of hauntings that grow from seemingly innocent folk and fairy tales with the works of psychologists such as Jung and Freud to study the deep-seated fears and specters that lie in wait among the shadowy waking and non-waking moments of the human psyche. Then move from analyzing individual human minds to studying how simple ghost stories and urban myths rise to the level of global fear. Delve into why and how myths are created, as well as the psychology involved in their lasting appeal.

**The Pen as Weapon: The Art of Satire**
**Duke University West Campus, Academy**
Term 1 (June 7–June 27)

What do "The Daily Show with Trevor Noah," Jonathan Swift’s "A Modest Proposal," Kurt Vonnegut’s "Cat’s Cradle," Gary Trudeau’s "Doonesbury," and "The Simpsons" all have in common? In a word: satire. Join your witty peers in an exploration of satire, the art of exposing the foibles and pitfalls of society, institutions, and individuals through wit and comedy. Discuss satire's role in social and political movements and examine the ways in which pointed humor, irony, and exaggeration can quickly lead to controversy and even violence depending upon political, religious, and geographic contexts. Analyze what constitutes well-written satire, and how authors successfully navigate an ever-changing cultural landscape to create humorous and constructive social criticism.

**The Science and Finesse of Entrepreneurship**
**Duke University East Campus**
Term 1 (June 7–June 27)

As today’s technology sector has proven time and again, entrepreneurship is both a science and an art. But how do you move from inspiration to investor? How do you turn a start-up into a company that lasts? Study the success stories of Silicon Valley and learn how to differentiate ideas from opportunities. Examine the fundamentals of e-entrepreneurship as a template for success in other key sectors like information, energy, medical and consumer technologies. Develop the critical thinking skills and processes vital to business success. Learn how to assemble a team and the resources you need. Through research, collaboration, and simulations, develop a plan for a company built on positive impact, sustainable performance, and longevity. Students who have taken Where Great Minds and Big Money Meet should not enroll in this course due to curricular overlap.

**Words that Matter: Rhetoric and Persuasion**
**Duke University East Campus**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Delve into an advanced exploration of the power of the spoken word. Examine influential speeches and debates, study the logic and structure of effective arguments, and research the reasoning behind deliberate word choices. Create your own persuasive style, hone your skills of analysis and focus your writing to articulate your message. Refine your speaking skills and debate delivery to illustrate points of divergence instead of mere disagreement. After practicing these skills, apply them by preparing and presenting in-class debates.
COURSES LISTED BY QUALIFICATION LEVEL

ACADEMY LEVEL COURSES

SCIENCES

**Aerospace Engineering**

Rollins College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH**  
Grades 7 8

Explore aviation history, physics, and engineering concepts related to flight, both in the atmosphere and in space. Investigate rocket propulsion, spacecraft launch vehicles, and orbital mechanics, as well as atmospheric conditions, aerodynamics, propulsion systems, aircraft and spacecraft design, performance analysis, stability and control, and helicopter aerodynamics. Apply these principles in a laboratory setting and participate in field trips, guest lectures, workshops, and contests. This course is math- and physics-intensive.

MATHEMATICS

**Algebra I**

Texas Christian University  
Term 1 (June 7–June 27)

Appalachian State University  
Term 2 (July 5–July 25)

**ACADEMY MATH**  
Grades 7 8

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course.

SOCIAL SCIENCES

**American Foreign Policy**

The University of Georgia  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH & VERBAL**  
Grades 8 9 10

How is American foreign policy determined, and who is responsible for shaping it? Explore the history of America’s foreign policy and the current changes and conflicts that challenge it. Examine the theories and philosophy behind various approaches to international relations, and compare America’s driving principles with those of other nations. Identify the role of international law and international organizations in the formation of policy, and strategize ways for the United States to identify and incorporate emerging global powers into a peaceful and comprehensive strategy.

FINE ARTS

**Architecture**

Texas Christian University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College  
Term 2 (July 5–July 25)

**ACADEMY MATH & VERBAL**  
Grades 7 8

Explore the history and process of designing spaces and structures through a comprehensive examination of the rich world of architecture. Study drafting techniques and buildings of great historical significance and learn the language of architecture, including typology, plan, section, elevation, perspective, axonometric projection, scale, and program. Work collaboratively and independently on creating and building your own projects for various purposes. Explore the macro and micro scales of architecture as you juxtapose the idea that “no building is an island” with the alternative viewpoint that “architecture is in the details.”

HUMANITIES

**Choosing Sides: Debate and Persuasion**

Appalachian State University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY VERBAL**  
Grades 7 8

Lawyers, politicians, and CEOs use sound arguments to transform public opinion, move people to their feet, or change the course of nations. Explore rhetorical devices, public speaking, and various forms of debate as you study historical debates and learn to construct your own compelling arguments. Practice your debating skills through written and oral performance in a variety of formats while learning to argue multiple sides of a single issue.

SOCIAL SCIENCES

**Consumer Psychology and Modern Marketing**

Rollins College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University  
Term 2 (July 5–July 25)

**ACADEMY MATH & VERBAL**  
Grades 7 8

Why do people have completely different perceptions about nearly identical products? Why are they so attached to particular brands? How do they actually decide what they’re going to buy? Explore these questions and related topics like motivation, perception, consumer judgment, decision making, social influence, and special topics in recent consumer behavior research. Examine the impact of environmental influences (culture, politics, socioeconomics, lifestyle, and beliefs) and better understand the psychology of consumer decision making. Apply business and psychology knowledge to analyze current marketing problems.
SCIENCES

Crime Scene Investigations
Appalachian State University
Term 1 (June 7–June 27)
Rollins College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Go beyond the simplified forensic science that has been popularized in the media; learn the real techniques forensic investigators use to gather and analyze evidence at a crime scene and in the lab. Plot and process a mock crime scene, and discover the science behind DNA analysis, fingerprinting, and facial reconstruction. Discuss the forensic evidence in famous solved and unsolved cases. Explore what it means to be an expert witness and learn about the laws associated with forensic studies.

SOCIAL SCIENCES

Criminal Law and Mock Trial
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Survey major topics in criminal law, the criminal justice system, and relevant constitutional law. Study the evolution of our justice system and review criminal trials that have transfixed our nation. Examine the ways in which the Supreme Court interprets constitutional law and debate issues ranging from the death penalty to the insanity plea. Discuss the Supreme Court’s role in interpreting constitutional law. Class may visit a courthouse. Practice the use of case method, enhance research and public speaking skills as you argue a case, and simulate the procedures of a typical criminal trial.

MATHEMATICS

Cryptography, Codebreaking, and the Mathematics of Spying
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.

SCIENCES

Design Challenges: Physics and Engineering
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Rollins College
Term 2 (July 5–July 25)

Force, motion, and energy make up the foundation of physics. Explore these concepts by examining their roles in design and engineering. Learn how engineers determine the design and materials to use before building a structure. Utilize math, physics, and engineering to complete hands-on problem-solving and model-building activities. Explore advances in technology and their effect on design.

TECHNOLOGY

Engineering in the Virtual World
Rollins College
Term 1 (June 7–June 27)

Enter the world of 3-D modeling and build the software knowledge that has become arguably the most important skill in an engineer’s toolbox. Coupled with the recent surge in 3-D printing across industries, digital drafting skills have slashed the design-to-prototype-to-redesign loop from months to hours. Learn the skills and techniques that brought engineering into the digital age. Apply engineering principles to problems and quickly test the limits of your own design solution. Evaluate the trajectory of modeling and manufacturing in three dimensions.

SCIENCES

Engineering Problem Solving
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.
**HUMANITIES**

### Fantasy Worlds and Science Fiction

**Appalachian State University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Rollins College**
Term 2 (July 5–July 25)

**ACADEMY VERBAL** Grades 7 8

Travel through the minds of writers who have shaped the genre of fantasy literature. Voyage into far and uncharted territories, (re)discover strange yet familiar friends, fight frightening foes, and return (hopefully) in one piece from our journey with a far greater understanding of home. Consider the structure of the fictive world and the significance of children with unusual gifts. Critically debate what these authors are asking us to see, believe, or interpret about their created worlds and about our own. Students who have taken From Wonderland to Hogwarts should not enroll in this course due to curricular overlap.

**SCIENCES**

### Human Anatomy: The Structure and Function

**Appalachian State University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Rollins College**
Term 1 (June 7–June 27)

**Texas Christian University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**ACADEMY MATH** Grades 7 8

The human body is composed of complex, interrelated systems. Explore the systems of the human body and examine how they work together. Study basic anatomy and physiology as well as the chemical processes that allow body systems to function. Through laboratory activities, research, and debate, become familiar with the complex workings of the body and current issues in medical science. Students who have taken The Human Body should not enroll in this course due to curricular overlap.

**SCIENCES**

### Infectious Diseases

**The University of Georgia**
Term 1 (June 7–June 27)

**ACADEMY MATH** Grades 8 9 10

From the Ebola virus to smallpox to anthrax, disease and the risk of epidemics has been a common topic in news reports and a growing concern for many people. How then do we understand the nature of these diseases, the way they spread, how they can be controlled, and the true risk they may pose? Take a multi-disciplinary approach to studying epidemics, pandemics, and the infectious agents that can cause them. Focus primarily on the viruses, bacteria, and other infectious agents, including how they evade the immune system and cause their respective diseases. Explore the fields of genetics, biochemistry, public health, epidemiology, pharmacology, history, and anthropology to better understand the full effect of these diseases. While not a lab-based class, activities will include discussions, literature review, research projects, and interactive, hands-on simulations, some of which may take place in a lab.

**SCIENCES**

### Marine Biology: Estuaries and Marshes

**Duke University Marine Laboratory**
marine Lab (June 14–July 4)

**CENTER MATH & VERBAL** Grades 8 9 10

**ACADEMY MATH & VERBAL** Grades 8 9 10

Survey and explore the structure, function, ecology, and development of marine life found in estuarine and coastal habitats. The unusual nature of these habitats that exist between the land and the open ocean create unique relationships among the plants and animals that live there. Use classroom presentations, laboratory experiments, and field trips to gain hands-on experience with the marine life that exists in coastal habitats.
**Marine Biology: Near Shore and Oceans**

*Duke University Marine Laboratory*  
*Marine Lab (June 14–July 4)*  

Perform an in-depth examination of the biology of marine life in ocean and inlet habitats. The Duke University Marine Lab provides access to these large bodies of water and the organisms that inhabit them. Examine how life has adapted to the features of these ocean habitats and how that adaptation influences the relationships within the ecological communities. Along with work in the classroom, engage in hands-on fieldwork through dredging, trawling, and towing trips on Duke University’s research vessels at various marine and geological sites.

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**Math, Money, and You**

*Appalachian State University*  
*Term 1 (June 7–June 27)*  

**ACADEMY MATH**  
*Grades 8, 9, 10*  

Delve into the world of math and money. Why do stores put items on sale and risk making less money? When is the right time to purchase a stock or bond, and what investments make sense? How can you become a millionaire by collecting pennies? Math is fundamental in making wise financial choices. Explore how math affects decisions regarding personal and business finance, and how marketing and innovation have changed in a more socially connected society. Examine direct and indirect variation and arithmetic and geometric growth. Develop a deeper understanding of the stock market, taxes, mortgages, interest-bearing accounts and the effects these have on our financial decisions on a daily basis. Discover behavioral finance strategies through investigative simulations and entrepreneurial projects.

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**Mathematical Models, Analysis, and Applications**

*The University of Georgia*  
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*  

**ACADEMY MATH**  
*Grades 8, 9, 10*  

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

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**Mock Trial**

*Appalachian State University*  
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*  

**ACADEMY MATH & VERBAL**  
*Grades 7, 8*  

Examine fundamental topics of law, including the criminal and civil justice system, rules of evidence, eyewitness testimony, civil rights, and challenges to constitutional law. Apply the principles and practices of courtroom trials, experiment with the art of litigation as prosecutors and defenders, and consider challenges inherent in seeking justice. Read and understand precedent-setting decisions made by the Supreme Court and discuss the Court’s role in interpreting constitutional law. Practice using the case method while enhancing research and public speaking skills. Class may visit a courthouse. This course is writing intensive.

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**Modern Medicine: Disease and Immunology**

*Duke University West Campus, Academy*  
*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*  

**ACADEMY MATH**  
*Grades 8, 9, 10*  

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.

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**Myths and Legends**

*Appalachian State University*  
*Term 2 (July 5–July 25)*  

**ACADEMY MATH & VERBAL**  
*Grades 7, 8*  

From Gilgamesh to the Avengers, the stories we tell are an integral part of every culture around the world. It is a practice that defines who we are and what our societies’ value. Two important kinds of ancient storytelling — creation myths and heroic tales - have proven especially important. Together, they make up a vital part of many cultures and traditions, as well as the central subject matter of this course. Acquire a cross-cultural understanding of the hero’s journey and creation stories through reading, creative writing, drama, and research. Undergo your own hero’s journey as you relate your own life experiences to ancient archetypes and heroic templates.
**SCiences**

**Neuropsychology**

**Rice University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Duke University West Campus, Academy**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Why are roller coasters thrilling for some and terrifying for others? How does brain development affect perception, judgment, and decision-making? Understanding the intersection and interaction of the human brain and behavior is at the heart of neuropsychology. Study the physiology of the brain and cognitive functions that affect behavior. Investigate how the brain works by also considering neuroscientific, philosophical, neurological, and psychiatric perspectives.

**Oceanography**

**Duke University Marine Laboratory**
Marine Lab (June 14–July 4)

Delve into the fundamental components of studying the global oceans. Investigate the physical, chemical, geological, and biological processes that govern microscopic to macroscopic patterns in the ocean system. Explore general issues on the nature of science, the role of scientific rationalism in modern society, and the development of practical problem-solving skills. Examine oceanography’s relationship to social and political issues. Study biotic and abiotic components of the global oceans through engaged discussion, laboratory experiments, and field research. Design and complete a research project to present to your peers.

**Pharmacology**

**Duke University West Campus, Academy**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

How do we discover new drugs? How do pharmacologists balance the therapeutic value of a drug with its negative side effects? How do drugs treat pain, cure disease, or alleviate symptoms? How do our genes play a role in the success or failure of drug treatment? Who bears responsibility for the development of life-saving drugs, and what should they cost? Examine the field of pharmacology and its relationship to health, disease, and society. Study how the chemical properties of drugs interact with biological systems and how pharmaceuticals affect our health and behavior. Participate in hands-on laboratory exercises to visualize and practice principles and ideas.

**Philosophy of Knowledge**

**The University of Georgia**
Term 2 (July 5–July 25)

**Duke University West Campus, Academy**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

For centuries, philosophers have debated the relationship between the mind and the world. What is knowledge? What makes knowledge meaningful? How do we know what we know? Investigate epistemology, the branch of philosophy concerned with the nature, scope, and limitations of knowledge. Study the propositions of truth, beliefs, and knowledge - what are the differences? Delve into theories of knowledge acquisition such as empiricism, rationalism, and constructivism. Consider answers offered to these questions by philosophers throughout the ages, such as Aristotle, Plato, Descartes, Hegel, and Nietzsche.

**Technologies**

**Programming for the Web**

**Appalachian State University**
Term 1 (June 7–June 27)

**Texas Christian University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

There is an increasing demand for computer applications to be collaborative, dynamic, and tied to the user instead of a computer or mobile device. As applications move off the computer and into “the cloud,” web application programming is proving to be a critical part of the next computing revolution. Learn about the basic principles of dynamic web application programming and the unique considerations of programming for the web. By the end of the course, develop an original web application. This introductory course requires no prior programming experience.

**Social Sciences**

**Psychology**

**Appalachian State University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Texas Christian University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense and perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.
The bizarre world of quantum mechanics seems to contradict our understanding of the everyday natural processes that we observe in the macroscopic world. Yet our understanding of the principles of quantum mechanics is essential to the creation of lasers, microprocessors, electron microscopes, superconductors, and magnetic resonance imaging (MRI) technology, along with countless other devices and scientific processes. Through hands-on labs, examine the foundations of quantum physics and explore modern applications of this fascinating subject, including its impact on diverse fields within engineer and science, including materials science, nanotechnology, electronic devices, and photonics. This course is math-intensive. Completion of Algebra I is preferred.

The southern Appalachian Mountains have a vast history that encompasses hundreds of millions of years. The mountains of Boone, North Carolina and the surrounding area provide a rich environment for investigating the events that have shaped the landscape of this fascinating region. Span the history of Earth and life on it, exploring geology, ecology, and paleontology. See first-hand evidence of the area's history through interactive laboratory activities and field trips into the mountains.

What do J.R.R. Tolkien's Gollum, Shakespeare's fairies, Stephen King's Cujo, Suzanne Collins' Katniss Everdeen, and Ray Bradbury's Martians all have in common? They each inhabit the highly imaginative world of speculative fiction—a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

Examine the diagnosis, treatment, and prevention of common sports injuries from an anatomical, physiological, and psychological perspective. Explore how advances in technology have affected the field of sports medicine, improving both prevention and treatment. Analyze the decision-making used in designing treatment plans for athletes and non-athletes. Learn common injury care techniques used by athletic trainers, and evaluate the implications of sports medicine beyond the training room.

Examine the intersection of neuroscience and psychology as you investigate the most complex organ in the human body. Through the framework of brain physiology and development, examine intelligence, creativity, and the way people experience the world. In addition to classroom activities, discussions, and debate, participate in hands-on laboratory work, brain imaging, and academic research.

Through the use of literature and film clips, investigate the psychological roots of ghosts, vampires, and other unexplainable paranormal phenomena. Pair the stories of hauntings that grow from seemingly innocent folk and fairy tales with the works of psychologists such as Jung and Freud to study the deep-seated fears and specters that lie in wait among the shadowy waking and non-waking moments of the human psyche. Then move from analyzing individual human minds to studying how simple ghost stories and urban myths rise to the level of global fear. Delve into why and how myths are created, as well as the psychology involved in their lasting appeal.
**HUMANITIES**

**The Pen as Weapon: The Art of Satire**

**The University of Georgia**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Duke University West Campus, Academy**  
Term 1 (June 7–June 27)

ACADEMY VERBAL: 8 9 10

What do “The Daily Show with Trevor Noah,” Jonathan Swift’s “A Modest Proposal,” Kurt Vonnegut’s “Cat’s Cradle,” Gary Trudeau’s “Doonesbury,” and “The Simpsons” all have in common? In a word: satire. Join your witty peers in an exploration of satire, the art of exposing the foibles and pitfalls of society, institutions, and individuals through wit and comedy. Discuss satire’s role in social and political movements and examine the ways in which pointed humor, irony, and exaggeration can quickly lead to controversy and even violence depending upon political, religious, and geographic contexts. Analyze what constitutes well-written satire, and how authors successfully navigate an ever-changing cultural landscape to create humorous and constructive social criticism.

**The Personality of Style: Creative Writing**

**Appalachian State University**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Texas Christian University**  
Term 1 (June 7–June 27)

ACADEMY VERBAL: 7 8

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

**FINE ARTS**

**Theater Arts**

**Rollins College**  
Term 1 (June 7–June 27)

**Appalachian State University**  
Term 2 (July 5–July 25)

ACADEMY VERBAL: 7 8

Unlike other forms of literature, drama is not meant to be read; it is meant to be performed for an audience. Much like a piece of sheet music, a play is merely a blueprint for a performance. Discover how theater is made through the exploration of classic plays. Analyze various texts and experience drama from the point of view of those who create it, those who perform it, and those who make it happen behind the scenes. Experiment with different roles and character choices. Write short dramas and perform short works.
**CENTER LEVEL COURSES**

**MATHEMATICS**

**Algebra II**
*Trinity University*  
Term 2 (July 5–July 25)

**CENTER MATH**

Complete a highly accelerated year of high school math. A graphing calculator is required. A TIP-created exam will be the final assessment in the course. Prerequisite: Algebra I or its equivalent. You must mail a school transcript, a copy of a grade report, or a letter from your school to document your successful completion of Algebra I or its equivalent.

**SCIENCES**

**Anatomy, Physiology, and Medical Ethics**
*Georgia Institute of Technology*  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Duke University West Campus, Center**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**

Learn the tools to view the human body as a complex and intricate structure. Explore the connection between structure (anatomy) and function (physiology), and analyze this relationship in cells, organs, and organisms as a whole. Examine the different functional systems such as digestive, circulatory, and skeletal and the various building blocks of the body. Participate in hands-on laboratory exercises to visualize and practice principles and ideas. Discuss established medical ethics, and debate circumstances, technologies, and advances that challenge and/or justify ethical standards.

**TECHNOLOGY**

**Applications, Algorithms, Computers: Modern Programming**
*Rice University*  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH**

How does Google instantly find the relevant websites when you type a word into the search bar? How does a city know the most efficient route that their trash collectors should take? Explore the ways that computer scientists develop algorithms, processes, and programs that allow complicated problems to be addressed in meaningful ways. Go beyond simply understanding how to create computer programs and understand the mathematics that drive the adaptation of these programs to many fields of study, including medical sciences, aerospace, business and physical sciences. Some computer programming experience is beneficial, but not required.

**SOCIAL SCIENCES**

**Archaeology and Anthropology: Stones and Bones**
*Wake Forest University*  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**

Delve into a college-level introduction to anthropology, the holistic study of humans and human societies, both in the classroom and in the field. Explore anthropology’s traditional four fields: archaeology, cultural anthropology, linguistics, and biological (or physical) anthropology. Study some of the major discoveries and theoretical precepts of these disciplines, emphasizing the application of anthropological methods. Identify, plot, and excavate an archaeological site, classify and analyze the fossilized remains of human ancestors, and conduct ethnographic research.

**FINE ARTS**

**Architecture**
*Davidson College*  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**

Explore the history and process of designing spaces and structures through a comprehensive examination of the rich world of architecture. Study drafting techniques and buildings of great historical significance and learn the language of architecture, including typology, plan, section, elevation, perspective, axonometric projection, scale, and program. Work collaboratively and independently on creating and building your own projects for various purposes. Explore the macro and micro scales of architecture as you juxtapose the idea that “no building is an island” with the alternative viewpoint that “architecture is in the details.”

**SCIENCES**

**Architecture in the Urban Environment**
*Rice University*  
Term 1 (June 7–June 27)

**Georgia Institute of Technology**  
Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**

Modern architecture represents the intersection of science, technology, engineering, and art. Discover the intricacies of architecture and how it defines the very nature of an urban landscape. Explore the impact of technology and environmental concerns and learn how to create significant and functional space within an urban environment. Explore the global history of metropolitan architecture and how it has evolved to embrace the challenges of designing buildings in these ever-changing settings. Apply drafting techniques to repurpose existing infrastructures, bring nature back to cities, or design dazzling new skyscrapers. Consider the environmental, social, cultural, and artistic impacts of your designs and learn to capture the public’s imagination through hands-on, project-based learning.
While science fiction has a long history of intelligent machines, we now live in a world in which these machines are reality - and you can learn the skills to work in this exciting field. We can hold conversations with Siri on our iPhones, watch computers defeat the world's greatest chess players, and might soon ride around in driverless cars. These new technologies require artificial intelligence, which is the study and development of technology that can reason, deduct and, basically, act human. Learn the programming necessary to work in machine intelligence development, and explore the origins of AI as well as modern areas of research, including language processing, perception, motion, and manipulation.

**Astronautical Engineering**

**Georgia Institute of Technology**
Term 1 (June 7–June 27)

**Rice University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Explore the history and orbital mechanics of spaceflight from Newton and Kepler through Mercury, Gemini, Apollo, and the space shuttle programs. Learn the engineering behind spaceflight and spacecraft design. Study how objects move through space. Investigate various fields in science related to spaceflight, such as physics, aeronautics, and rocket propulsion. This course is math-intensive. Completion of Algebra I is preferred but not required. Note: Students who have taken TIP’s Spacecraft Mission Design should not enroll in this course due to overlap in content.

**Beyond Baker Street: The Detective as Scientist in Literature and Film**

**Davidson College**
Term 1 (June 7–June 27)

**Trinity University**
Term 1 (June 7–June 27)

**Wake Forest University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

I never guess. It is a shocking habit—destructive to the logical faculty. So said Sherlock Holmes, the quintessential fictional detective. Since then, scores of literary sleuths have followed in his footsteps, relying on investigation, scientific analysis, and deduction to pierce the veil of mystery. Join this deductive tradition and learn to spot and interpret clues that elude the less observant. Dissect detective fiction and master current trends in crime scene investigation as you learn to interpret evidence and construct compelling arguments for your case. Conduct your own investigations and reach your own conclusions - elementary or otherwise.

**Beyond Science Fiction**

**Rice University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What can the fantastical, technical worlds created in speculative fiction tell us about how we see our own? Speculative fiction's use of magical elements intertwines real-world ethical dilemmas with challenges to how we think about human nature. Understand the history of this science fiction subgenre to see how it became one of the most exciting areas of contemporary literature. Critically read contemporary speculative fiction texts and use experimental storytelling techniques to create original writing. Give and receive peer feedback to enhance your own writing and critical reading ability. Students who have taken 7-8 Speculative Fiction: Reading and Writing About Alternate Worlds should not enroll in this course due to overlap in content.

**Big Screen, Little Screen: Writing for the Camera**

**Duke University East Campus**
Term 1 (June 7–June 27)

Many of us believe we have the next great movie idea that will take Hollywood by storm, do away with recycled story lines and tired plots, and return us to the golden era of cinema with films that are both challenging and entertaining. Delve into your imagination and explore the outside world to express your creative ideas. Develop a habit of taking notes on anything and everything, learn from and appreciate the writing of talented screenwriters, and fine-tune your knowledge of the written word. Apply these skills to the art of screenwriting - idea development, outlining, treatments, story, character, setting, dialogue, theme, and subplots - and explore new storylines to captivate your audience.

**Biological & Chemical Sciences**

**Davidson College**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Trinity University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Rollins College**
Term 2 (July 5–July 25)

Science moves forward by generating theories consistent with laboratory observation. Interact directly with natural phenomena and data collected by others as you design investigations, manipulate equipment, and analyze results. Engage in scientific reasoning through laboratory exercises, class discussions and field trips, using the same biology and chemistry procedures scientists use in the field. With experiments in classical and modern genetics, bacteria sampling, anatomy, and chemical reaction, work collaboratively to analyze data, connect outcomes with theory, and draw conclusions from experiments. Explore current scientific research and discuss the societal implications of advancing scientific knowledge.
In the United States, 1.5 million people are diagnosed with cancer each year. Given the prevalence of this disease, much attention and research has been focused on identifying causes and designing treatments to combat it. Examine the historical perspective on the biology of cancer and explore the molecular biology and genetic changes that occur during cancer, including the six hallmarks of cancer, as defined by Robert Weinberg. Discuss the role of genetics, oncogenes, and tumor suppressor genes in the development of the disease. Debate the ethics surrounding genetic testing and cancer treatment. Conduct research using current articles and primary literature on cancer at Duke’s Perkins Library and participate in laboratory activities to illustrate concepts.

Biomedical engineering applies fundamental science and math principles to improve human health beyond the limits of traditional medicine. Learn the engineering design process used by biomedical engineers and investigate how they create new diagnosis and treatment methods in tissue engineering, genetic engineering, drug delivery, and biomedical instrumentation. Explore principles such as density, hydraulic, and pneumatic systems, Newton’s laws of motion, genetics, and electromagnetism. Perform gel electrophoresis, gene expression analysis, circuitry design, and cell staining, techniques routinely used by biomedical engineers to advance the field of medicine.

In an age when global financial transactions involve millions, billions, and even trillions of dollars, the question arises: Where does all of the money go? Examine finance principles such as the time value of money and the risk-return relationship. Analyze financial instruments both from investors’ and companies’ perspectives. Assess the financial rewards and challenges faced by firms and individuals in a global economy. Consider the role of technology in global finance. Examine the various methods used for financial forecasting. Use “money math” to perform quantitative stock evaluations, data measurement, product costing, and corporate budgeting.
**Mathematics**

**Cryptography, Codebreaking, and the Mathematics of Spying**

**Davidson College**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Wake Forest University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Cryptology and Number Theory**

**Rice University**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.

**Mathematics**

**Director’s Cut: From Storyboard to Screen**

**Duke University East Campus**
Term 2 (July 5–July 25)

This course is an interactive introduction to film as a form of art and entertainment. Explore the basic history, concepts, and terms associated with the study and production of film, then go beyond the theoretical to apply these concepts to the production of short videos through hands-on assignments and exercises. Examine how films are constructed through the interplay of narrative, technological, and aesthetic systems, then use these basic concepts to bring life to your own creative vision. Note: Students who have taken TIP’s Celluloid Visions: A Critical Study of Film should not enroll in this course due to overlap in content.

**Social Sciences**

**Dictators, Kings, and CEOs: The Evolution of Empire**

**Duke University East Campus**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Duke University West Campus, Center**
Term 2 (July 5–July 25)

Empires are perhaps the single most formative phenomenon in history. Survey influential empires through the ages and learn how they impacted the development of the world politically, culturally, socially, and militarily. Follow Augustus as his legions spread the glory of Rome across Europe. Ride with Genghis Khan as he shakes the foundations of the civilized world with terror. Examine the spread of American culture and beliefs across the globe, from McDonald’s to democracy. Engage in literary analysis and historical research at Duke University’s libraries.

**Humanities**

**Electrical Engineering**

**Duke University West Campus, Center**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Electrical engineers are key creators behind many high-tech innovations such as global positioning systems that can pinpoint a car’s location, giant generators that can power entire cities, and new designs for an airplane’s electrical system. Explore the physical basis and mathematical models of electrical components and circuits. Work in teams to design and build electronic circuits and investigate voltage, resistance, amperes, watts, and circuit theorems. Analyze linear circuits, semiconductors, frequency representation, and sequential logic. Determine applications for electrical engineering concepts in other scientific fields and everyday life. *This course is open to current ninth and tenth graders only.*

**Science**

**Engineering for Fun**

**Georgia Institute of Technology**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Rice University**
Term 2 (July 5–July 25)

Behind roller coasters, water parks, miniature golf courses, and theme parks are engineers who understand physical forces, the fundamentals of design, and the psychology that goes into the business of fun. Join their ranks and put your knowledge of engineering principles and theory into practice while also learning principles of user experience, collaboration, prototype development, field testing, design adaptation, and the marketing considerations behind a project’s launch. Visit a local amusement park to observe the psychological and engineering principles that go into this field firsthand. Create and model entertainment attractions manually and with 3-D computer-aided design programs while completing both individual and group assignments—all in the name of fun!
to analyze how those media might influence societal standards.

reasoning. Consider dilemmas and the ethics implicit in modern media understanding of the philosophical issues and concepts of moral action right or wrong? Explore common ethical theories to gain an understanding of the ethical lens with which we interpret ourselves and the world. As D. H. Lawrence wrote, “Ethics and equity and the principles of justice do not change with the calendar.” Are “white lies” ever justified? Ethical dilemmas confront us every day, and the decisions we make reflect the ethical lens with which we interpret ourselves and the world. As D. H. Lawrence wrote, “Ethics and equity and the principles of justice do not change with the calendar.” But how do we know what those principles are? What makes an action right or wrong? Explore common ethical theories to gain an understanding of the philosophical issues and concepts of moral reasoning. Consider dilemmas and the ethics implicit in modern media to analyze how those media might influence societal standards.

Forensic science is the scientific analysis of physical evidence. Examine some types of evidence encountered in criminal investigations and the techniques used to analyze that evidence. Analyze fingerprint and trace evidence such as hairs, fibers, glass, and paint. Engage in laboratory exercises simulating real-life methods of evidence analysis, and then participate in a mock crime scene, examining the many roles of crime scene investigators. Round out the course with discussion and debate cases and the portrayal of forensic science in popular culture.

Using complex mathematical concepts, analyze situations in which two or more parties are competing, determine the best course of action for each party, predict the outcome, and then apply these concepts to circumstances across all disciplines. Investigate the foundations of Game Theory, or Formal Decision Theory, and its use as a tool to help people conceptualize and navigate complex decision-making processes in ways that produce optimum benefit. Explore applications in economics that inform mergers, negotiations, marketing and pricing strategies, and contract formation, as well as applications in strategic conflict and warfare, evolutionary systems, psychology, and sociology. *This course is open to current ninth and tenth graders only.

Using the world-famous Duke University Lemur Center as your classroom, conduct daily observation, data collection, behavior analysis, and research into lemurs, lorises, bushbabies, and more. The study of these biological relatives helps us understand where we fit into the animal kingdom and why we are so unique. Examine common characteristics of primates, and explore current primate taxonomy, the evolution of the group, and trends and variation in primate subsistence, physiology, locomotion, social structures, and cognition. Consider the impact of a changing society on these creatures. Note: Students who have taken TIP’s Primate Biology: Lemurs, Lorises, and Bushbabies should not enroll in this course due to overlap in content.
**Historical Epidemiology**

**Duke University East Campus**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Georgia Institute of Technology**  
Term 1 (June 7–June 27)

**Rice University**  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

From the Black Death to smallpox to HIV/AIDS and the Ebola virus, infectious diseases have profoundly affected human history and shaped the progress of societies. Evaluate, track, and analyze the impact of major epidemics throughout the ages. Study modern epidemiological techniques in a classroom setting. Learn the basic concepts and techniques behind recognizing and fighting pandemics, then apply this knowledge to historic epidemics as a foundation for developing modeling techniques that fight modern disease. Learn how the media and organizations like the World Health Organization and Center for Disease Control all play a role in fighting these major threats to our survival. Students who have taken Pathogens, Plagues and Patient Zero: Historical Epidemiology should not enroll in this course due to curricular overlap.

**International Relations: Global Conflicts**

**Duke University East Campus**  
Term 1 (June 7–June 27)

**Georgia Institute of Technology**  
Term 2 (July 5–July 25)

Why do people go to war, engage in trade, or defend human rights? How do these issues affect the individual, and what difference can one person make? Analyze and debate these theoretical, practical, and ethical questions as they relate to terrorism, the media, Marxism, globalization, weapons of mass destruction, ethnic conflict, nationalism, sovereignty, genocide, and international law. Study current and historical conflicts to analyze and predict outcomes and their ramifications.

**Macroeconomics**

**Duke University East Campus**  
Term 2 (July 5–July 25)

Complete an intensive course equivalent to an introductory or principles level college course in macroeconomics. Develop a basic understanding of the theory and practice of macroeconomics, including an understanding of the determinants of the levels of income, output, and employment. Analyze the determinants of consumption, investment, government spending, and net exports, and study the model of international trade that determines exchange rates and the balance of trade. Discuss the economic impact of the federal deficit and debt and the effectiveness of discretionary fiscal and monetary policies under a number of models, and analyze macroeconomic debates to effectively participate in the political process.
**Mathematics**

**Mathematical Models, Analysis, and Applications**

**Trinity University**
Term 1 (June 7–June 27)

*Center Math* (grades 7-8)

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

**Mathematics**

**Mathematical Problem Solving**

**Davidson College**
Term 1 (June 7–June 27)

**Trinity University**
Term 2 (July 5–July 25)

*Center Math* (grades 7-8)

Apply mathematical knowledge and methods in new ways to solve interesting and complicated problems and proofs. Prepare for high school mathematics and beyond by developing critical mathematical thinking. This course also covers common mathematics contest topics and encourages students to delve into more difficult problems using knowledge of these topics. Develop structural knowledge of mathematical proofs, the foundation for all higher-level mathematics. A diagnostic test given at the beginning of the term will ensure you are challenged with new mathematical concepts.

**Social Sciences**

**Mock Trial**

**Duke University East Campus**
Term 1 (June 7–June 27)

*Center Math & Verbal* (grades 7-8)

Examine fundamental topics of law, including the criminal and civil justice system, rules of evidence, eyewitness testimony, civil rights, and challenges to constitutional law. Apply the principles and practices of courtroom trials, experiment with the art of litigation as prosecutors and defenders, and consider challenges inherent in seeking justice. Read and understand precedent-setting decisions made by the Supreme Court and discuss the Court’s role in interpreting constitutional law. Practice using the case method while enhancing research and public speaking skills. Class may visit a courthouse. This course is writing intensive.

**Mathematics**

**Mobius Strips, Klein Bottles, and Fractals: The Mathematics of Distortion**

**Georgia Institute of Technology**
Term 1 (June 7–June 27)

**Duke University East Campus**
Term 2 (July 5–July 25)

*Center Math* (grades 8-9-10)

Explore topology, the mathematical study of twisting, bending, and stretching objects. Learn how industrial design, engineering, and theoretical physics employ applications of Möbius strips. Discover mathematical distortion techniques that work on highly complex systems, such as roving sensor networks for security systems. Examine the continuity between shapes and the ways in which seemingly different objects are topologically the same. Study fractals, knots, and manifolds using concepts of points, lines and curves.

**Social Sciences**

**Microeconomics**

**Duke University East Campus**
Term 1 (June 7–June 27)

*Center Math* (grades 8-9-10)

Complete an intensive course, roughly equivalent to an introductory or principles level college course in microeconomics. Use microeconomics as a model to understand and analyze human behavior. Apply an analytical approach to the study of how individuals and societies deal with the fundamental problem of scarce resources. Understand how these principles affect individuals trying to maximize their utility, businesses trying to maximize their profits, and societies trying to manage resources. Analyze controversial issues such as minimum wage laws, farm subsidies, rent controls, protectionism, pollution, welfare programs, and the tradeoff occurring between equity and efficiency that result from various microeconomic policies.
Modern Medicine: Disease and Immunology

Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College
Term 1 (June 7–June 27)

Trinity University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**SCIENCES**

Nuclear Science

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Oceanography

Duke University Marine Laboratory
Marine Lab (June 14–July 4)

Philosophy in Literature and Film

Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**HUMANITIES**

Myths and Legends

Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University
Term 2 (July 5–July 25)

From Gilgamesh to the Avengers, the stories we tell are an integral part of every culture around the world. It is a practice that defines who we are and what our societies’ value. Two important kinds of ancient storytelling - creation myths and heroic tales - have proven especially important. Together, they make up a vital part of many cultures and traditions, as well as the central subject matter of this course. Acquire a cross-cultural understanding of the hero’s journey and creation stories through reading, creative writing, drama, and research. Undergo your own hero’s journey as you relate your own life experiences to ancient archetypes and heroic templates.

**ACADEMY MATH & VERBAL**

Center Math & Verbal
Grades 8 9 10

Oceanography

Delve into the fundamental components of studying the global oceans. Investigate the physical, chemical, geological, and biological processes that govern microscopic to macroscopic patterns in the ocean system. Explore general issues on the nature of science, the role of scientific rationalism in modern society, and the development of practical problem-solving skills. Examine oceanography’s relationship to social and political issues. Study biotic and abiotic components of the global oceans through engaged discussion, laboratory experiments, and field research. Design and complete a research project to present to your peers.

**MATH & VERBAL**

Center Math & Verbal
Grades 8 9 10

Philosophy in Literature and Film

In subtle and overt ways, philosophical concepts ranging from nihilism to existentialism shape novels, plays, comic books, pop music, and documentaries. Through critical literary and film analysis, explore the ways in which authors and filmmakers express various philosophical ideas through their media. Investigate the relationship between philosophy and art and develop an understanding of the way in which literature and film present a unique approach to philosophical quandaries regarding self, morality, epistemology, and perception.

**ACADEMY MATH & VERBAL**

Academy Math & Verbal
Grades 8 9 10

**SCIENCES**

Neuroscience

Georgia Institute of Technology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**HUMANITIES**

From Gilgamesh to the Avengers, the stories we tell are an integral part of every culture around the world. It is a practice that defines who we are and what our societies’ value. Two important kinds of ancient storytelling - creation myths and heroic tales - have proven especially important. Together, they make up a vital part of many cultures and traditions, as well as the central subject matter of this course. Acquire a cross-cultural understanding of the hero’s journey and creation stories through reading, creative writing, drama, and research. Undergo your own hero’s journey as you relate your own life experiences to ancient archetypes and heroic templates.

Humans everywhere are turning to the brain for answers to questions that have plagued our species for centuries: Why do people do evil things? What is love? Why do we dream? How do we remember? What is consciousness? Address these questions from the perspectives of physiology, pharmacology, pathology, psychology, and philosophy. After becoming acquainted with the methods and tools that researchers employ in their studies, explore puzzling questions by examining evolving theories and contemporary methodologies in science and philosophy. Examine the basic structural and organizational aspects of neuroanatomy and physiology, study current research regarding sleeping/dreaming, consciousness, behavioral disorders, neuropathology, memory, and artificial intelligence.

**ACADEMY MATH & VERBAL**

Academy Math & Verbal
Grades 8 9 10
debates, mini-experiments, and projects.

mental health. Participate in group activities, classroom discussions, emotions, personality, intelligence, creativity, abnormalities, and sense and perception, consciousness, learning, memory, cognition, the world. Discuss a wide range of topics, including the human brain, current neuroscientific discoveries being made by researchers around the realm of psychology and examine the field from its historical roots to areas of interdisciplinary study and practical applications. Survey the

The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense and perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.


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 What is time? How have different cultures throughout history understood and represented it? Does it unfold in a straight line, or is it best represented by a circle of eternal recurrence? Examine how a wide range of thinkers have dealt with the issue of time and temporality. Discuss the phenomenology of Martin Heidegger and the space-time theory of Albert Einstein alongside Native American mythology, Romantic poetry, Buddhist philosophy, and Christian theology. Analyze how television and movies create new visions of the past when depicting historical periods. Consider the theories of dimensions of time to tackle a proposition that has obsessed modern culture: time travel.

Since the beginning of recorded history, politics has been a struggle between two opposing forces: elite and popular power. While elite history is recorded in the actions of kings and the growth of empires, the politics of the lower classes is expressed in an era’s popular culture. Examine grassroots movements and their efforts to subvert political regimes throughout history. Analyze Greek tragedy, Shakespeare’s Elizabethan propaganda, Whitman’s Democratic Romanticism, Beat poetry, 1960s protest music, and the current blogosphere in conversation with political theorists such as Plato, Rousseau, Emerson, and Marx. Follow the transformation of political cultures from the ancient to the modern world by analyzing the development of popular culture from Dionysian festivals to the modern blogosphere.

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TECHNOLOGY

Robotics
Trinity University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Study the fields of both robotics and engineering to discover the intersection between theory and interactive, hands-on application. Explore the various fundamental topics behind the exciting field of robotics, participate in interactive lab exercises, then construct and program robots to illustrate the principles you’ve learned. Examine the role of robotics in today’s society and debate the advantages and disadvantages of using robots in various situations.

SOCIAL SCIENCES

Social Psychology
Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Social psychology is the formal study of the ways in which individuals affect one another. Examine how people’s attitudes, biases, and behaviors are influenced by other people and how these influences affect society as a whole. Explore the ways social psychologists use the scientific method to study people’s thoughts and behaviors in social situations and how ethical principles govern their research. Discuss and debate topics such as the self, prejudice, gender, race, conformity, obedience, aggression, group influence, and pro-social behavior. Drawing from examples in the media, law, politics, history, culture, and our own lives, examine how we are affected by social relationships and what a difference these relationships make in the way we live.

HUMANITIES

Speculative Fiction: Reading and Writing About Alternate Worlds
Trinity University
Term 1 (June 7–June 27)
Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What do J.R.R. Tolkien’s Gollum, Shakespeare’s fairies, Stephen King’s Cujo, Suzanne Collins’ Katniss Everdeen, and Ray Bradbury’s Martians all have in common? They each inhabit the highly imaginative world of speculative fiction - a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

That’s Debatable
Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Wake Forest University
Term 1 (June 7–June 27)

State your case! Learn the art of argument used in political debates, courtroom arguments and rebuttals, and effective business presentations. Analyze influential speeches and use research as a central tool in formulating persuasive speeches. Study the logic of argument and the use of words to create an elegant discourse. Learn to develop effective spoken and written arguments by making and supporting claims with evidence, and by paying attention to what constitutes evidence with a particular audience.

HUMANITIES

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SCIENCES

The Brain, Intelligence, and Creativity
Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Trinity University
Term 2 (July 5–July 25)

Examine the intersection of neuroscience and psychology as you investigate the most complex organ in the human body. Through the framework of brain physiology and development, examine intelligence, creativity, and the way people experience the world. In addition to classroom activities, discussions, and debate, participate in hands-on laboratory work, brain imaging, and academic research.

SOCIAL SCIENCES

The Ethics of Artificial Intelligence
Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What happens when you create an intelligent, autonomous robot and then limit its freedom? The field of artificial intelligence already permeates more aspects of our daily lives than we realize. It drives our cars, flies our planes, manages our money, and protects our safety. Its approach to more human-like thoughts and actions raises predictable complications. Are they to be considered tools or lifeforms? How can we ensure that these machines will respect our ethical and moral principles? Debate the laws by which these thinking machines should abide. Analyze and argue philosophical approaches to AI’s integration into society, and build the ethical foundation and psychological framework necessary to navigate this emerging landscape.
**HUMANITIES**

**The Personality of Style: Creative Writing**

*Davidson College*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Wake Forest University*
Term 1 (June 7–June 27)

*Trinity University*
Term 2 (July 5–July 25)

**CENTER VERBAL**

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

**SOCIAL SCIENCES**

**The Science and Finesse of Entrepreneurship**

*Duke University East Campus*
Term 1 (June 7–June 27)

**CENTER MATH & VERBAL**

As today’s technology sector has proven time and again, entrepreneurship is both a science and an art. But how do you move from inspiration to investor? How do you turn a start-up into a company that lasts? Study the success stories of Silicon Valley and learn how to differentiate ideas from opportunities. Examine the fundamentals of e-entrepreneurship as a template for success in other key sectors like information, energy, medical and consumer technologies. Develop the critical thinking skills and processes vital to business success. Learn how to assemble a team and the resources you need. Through research, collaboration, and simulations, develop a plan for a company built on positive impact, sustainable performance, and longevity. Students who have taken Where Great Minds and Big Money Meet should not enroll in this course due to curricular overlap.

**SCIENCES**

**Understanding Genetics**

*Davidson College*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH**

Genetic technology helps identify and cure diseases, solve crimes, and understand family heritage. Take a hands-on approach to studying deoxyribonucleic acid (DNA) and the way the information within it creates a roadmap for human development and risk of disease. Explore DNA structure, replication, mutations, and how scientists are applying evolving new technologies to treat diseases. Through lab experiments, simulations, discussions, and presentations, learn about the mechanics of DNA and why it is arguably the most important molecule to all life on Earth. Students who have taken DNA: Unlocking the Genetic Code should not enroll in this course due to curricular overlap.

**HUMANITIES**

**Universal Innovation: Unlocking the Future**

*Rollins College*
Term 1 (June 7–June 27)

*Trinity University*
Term 1 (June 7–June 27)

*Davidson College*
Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**

In a modern economy, mastering your field is not enough. Skills such as creativity, critical thinking, problem solving, resilience, and adaptability are all vital to continuous innovation. Combining technical knowledge with these creative skills has allowed such companies as Disney, Pixar, and Apple to flourish. Unlock your creative, innovative self through hands-on activities, discussions, and assignments that span the fields of mathematics, sciences, and the humanities. Learn about the neuroscience and brain theory behind creativity, its modern applications to entrepreneurship, and develop confidence in your own ideas.

**HUMANITIES**

**Words that Matter: Rhetoric and Persuasion**

*Duke University East Campus*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER VERBAL**

Delve into an advanced exploration of the power of the spoken word. Examine influential speeches and debates, study the logic and structure of effective arguments, and research the reasoning behind deliberate word choices. Create your own persuasive style, hone your skills of analysis and focus your writing to articulate your message. Refine your speaking skills and debate delivery to illustrate points of divergence instead of mere disagreement. After practicing these skills, apply them by preparing and presenting in-class debates.
COURSES BY SUBJECT AREA

FINE ARTS

Architecture
Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**
**[grades 7 8]**

Explore the history and process of designing spaces and structures through a comprehensive examination of the rich world of architecture. Study drafting techniques and buildings of great historical significance and learn the language of architecture, including typology, plan, section, elevation, perspective, axonometric projection, scale, and program. Work collaboratively and independently on creating and building your own projects for various purposes. Explore the macro and micro scales of architecture as you juxtapose the idea that “no building is an island” with the alternative viewpoint that “architecture is in the details.”

Architecture
Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College
Term 2 (July 5–July 25)

**ACADEMY MATH & VERBAL**
**[grades 7 8]**

Explore the history and process of designing spaces and structures through a comprehensive examination of the rich world of architecture. Study drafting techniques and buildings of great historical significance and learn the language of architecture, including typology, plan, section, elevation, perspective, axonometric projection, scale, and program. Work collaboratively and independently on creating and building your own projects for various purposes. Explore the macro and micro scales of architecture as you juxtapose the idea that “no building is an island” with the alternative viewpoint that “architecture is in the details.”

Theater Arts
Rollins College
Term 1 (June 7–June 27)

Appalachian State University
Term 2 (July 5–July 25)

**ACADEMY VERBAL**
**[grades 7 8]**

Unlike other forms of literature, drama is not meant to be read; it is meant to be performed for an audience. Much like a piece of sheet music, a play is merely a blueprint for a performance. Discover how theater is made through the exploration of classic plays. Analyze various texts and experience drama from the point of view of those who create it, those who perform it, and those who make it happen behind the scenes. Experiment with different roles and character choices. Write short dramas and perform short works.

HUMANITIES

Beyond Baker Street: The Detective as Scientist in Literature and Film
Davidson College
Term 1 (June 7–June 27)

Trinity University
Term 1 (June 7–June 27)

Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER MATH & VERBAL**
**[grades 7 8]**

I never guess. It is a shocking habit—destructive to the logical faculty. So said Sherlock Holmes, the quintessential fictional detective. Since then, scores of literary sleuths have followed in his footsteps, relying on investigation, scientific analysis, and deduction to pierce the veil of mystery. Join this deductive tradition and learn to spot and interpret clues that elude the less observant. Dissect detective fiction and master current trends in crime scene investigation as you learn to interpret evidence and construct compelling arguments for your case. Conduct your own investigations and reach your own conclusions - elementary or otherwise.

Beyond Science Fiction
Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**CENTER VERBAL**
**[grades 8 9 10]**

What can the fantastical, technical worlds created in speculative fiction tell us about how we see our own? Speculative fiction’s use of magical elements intertwines real-world ethical dilemmas with challenges to how we think about human nature. Understand the history of this science fiction subgenre to see how it became one of the most exciting areas of contemporary literature. Critically read contemporary speculative fiction texts and use experimental storytelling techniques to create original writing. Give and receive peer feedback to enhance your own writing and critical reading ability. Students who have taken 7-8 Speculative Fiction: Reading and Writing About Alternate Worlds should not enroll in this course due to overlap in content.

Big Screen, Little Screen: Writing for the Camera
Duke University East Campus
Term 1 (June 7–June 27)

**CENTER VERBAL**
**[grades 8 9 10]**

Many of us believe we have the next great movie idea that will take Hollywood by storm, do away with recycled story lines and tired plots, and return us to the golden era of cinema with films that are both challenging and entertaining. Delve into your imagination and explore the outside world to express your creative ideas. Develop a habit of taking notes on anything and everything, learn from and appreciate the writing of talented screenwriters, and fine-tune your knowledge of the written word. Apply these skills to the art of screenwriting - idea development, outlining, treatments, story, character, setting, dialogue, theme, and subplots - and explore new storylines to captivate your audience.
Choosing Sides: Debate and Persuasion
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Rollins College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)
Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Lawyers, politicians, and CEOs use sound arguments to transform public opinion, move people to their feet, or change the course of nations. Explore rhetorical devices, public speaking, and various forms of debate as you study historical debates and learn to construct your own compelling arguments. Practice your debating skills through written and oral performance in a variety of formats while learning to argue multiple sides of a single issue.

Director’s Cut: From Storyboard to Screen
Duke University East Campus
Term 2 (July 5–July 25)

This course is an interactive introduction to film as a form of art and entertainment. Explore the basic history, concepts, and terms associated with the study and production of film, then go beyond the theoretical to apply these concepts to the production of short videos through hands-on assignments and exercises. Examine how films are constructed through the interplay of narrative, technological, and aesthetic systems, then use these basic concepts to bring life to your own creative vision. Note: Students who have taken TIP’s Celluloid Visions: A Critical Study of Film should not enroll in this course due to curricular overlap.

Ethics and the Little White Lie
Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Are “white lies” ever justified? Ethical dilemmas confront us every day, and the decisions we make refine the ethical lens with which we interpret ourselves and the world. As D. H. Lawrence wrote, “Ethics and equity and the principles of justice do not change with the calendar.” But how do we know what those principles are? What makes an action right or wrong? Explore common ethical theories to gain an understanding of the philosophical issues and concepts of moral reasoning. Consider dilemmas and the ethics implicit in modern media to analyze how those media might influence societal standards.

Fantasy Worlds and Science Fiction
Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Travel through the minds of writers who have shaped the genre of fantasy literature. Voyage into far and uncharted territories, (re) discover strange yet familiar friends, fight frightening foes, and return (hopefully) in one piece from our journey with a far greater understanding of home. Consider the structure of the fictive world and the significance of children with unusual gifts. Critically debate what these authors are asking us to see, believe, or interpret about their created worlds and about our own. Students who have taken From Wonderland to Hogwarts should not enroll in this course due to curricular overlap.

Myths and Legends
Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University
Term 2 (July 5–July 25)

From Gilgamesh to the Avengers, the stories we tell are an integral part of every culture around the world. It is a practice that defines who we are and what our societies’ value. Two important kinds of ancient storytelling—creation myths and heroic tales—have proven especially important. Together, they make up a vital part of many cultures and traditions, as well as the central subject matter of this course. Acquire a cross-cultural understanding of the hero’s journey and creation stories through reading, creative writing, drama, and research. Undergo your own hero’s journey as you relate your own life experiences to ancient archetypes and heroic templates.

Myths and Legends
Appalachian State University
Term 1 (June 7–June 27)

Texas Christian University
Term 2 (July 5–July 25)
In subtle and overt ways, philosophical concepts ranging from nihilism to existentialism shape novels, plays, comic books, pop music, and documentaries. Through critical literary and film analysis, explore the ways in which authors and filmmakers express various philosophical ideas through their media. Investigate the relationship between philosophy and art and develop an understanding of the way in which literature and film present a unique approach to philosophical quandaries regarding self, morality, epistemology, and perception.

**Philosophy of Knowledge**

The University of Georgia  
Term 2 (July 5–July 25)

Duke University West Campus, Academy  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

For centuries, philosophers have debated the relationship between the mind and the world. What is knowledge? What makes knowledge meaningful? How do we know what we know? Investigate epistemology, the branch of philosophy concerned with the nature, scope, and limitations of knowledge. Study the propositions of truth, beliefs, and knowledge - what are the differences? Delve into theories of knowledge acquisition such as empiricism, rationalism, and constructivism. Consider answers offered to these questions by philosophers throughout the ages, such as Aristotle, Plato, Descartes, Hegel, and Nietzsche.

**Philosophy of Time**

Duke University East Campus  
Term 2 (July 5–July 25)

What is time? How have different cultures throughout history understood and represented it? Does it unfold in a straight line, or is it best represented by a circle of eternal recurrence? Examine how a wide range of thinkers have dealt with the issue of time and temporality. Discuss the phenomenology of Martin Heidegger and the space-time theory of Albert Einstein alongside Native American mythology, Romantic poetry, Buddhist philosophy, and Christian theology. Analyze how television and movies create new visions of the past when depicting historical periods. Consider the theories of dimensions of time to tackle a proposition that has obsessed modern culture: time travel.

**Refining Your Voice Through Creative Writing**

Duke University East Campus  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Experienced writers apply here. No matter your preferred genre, go beyond your writing limits by exploring countless creative ways of crafting and structuring language. Examine various techniques such as chronology, argument, evolving revelation, juxtaposition, and retrospective. Critique works from prominent authors to lesser-known masters. Become a more emboldened writer through the critical peer review process. Novelists, memoirists, poets, and authors of all other genres will be supported and challenged in this course. Students who have taken Literary License without Limits should not enroll in this course due to curricular overlap.

**Speculative Fiction: Reading and Writing About Alternate Worlds**

The University of Georgia  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Academy  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What do J.R.R. Tolkien’s Gollum, Shakespeare’s fairies, Stephen King’s Cujo, Suzanne Collins’ Katniss Everdeen, and Ray Bradbury’s Martians all have in common? They each inhabit the highly imaginative world of speculative fiction—a genre that includes science fiction, fantasy, horror, utopian, and dystopian fiction. Authors of speculative fiction often wrestle with complex social and psychological issues ranging from genetic engineering to predestination and personal freedom to forms of government, often in far-reaching and fantastical settings. Experiment with storytelling techniques in your writing and receive peer feedback in a course that challenges you to imagine and create original worlds of your own. Read and analyze a variety of authors within the genre with a critical eye towards enhancing your own writing.

**That’s Debatable**

Davidson College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University  
Term 1 (June 7–June 27)

State your case! Learn the art of argument used in political debates, courtroom arguments and rebuttals, and effective business presentations. Analyze influential speeches and use research as a central tool in formulating persuasive speeches. Study the logic of argument and the use of words to create an elegant discourse. Learn to develop effective spoken and written
arguments by making and supporting claims with evidence, and by paying attention to what constitutes evidence with a particular audience.

The Haunting: Exposing the Mind’s Fear of Myth & Monster

Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH & VERBAL GRADES 8 9 10

Through the use of literature and film clips, investigate the psychological roots of ghosts, vampires, and other unexplainable paranormal phenomena. Pair the stories of hauntings that grow from seemingly innocent folk and fairy tales with the works of psychologists such as Jung and Freud to study the deep-seated fears and specters that lie in wait among the shadowy waking and non-waking moments of the human psyche. Then move from analyzing individual human minds to studying how simple ghost stories and urban myths rise to the level of global fear. Delve into why and how myths are created, as well as the psychology involved in their lasting appeal.

The Pen as Weapon: The Art of Satire

The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Academy
Term 1 (June 7–June 27)

ACADEMY VERBAL GRADES 8 9 10

What do “The Daily Show with Trevor Noah,” Jonathan Swift’s “A Modest Proposal,” Kurt Vonnegut’s “Cat’s Cradle,” Gary Trudeau’s “Doonesbury,” and “The Simpsons” all have in common? In a word: satire. Join your witty peers in an exploration of satire, the art of exposing the foibles and pitfalls of society, institutions, and individuals through wit and comedy. Discuss satire’s role in social and political movements and examine the ways in which pointed humor, irony, and exaggeration can quickly lead to controversy and even violence depending upon political, religious, and geographic contexts. Analyze what constitutes well-written satire, and how authors successfully navigate an ever-changing cultural landscape to create humorous and constructive social criticism.

The Personality of Style: Creative Writing

Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University
Term 1 (June 7–June 27)

ACADEMY VERBAL GRADES 7 8

Discover your artistic voice through an in-depth look at examples of great literature and the elements that form the foundation of such writing - plot, character, setting, and style. With particular emphasis on fiction, poetry, and nonfiction, use the writing process to create short and long literary works of your own. Work collaboratively with the instructor and your classmates to refine editing and revision skills. Analyze a range of literary pieces to improve your own creative writing. Students who have taken Creative Writing should not enroll in this course due to curricular overlap.

Universal Innovation: Unlocking the Future

Rollins College
Term 1 (June 7–June 27)

Trinity University
Term 1 (June 7–June 27)

Davidson College
Term 2 (July 5–July 25)

In a modern economy, mastering your field is not enough. Skills such as creativity, critical thinking, problem solving, resilience, and adaptability are all vital to continuous innovation. Combining technical knowledge with these creative skills has allowed such companies as Disney, Pixar, and Apple to flourish. Unlock your creative, innovative self through hands-on activities, discussions, and assignments that span the fields of mathematics, sciences, and the humanities. Learn about the neuroscience and brain theory behind creativity, its modern applications to entrepreneurship, and develop confidence in your own ideas.

Words that Matter: Rhetoric and Persuasion

Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

DELVE INTO AN ADVANCED EXPLORATION OF THE POWER OF THE SPOKEN WORD. EXAMINE INFLUENTIAL SPEECHES AND DEBATES, STUDY THE LOGIC AND STRUCTURE OF EFFECTIVE ARGUMENTS, AND RESEARCH THE REASONING BEHIND DELIBERATE WORD CHOICES. CREATE YOUR OWN PERSUASIVE STYLE, HONE YOUR SKILLS OF ANALYSIS AND FOCUS YOUR WRITING TO ARTICULATE YOUR MESSAGE. REFINED YOUR SPEAKING SKILLS AND DEBATE DELIVERY TO ILLUSTRATE POINTS OF DIVERGENCE INSTEAD OF MERE DISAGREEMENT. AFTER PRACTICING THESE SKILLS, APPLY THEM BY PREPARING AND PRESENTING IN-CLASS DEBATES.
Throughout history, human societies have devoted significant resources to the protection of domestic secrets and the detection of foreign intelligence. Explore the techniques of cryptography and code breaking; delve into the complex mathematical theories behind modern cryptography; and learn to translate these theories into working computer code. Brainstorm solutions to problems involving cipher development and Internet security by producing an independent project on a topic of your choice. Completion of Algebra I or its equivalent is preferred, but not required.

**Cryptography, Codebreaking, and the Mathematics of Spying**

*The University of Georgia*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Duke University West Campus, Academy**
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The history of cryptography, the art of enciphering and deciphering, is one of the most exciting stories of applied mathematics. It is a story of conspiracies and intrigue, secret societies and intelligence services, war and peace, power and money. Governments and big corporations have been paralyzed by code breakers, and outcomes of wars have been influenced by cryptologists. The ongoing race between encrypters and attackers has led to ingenious and elaborate coding algorithms that make heavy use of classical results from number theory. Approach the subject from a historical point of view, emphasizing the elementary theoretical aspects of number theory, abstract algebra, and cryptography. Study monoalphabetic and polyalphabetic substitution ciphers as well as modular arithmetic and mathematical induction, basic probability theory, and elementary matrix theory. Students who have taken Spy 101: Cryptology and Number Theory should not enroll in this course due to curricular overlap.

**Game Theory: Economics**

*Duke University East Campus*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Using complex mathematical concepts, analyze situations in which two or more parties are competing, determine the best course of action for each party, predict the outcome, and then apply these concepts to circumstances across all disciplines. Investigate the foundations of Game Theory, or Formal Decision Theory, and its use as a tool to help people conceptualize and navigate complex decision-making processes in ways that produce optimum benefit. Explore applications in economics that inform mergers, negotiations, marketing and pricing strategies, and contract formation, as well as applications in strategic conflict and warfare, evolutionary systems, psychology, and sociology. *This course is open to current ninth and tenth graders only.*
Math, Money, and You
Appalachian State University
Term 1 (June 7–June 27)

ACADEMY MATH  
Grades 7 8

Delve into the world of math and money. Why do stores put items on sale and risk making less money? When is the right time to purchase a stock or bond, and what investments make sense? How can you become a millionaire by collecting pennies? Math is fundamental in making wise financial choices. Explore how math affects decisions regarding personal and business finance, and how marketing and innovation have changed in a more socially connected society. Examine direct and indirect variation and arithmetic and geometric growth. Develop a deeper understanding of the stock market, taxes, mortgages, interest-bearing accounts and the effects these have on our financial decisions on a daily basis. Discover behavioral finance strategies through investigative simulations and entrepreneurial projects.

Mathematical Models, Analysis, and Applications
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH  
Grades 8 9 10

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

Mathematical Models, Analysis, and Applications
Trinity University
Term 1 (June 7–June 27)

CENTER MATH  
Grades 7 8

Engage in mathematical analysis as it relates to the real world. How do you use numbers to prove your point? How do you create mathematical models that skew data in your favor? Uncover sample bias and deceiving graphs. Interpret, analyze, and model data across disciplines. Delve into the math of data analysis and see how professionals in the fields of science, technology, health care, government, and business use statistics and mathematical modeling to make meaningful predictions. Investigate and report on personalized topics, conduct statistical experiments, and dig into databases with the help of p-values, vectors, variances, regression lines, and permutations to learn how applied math plays an integral role in everyday life. Students who have taken Mathematical Modeling and Applied Statistics should not enroll in this course due to curricular overlap.

Mathematical Problem Solving
Davidson College
Term 1 (June 7–June 27)

Trinity University
Term 2 (July 5–July 25)

ACADEMY MATH  
Grades 7 8

Apply mathematical knowledge and methods in new ways to solve interesting and complicated problems and proofs. Prepare for high school mathematics and beyond by developing critical mathematical thinking. This course also covers common mathematics contest topics and encourages students to delve into more difficult problems using knowledge of these topics. Develop structural knowledge of mathematical proofs, the foundation for all higher-level mathematics. A diagnostic test given at the beginning of the term will ensure you are challenged with new mathematical concepts.

Mobius Strips, Klein Bottles, and Fractals: The Mathematics of Distortion
Georgia Institute of Technology
Term 1 (June 7–June 27)

Duke University East Campus
Term 2 (July 5–July 25)

ACADEMY MATH  
Grades 8 9 10

Explore topology, the mathematical study of twisting, bending, and stretching objects. Learn how industrial design, engineering, and theoretical physics employ applications of Möbius strips. Discover mathematical distortion techniques that work on highly complex systems, such as roving sensor networks for security systems. Examine the continuity between shapes and the ways in which seemingly different objects are topologically the same. Study fractals, knots, and manifolds using concepts of points, lines and curves.

SCIENCE

Aerospace Engineering
Rollins College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

ACADEMY MATH  
Grades 7 8

Explore aviation history, physics, and engineering concepts related to flight, both in the atmosphere and in space. Investigate rocket propulsion, spacecraft launch vehicles, and orbital mechanics, as well as atmospheric conditions, aerodynamics, propulsion systems, aircraft and spacecraft design, performance analysis, stability and control, and helicopter aerodynamics. Apply these principles in a laboratory setting and participate in field trips, guest lectures, workshops, and contests. This course is math- and physics-intensive.
Anatomy, Physiology, and Medical Ethics

Georgia Institute of Technology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH & VERBAL 8 9 10

Learn the tools to view the human body as a complex and intricate structure. Explore the connection between structure (anatomy) and function (physiology), and analyze this relationship in cells, organs, and organisms as a whole. Examine the different functional systems such as digestive, circulatory, and skeletal and the various building blocks of the body. Participate in hands-on laboratory exercises to visualize and practice principles and ideas. Discuss established medical ethics, and debate circumstances, technologies, and advances that challenge and/or justify ethical standards.

Architecture in the Urban Environment

Rice University
Term 1 (June 7–June 27)

Georgia Institute of Technology
Term 2 (July 5–July 25)

CENTER MATH & VERBAL 8 9 10

Modern architecture represents the intersection of science, technology, engineering, and art. Discover the intricacies of architecture and how it defines the very nature of an urban landscape. Explore the impact of technology and environmental concerns and learn how to create significant and functional space within an urban environment. Explore the global history of metropolitan architecture and how it has evolved to embrace the challenges of designing buildings in these ever-changing settings. Apply drafting techniques to repurpose existing infrastructures, bring nature back to cities, or design dazzling new skyscrapers. Consider the environmental, social, cultural, and artistic impacts of your designs and learn to capture the public’s imagination through hands-on, project-based learning.

Astronautical Engineering

Georgia Institute of Technology
Term 1 (June 7–June 27)

Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH 8 9 10

Explore the history and orbital mechanics of spaceship from Newton and Kepler through Mercury, Gemini, Apollo, and the space shuttle programs. Learn the engineering behind spaceship and spacecraft design. Study how objects move through space. Investigate various fields in science related to spaceship, such as physics, aeronautics, and rocket propulsion. This course is math-intensive. Completion of Algebra I is preferred but not required. Note: Students who have taken TIP’s Spacecraft Mission Design should not enroll in this course due to overlap in content.

Biological & Chemical Sciences

Davidson College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Trinity University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College
Term 2 (July 5–July 25)

CENTER MATH 7 8

Science moves forward by generating theories consistent with laboratory observation. Interact directly with natural phenomena and data collected by others as you design investigations, manipulate equipment, and analyze results. Engage in scientific reasoning through laboratory exercises, class discussions and field trips, using the same biology and chemistry procedures scientists use in the field. With experiments in classical and modern genetics, bacteria sampling, anatomy, and chemical reaction, work collaboratively to analyze data, connect outcomes with theory, and draw conclusions from experiments. Explore current scientific research and discuss the societal implications of advancing scientific knowledge.

Biology of Cancer

Georgia Institute of Technology
Term 1 (June 7–June 27)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH 8 9 10

In the United States, 1.5 million people are diagnosed with cancer each year. Given the prevalence of this disease, much attention and research has been focused on identifying causes and designing treatments to combat it. Examine the historical perspective on the biology of cancer and explore the molecular biology and genetic changes that occur during cancer, including the six hallmarks of cancer, as defined by Robert Weinberg. Discuss the role of genetics, oncogenes, and tumor suppressor genes in the development of the disease. Debate the ethics surrounding genetic testing and cancer treatment. Conduct research using current articles and primary literature on cancer at Duke's Perkins Library and participate in laboratory activities to illustrate concepts.

Biomedical Engineering

Georgia Institute of Technology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

CENTER MATH 8 9 10

Biomedical engineering applies fundamental science and math principles to improve human health beyond the limits of traditional medicine. Learn the engineering design process used by biomedical engineers and investigate how they create new diagnosis and treatment methods in tissue engineering, genetic engineering, drug delivery, and biomedical instrumentation. Explore principles such as density, hydraulic, and pneumatic systems, Newton's laws of motion, genetics, and electromagnetism. Perform gel electrophoresis, gene expression analysis, circuitry design, and cell staining, techniques routinely used by biomedical engineers to advance the field of medicine.
Go beyond the simplified forensic science that has been popularized in the media; learn the real techniques forensic investigators use to gather and analyze evidence at a crime scene and in the lab. Plot and process a mock crime scene, and discover the science behind DNA analysis, fingerprinting, and facial reconstruction. Discuss the forensic evidence in famous solved and unsolved cases. Explore what it means to be an expert witness and learn about the laws associated with forensic studies.

**Design Challenges: Physics and Engineering**

*Appalachian State University*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Texas Christian University*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Rollins College*
Term 2 (July 5–July 25)

> Force, motion, and energy make up the foundation of physics. Explore these concepts by examining their roles in design and engineering. Learn how engineers determine the design and materials to use before building a structure. Utilize math, physics, and engineering to complete hands-on problem-solving and model-building activities. Explore advances in technology and their effect on design.

**Electrical Engineering**

*Appalachian State University*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Rice University*
Term 2 (July 5–July 25)

> Electrical engineers are key creators behind many high-tech innovations such as global positioning systems that can pinpoint a car’s location, giant generators that can power entire cities, and new designs for an airplane’s electrical system. Explore the physical basis and mathematical models of electrical components and circuits. Work in teams to design and build electronic circuits and investigate voltage, resistance, amperes, watts, and circuit theorems. Analyze linear circuits, semiconductors, frequency representation, and sequential logic. Determine applications for electrical engineering concepts in other scientific fields and everyday life. *This course is open to current ninth and tenth graders only.

**Engineering for Fun**

*Georgia Institute of Technology*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Engineering Problem Solving**

*Davidson College*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

**Engineering for Fun**

*Texas Christian University*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Trinity University*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Wake Forest University*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Rollins College*
Term 2 (July 5–July 25)

> Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.

**Engineering Problem Solving**

*The University of Georgia*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Rice University*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

*Duke University West Campus, Academy*
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

> Explore the various fields of engineering and their interactions in an intensively hands-on way. Study how engineers apply science and mathematics to meet social and commercial needs: constructing a dam, building efficient aircraft, designing safe patterns for the flow of traffic, or concocting an environmentally friendly plastic on a commercial scale. Build structures and test their ability to withstand various forces, design circuits and analyze the effects of different resistors, and participate in other interactive labs.
Environmental Chemistry

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Working at the intersection of chemistry and toxicology, explore the causes and effects of major classes of pollutant chemicals. Determine how these pollutants enter the air, earth, and water, and how we detect them. Learn about laboratory testing used to identify toxic chemicals and apply those techniques to samples you collect from local ecosystems. Identify ways that toxic chemicals are absorbed and processed by animals, humans, and plants. Discuss and analyze the potential effects of toxins and toxicants on individual organisms, populations, and ecosystems, such as the lead contamination of drinking water in Flint, Michigan. Students who have taken Environmental Toxicology should not enroll in this course due to curricular overlap.

Experiments in Science: Biology, Chemistry, and Physics

Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College
Term 2 (July 5–July 25)

Investigate science through the process that has driven discovery for centuries: experimentation. Experiments are what allow scientists to connect their ideas and theories with the practical nature of the real world. Research and conduct experiments in a wide range of scientific fields, including molecular genetics, earth’s history, field ecology, alternative energies, physics, and more. Learn not only how to design and conduct informative experiments, but also how to interpret the results in a way that helps us understand more about the world in which we live.

Forensic Science

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Georgia Institute of Technology
Term 2 (July 5–July 25)

Forensic science is the scientific analysis of physical evidence. Examine some types of evidence encountered in criminal investigations and the techniques used to analyze that evidence. Analyze fingerprint and trace evidence such as hairs, fibers, glass, and paint. Engage in laboratory exercises simulating real-life methods of evidence analysis, and then participate in a mock crime scene, examining the many roles of crime scene investigators. Round out the course with discussion and debate cases and the portrayal of forensic science in popular culture.

Hanging with Lemurs: An Introduction to Primatology

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Using the world-famous Duke University Lemur Center as your classroom, conduct daily observation, data collection, behavior analysis, and research into lemurs, lorises, bushbabies, and more. The study of these biological relatives helps us understand where we fit into the animal kingdom and why we are so unique. Examine common characteristics of primates, and explore current primate taxonomy, the evolution of the group, and trends and variation in primate subsistence, physiology, locomotion, social structures, and cognition. Consider the impact of a changing society on these creatures. Note: Students who have taken TIP’s Primate Biology: Lemurs, Lorises, and Bushbabies should not enroll in this course due to curricular overlap.

Human Anatomy: The Structure and Function

Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rollins College
Term 1 (June 7–June 27)

Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The human body is composed of complex, interrelated systems. Explore the systems of the human body and examine how they work together. Study basic anatomy and physiology as well as the chemical processes that allow body systems to function. Through laboratory activities, research, and debate, become familiar with the complex workings of the body and current issues in medical science. Students who have taken The Human Body should not enroll in this course due to curricular overlap.

Infectious Diseases

The University of Georgia
Term 1 (June 7–June 27)

From the Ebola virus to smallpox to anthrax, disease and the risk of epidemics has been a common topic in news reports and a growing concern for many people. How then do we understand the nature of these diseases, the way they spread, how they can be controlled, and the true risk they may pose? Take a multi-disciplinary approach to studying epidemics, pandemics, and the infectious agents that can cause them. Focus primarily on the viruses, bacteria, and other infectious agents, including how they evade the immune system and cause their respective diseases. Explore the fields of genetics, biochemistry, public health, epidemiology, pharmacology, history, and anthropology to better understand the full effect of these diseases. While not a lab-based class, activities will include discussions, literature review, research projects, and interactive, hands-on simulations, some of which may take place in a lab.
Modern veterinarians occupy a variety of careers ranging from typical clinical work on domestic or exotic animals to research and academic scholarship. Today’s veterinarians may work in private practice or for a university, an industry, or a government program. Explore the training, rigor, and career opportunities of veterinary medicine through the study of basic anatomy, physiology, histology, biochemistry, pharmacology, toxicology, animal health, public health, and veterinary medical ethics. Participate in laboratory work, veterinary school tours, research, procedures, and discussions. Apply knowledge gained to realistic clinical cases. This course is taught in conjunction with the Georgia School of Veterinary Medicine.

Marine Biology: Estuaries and Marshes
Duke University Marine Laboratory
Marine Lab (June 14–July 4)

Survey and explore the structure, function, ecology, and development of marine life found in estuarine and coastal habitats. The unusual nature of these habitats that exist between the land and the open ocean create unique relationships among the plants and animals that live there. Use classroom presentations, laboratory experiments, and field trips to gain hands-on experience with the marine life that exists in coastal habitats.

Marine Biology: Near Shore and Oceans
Duke University Marine Laboratory
Marine Lab (June 14–July 4)

Perform an in-depth examination of the biology of marine life in ocean and inlet habitats. The Duke University Marine Lab provides access to these large bodies of water and the organisms that inhabit them. Examine how life has adapted to the features of these ocean habitats and how that adaptation influences the relationships within the ecological communities. Along with work in the classroom, engage in hands-on fieldwork through dredging, trawling, and towing trips on Duke University’s research vessels at various marine and geological sites.

Materials Science:
The Building Blocks of Engineering
Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

From the Stone Age to the Computer Age, humans have always sought to identify and engineer materials with the mechanical, electrical, thermal, optical, and magnetic properties that make innovation possible. These discoveries have fueled mankind’s greatest achievements and set the stage for advancing technologies. Develop your own innovative abilities by using hands-on lab work to investigate the relationship between the microscopic structure and the unique properties of metals, polymers, composites, and ceramics. Explore the many applications of these materials and learn how they can be used to better the quality of life for all mankind.

Modern Medicine: Disease and Immunology
Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Disease can change the course of a single life or the course of human history. Today’s medical professionals work in an age rich with options for alleviating suffering, but diseases continue to spread and have significant impact on individuals and societies. Examine the anatomy of cells, tissues, and organ systems to better understand how disease inhibits their functions. Engage in surveys of hematology, serology, immunity, and genetics. Simulate the work of a doctor by conducting research, employing hands-on investigation, and developing skills to write formal laboratory reports.
Neuropsychology
Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Why are roller coasters thrilling for some and terrifying for others? How does brain development affect perception, judgment, and decision-making? Understanding the intersection and interaction of the human brain and behavior is at the heart of neuropsychology. Study the physiology of the brain and cognitive functions that affect behavior. Investigate how the brain works by also considering neuroscientific, philosophical, neurological, and psychiatric perspectives.

Neuroscience
Georgia Institute of Technology
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Humans everywhere are turning to the brain for answers to questions that have plagued our species for centuries: Why do people do evil things? What is love? Why do we dream? How do we remember? What is consciousness? Address these questions from the perspectives of physiology, pharmacology, pathology, psychology, and philosophy. After becoming acquainted with the methods and tools that researchers employ in their studies, explore puzzling questions by examining evolving theories and contemporary methodologies in science and philosophy. Examine the basic structural and organizational aspects of neuroanatomy and physiology, study current research regarding sleeping/dreaming, consciousness, behavioral disorders, neuropathology, memory, and artificial intelligence.

Nuclear Science
Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Nuclear science plays a vital role in the lives of Americans, providing approximately one-fifth of our energy and diagnosing and healing millions of patients with nuclear medical procedures. Nuclear science is used to enhance the food we eat, control pests, track materials flow in industry, date archeological artifacts, and identify chemical compositions. Through hands-on activities, computer simulations, and discussions, learn the science within the atom, study the history of key discoveries in the field, and debate the ethics of nuclear weaponry. Apply Einstein’s famous formula $E=mc^2$, and learn about atomic structure, isotopes, half-life, radioactivity, nuclear reactions, fission, and fusion.

Oceanography
Duke University Marine Laboratory
Marine Lab (June 14–July 4)

Delve into the fundamental components of studying the global oceans. Investigate the physical, chemical, geological, and biological processes that govern microscopic to macroscopic patterns in the ocean system. Explore general issues on the nature of science, the role of scientific rationalism in modern society, and the development of practical problem-solving skills. Examine oceanography’s relationship to social and political issues. Study biotic and abiotic components of the global oceans through engaged discussion, laboratory experiments, and field research. Design and complete a research project to present to your peers.

Pharmacology
Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

How do we discover new drugs? How do pharmacologists balance the therapeutic value of a drug with its negative side effects? How do drugs treat pain, cure disease, or alleviate symptoms? How do our genes play a role in the success or failure of drug treatment? Who bears responsibility for the development of life-saving drugs, and what should they cost? Examine the field of pharmacology and its relationship to health, disease, and society. Study how the chemical properties of drugs interact with biological systems and how pharmaceuticals affect our health and behavior. Participate in hands-on laboratory exercises to visualize and practice principles and ideas.

Quantum Mechanics and Modern Physics
Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The bizarre world of quantum mechanics seems to contradict our understanding of the everyday natural processes that we observe in the macroscopic world. Yet our understanding of the principles of quantum mechanics is essential to the creation of lasers, microprocessors, electron microscopes, superconductors, and magnetic resonance imaging (MRI) technology, along with countless other devices and scientific processes. Through hands-on labs, examine the foundations of quantum physics and explore modern applications of this fascinating subject, including its impact on diverse fields within engineer and science, including materials science, nanotechnology, electronic devices, and photonics. This course is math-intensive. Completion of Algebra I is preferred.
The southern Appalachian Mountains have a vast history that encompasses hundreds of millions of years. The mountains of Boone, North Carolina and the surrounding area provide a rich environment for investigating the events that have shaped the landscape of this fascinating region. Span the history of Earth and life on it, exploring geology, ecology, and paleontology. See first-hand evidence of the area's history through interactive laboratory activities and field trips into the mountains.

**Sports Medicine**

The University of Georgia  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Rice University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Examine the diagnosis, treatment, and prevention of common sports injuries from an anatomical, physiological, and psychological perspective. Explore how advances in technology have affected the field of sports medicine, improving both prevention and treatment. Analyze the decision-making used in designing treatment plans for athletes and non-athletes. Learn common injury care techniques used by athletic trainers, and evaluate the implications of sports medicine beyond the training room.

**The Brain, Intelligence, and Creativity**

Davidson College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Trinity University  
Term 2 (July 5–July 25)

Examine the intersection of neuroscience and psychology as you investigate the most complex organ in the human body. Through the framework of brain physiology and development, examine intelligence, creativity, and the way people experience the world. In addition to classroom activities, discussions, and debate, participate in hands-on laboratory work, brain imaging, and academic research.

**Understanding Genetics**

Davidson College  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Genetic technology helps identify and cure diseases, solve crimes, and understand family heritage. Take a hands-on approach to studying deoxyribonucleic acid (DNA) and the way the information within it creates a roadmap for human development and risk of disease. Explore DNA structure, replication, mutations, and how scientists are applying evolving new technologies to treat diseases. Through lab experiments, simulations, discussions, and presentations, learn about the mechanics of DNA and why it is arguably the most important molecule to all life on Earth. Students who have taken DNA: Unlocking the Genetic Code should not enroll in this course due to curricular overlap.

**SOCIAL SCIENCES**

**American Foreign Policy**

The University of Georgia  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

How is American foreign policy determined, and who is responsible for shaping it? Explore the history of America's foreign policy and the current changes and conflicts that challenge it. Examine the theories and philosophy behind various approaches to international relations, and compare America's driving principles with those of other nations. Identify the role of international law and international organizations in the formation of policy, and strategize ways for the United States to identify and incorporate emerging global powers into a peaceful and comprehensive strategy.

**Archaeology and Anthropology: Stones and Bones**

Wake Forest University  
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Delve into a college-level introduction to anthropology, the holistic study of humans and human societies, both in the classroom and in the field. Explore anthropology's traditional four fields: archaeology, cultural anthropology, linguistics, and biological (or physical) anthropology. Study some of the major discoveries and theoretical precepts of these disciplines, emphasizing the application of anthropological methods. Identify, plot, and excavate an archaeological site, classify and analyze the fossilized remains of human ancestors, and conduct ethnographic research.
Business Strategy: Beyond the Lemonade Stand
Rollins College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Study and practice business planning, decision analysis, and management strategies as they relate to the development and implementation of successful companies. Examine the leadership principles and strategies of highly successful entrepreneurs and analyze how a trend becomes firmly entrenched in the marketplace. Identify the microeconomic principles behind decision-making with regard to resources, price, and marketing as you develop and present your own successful business plan.

Consumer Psychology and Modern Marketing
Rollins College
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University
Term 2 (July 5–July 25)

Why do people have completely different perceptions about nearly identical products? Why are they so attached to particular brands? How do they actually decide what they’re going to buy? Explore these questions and related topics like motivation, perception, consumer judgment, decision making, social influence, and special topics in recent consumer behavior research. Examine the impact of environmental influences (culture, politics, socioeconomics, lifestyle, and beliefs) and better understand the psychology of consumer decision making. Apply business and psychology knowledge to analyze current marketing problems.

Criminal Law and Mock Trial
The University of Georgia
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Academy
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Survey major topics in criminal law, the criminal justice system, and relevant constitutional law. Study the evolution of our justice system and review criminal trials that have transfixed our nation. Examine the ways in which the Supreme Court interprets constitutional law and debate issues ranging from the death penalty to the insanity plea. Discuss the Supreme Court's role in interpreting constitutional law. Class may visit a courthouse. Practice the use of case method, enhance research and public speaking skills as you argue a case, and simulate the procedures of a typical criminal trial.

Criminal Trial Advocacy
Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

This course is modeled after law school curriculum. Delve into black-letter law and litigation techniques used by trial lawyers through a series of workshop activities and the analysis of criminal procedure cases. Apply legal principles through a series of structured oral arguments and mock trials. Explore the nuances of arrest, indictment, and pretrial discovery from the perspective of both the prosecution and the defense. Work through hypothetical problems in groups, engage in Socratic-style dialogues, and participate in class-wide discussions. Write legal briefs, apply previous court decisions to current controversies, and develop and present a case. Class may visit a courthouse.

Dictators, Kings, and CEOs: The Evolution of Empire
Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Duke University West Campus, Center
Term 2 (July 5–July 25)

Empires are perhaps the single most formative phenomenon in history. Survey influential empires through the ages and learn how they impacted the development of the world politically, culturally, socially, and militarily. Follow Augustus as he spread the glory of Rome across Europe. Ride with Genghis Khan as he shakes the foundations of the civilized world with terror. Examine the spread of American culture and beliefs across the globe, from McDonald's to democracy. Engage in literary analysis and historical research at Duke University's libraries.

Historical Epidemiology
Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Georgia Institute of Technology
Term 1 (June 7–June 27)

Rice University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

From the Black Death to smallpox to HIV/AIDS and the Ebola virus, infectious diseases have profoundly affected human history and shaped the progress of societies. Evaluate, track, and analyze the impact of major epidemics throughout the ages. Study modern epidemiological techniques in a classroom setting. Learn the basic concepts and techniques behind recognizing and fighting pandemics, then apply this knowledge to historic epidemics as a foundation for developing models that fight modern disease. Learn how the media and organizations like the World Health Organization and Center for Disease Control all play a role in fighting these major threats to our survival. Students who have taken Pathogens, Plagues and Patient Zero: Historical Epidemiology should not enroll in this course due to curricular overlap.
Examine fundamental topics of law, including the criminal and civil justice system, rules of evidence, eyewitness testimony, civil rights, and challenges to constitutional law. Apply the principles and practices of courtroom trials, experiment with the art of litigation as prosecutors and defenders, and consider challenges inherent in seeking justice. Read and understand precedent-setting decisions made by the Supreme Court and discuss the Court’s role in interpreting constitutional law. Practice using the case method while enhancing research and public speaking skills. Class may visit a courthouse. This course is writing intensive.

Mock Trial

Trinity University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Wake Forest University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Davidson College
Term 2 (July 5–July 25)

Complete an intensive course equivalent to an introductory or principles level college course in microeconomics. Develop a basic understanding of the theory and practice of microeconomics, including an understanding of the determinants of the levels of income, output, and employment. Analyze the determinants of consumption, investment, government spending, and net exports, and study the model of international trade that determines exchange rates and the balance of trade. Discuss the economic impact of the federal deficit and debt and the effectiveness of discretionary fiscal and monetary policies under a number of models, and analyze macroeconomic debates to effectively participate in the political process.

Microeconomics

Duke University East Campus
Term 1 (June 7–June 27)

Complete an intensive course, roughly equivalent to an introductory or principles level college course in microeconomic theory. Use microeconomics as a model to understand and analyze human behavior. Apply an analytical approach to the study of how individuals and societies deal with the fundamental problem of scarce resources. Understand how these principles affect individuals trying to maximize their utility, businesses trying to maximize their profits, and societies trying to manage resources. Analyze controversial issues such as minimum wage laws, farm subsidies, rent controls, protectionism, pollution, welfare programs, and the tradeoff occurring between equity and efficiency that result from various microeconomic policies.

Political Cultures and Countercultures: The Battle for Public Opinion

Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Since the beginning of recorded history, politics has been a struggle between two opposing forces: elite and popular power. While elite history is recorded in the actions of kings and the growth of empires, the politics of the lower classes is expressed in an era’s popular culture. Examine grassroots movements and their efforts to subvert political regimes throughout history. Analyze Greek tragedy, Shakespeare’s Elizabethan propaganda, Whitman’s Democratic Romanticism, Beat poetry, 1960s protest music, and the current blogosphere in conversation with political theorists such as Plato, Rousseau, Emerson, and Marx. Follow the transformation of political cultures from the ancient to the modern world by analyzing the development of popular culture from Dionysian festivals to the modern blogosphere.

Psychology

Appalachian State University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Texas Christian University
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

The field of psychology is remarkably diverse and includes countless areas of interdisciplinary study and practical applications. Survey the realm of psychology and examine the field from its historical roots to current neuroscientific discoveries being made by researchers around the world. Discuss a wide range of topics, including the human brain, sense perception, consciousness, learning, memory, cognition, emotions, personality, intelligence, creativity, abnormalities, and mental health. Participate in group activities, classroom discussions, debates, mini-experiments, and projects.
Analyze the ways in which society attempts to address such violence. Rousseau to Stalin to Al Qaeda to modern day pirates off the coast of Somalia. Since the late eighteenth century, revolutionaries have self-consciously resorted to force (or the threat of it) to try to advance their ends. Explore the historical development of modern revolutionaries and terrorist groups ranging from factions, but for refashioning the political system itself. Since the late eighteenth century, revolutionaries have self-consciously resorted to force (or the threat of it) to try to advance their ends. Explore the historical development of modern revolutionaries and terrorist groups ranging from Rousseau to Stalin to Al Qaeda to modern day pirates off the coast of Somalia. Analyze the ways in which society attempts to address such violence.

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Psychology of Decision Making: Behavioral Economics

Duke University East Campus
Term 1 (June 7–June 27)

Georgia Institute of Technology
Term 1 (June 7–June 27)

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Integrate insights from cognitive psychology, social psychology, and behavioral economics to understand why people make the choices they make. Examine how cognitive processes that help people make sense of complex information can also logically lead them astray in decision making. Investigate how emotion, motivation, and information-processing shortcuts interact with careful, rational weighing of information. As you study the surprising ways that individuals actually make decisions, gain insights about decision making in fields such as healthcare, finance, education, and government.

Revolution and Terror: Controversial Politics

Duke University East Campus
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

Violence and fear have always been instruments of politics. Rulers and rebels alike have resorted to force (or the threat of it) to try to advance their ends. Since the late eighteenth century, revolutionaries have self-consciously turned to violence and fear as instruments - not just for advancing their own factions, but for refashioning the political system itself. Explore the historical development of modern revolutionaries and terrorist groups ranging from Rousseau to Stalin to Al Qaeda to modern day pirates off the coast of Somalia. Analyze the ways in which society attempts to address such violence.

Social psychology is the formal study of the ways in which individuals affect one another. Examine how people's attitudes, biases, and behaviors are influenced by other people and how these influences affect society as a whole. Explore the ways social psychologists use the scientific method to study people's thoughts and behaviors in social situations and how ethical principles govern their research. Discuss and debate topics such as the self, prejudice, gender, race, conformity, obedience, aggression, group influence, and pro-social behavior. Drawing from examples in the media, law, politics, history, culture, and our own lives, examine how we are affected by social relationships and what a difference these relationships make in the way we live.

The Ethics of Artificial Intelligence

Duke University West Campus, Center
Term 1 (June 7–June 27) | Term 2 (July 5–July 25)

What happens when you create an intelligent, autonomous robot and then limit its freedom? The field of artificial intelligence already permeates more aspects of our daily lives than we realize. It drives our cars, flies our planes, manages our money, and protects our safety. Its approach to more human-like thoughts and actions raises predictable complications. Are they to be considered tools or lifeforms? How can we ensure that these machines will respect our ethical and moral principles? Debate the laws by which these thinking machines should abide. Analyze and argue philosophical approaches to AIs integration into society, and build the ethical foundation and psychological framework necessary to navigate this emerging landscape.

The Science and Finesse of Entrepreneurship

Duke University East Campus
Term 1 (June 7–June 27)

As today's technology sector has proven time and again, entrepreneurship is both a science and an art. But how do you move from inspiration to investor? How do you turn a start-up into a company that lasts? Study the success stories of Silicon Valley and learn how to differentiate ideas from opportunities. Examine the fundamentals of e-entrepreneurship as a template for success in other key sectors like information, energy, medical and consumer technologies. Develop the critical thinking skills and processes vital to business success. Learn how to assemble a team and the resources you need. Through research, collaboration, and simulations, develop a plan for a company built on positive impact, sustainable performance, and longevity. Students who have taken Where Great Minds and Big Money Meet should not enroll in this course due to curricular overlap.
**TECHNOLOGY**

**Applications, Algorithms, Computers: Modern Programming**

*Rice University*

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

| CENTER MATH | GRADES | 8 9 10 |

How does Google instantly find the relevant websites when you type a word into the search bar? How does a city know the most efficient route that their trash collectors should take? Explore the ways that computer scientists develop algorithms, processes, and programs that allow complicated problems to be addressed in meaningful ways. Go beyond simply understanding how to create computer programs and understand the mathematics that drive the adaptation of these programs to many fields of study, including medical sciences, aerospace, business and physical sciences. Some computer programming experience is beneficial, but not required.

**Artificial Intelligence**

*Georgia Institute of Technology*

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

| CENTER MATH | GRADES | 8 9 10 |

While science fiction has a long history of intelligent machines, we now live in a world in which these machines are reality - and you can learn the skills to work in this exciting field. We can hold conversations with Siri on our iPhones, watch computers defeat the world’s greatest chess players, and might soon ride around in driverless cars. These new technologies require artificial intelligence, which is the study and development of technology that can reason, deduct and, basically, act human. Learn the programming necessary to work in machine intelligence development, and explore the origins of AI as well as modern areas of research, including language processing, perception, motion, and manipulation.

**Computer Skills for Today’s Scientists and Engineers**

*Duke University East Campus*

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

| CENTER MATH & VERBAL | GRADES | 8 9 10 |

Physicists use supercomputers to analyze massive collisions in underground particle accelerators. Neuroscientists use artificial neural networks to probe the inner workings of the brain’s neurons. Engineers write computer code to control complicated circuitry and robotics. Scientists and engineers in a wide range of disciplines use modern computing technologies to make discoveries, design and develop new technologies and methods, analyze the results of experiments, and solve complex problems. Learn how to program using techniques scientists and engineers employ for data processing, laboratory equipment control, computation, and graphical analysis.

**Engineering in the Virtual World**

*Rollins College*

*Term 1 (June 7–June 27)*

| ACADEMY MATH | GRADES | 7 8 |

Enter the world of 3-D modeling and build the software knowledge that has become arguably the most important skill in an engineer’s toolbox. Coupled with the recent surge in 3-D printing across industries, digital drafting skills have slashed the design-to-prototype-to-redesign loop from months to hours. Learn the skills and techniques that brought engineering into the digital age. Apply engineering principles to problems and quickly test the limits of your own design solution. Evaluate the trajectory of modeling and manufacturing in three dimensions.

**Programming for the Web**

*Appalachian State University*

*Term 1 (June 7–June 27)*

| ACADEMY MATH | GRADES | 7 8 |

There is an increasing demand for computer applications to be collaborative, dynamic, and tied to the user instead of a computer or mobile device. As applications move off the computer and into “the cloud,” web application programming is proving to be a critical part of the next computing revolution. Learn about the basic principles of dynamic web application programming and the unique considerations of programming for the web. By the end of the course, develop an original web application. This introductory course requires no prior programming experience.

**Robotics**

*Trinity University*

*Term 1 (June 7–June 27) | Term 2 (July 5–July 25)*

| CENTER MATH | GRADES | 7 8 |

Study the fields of both robotics and engineering to discover the intersection between theory and interactive, hands-on application. Explore the various fundamental topics behind the exciting field of robotics, participate in interactive lab exercises, then construct and program robots to illustrate the principles you’ve learned. Examine the role of robotics in today’s society and debate the advantages and disadvantages of using robots in various situations.