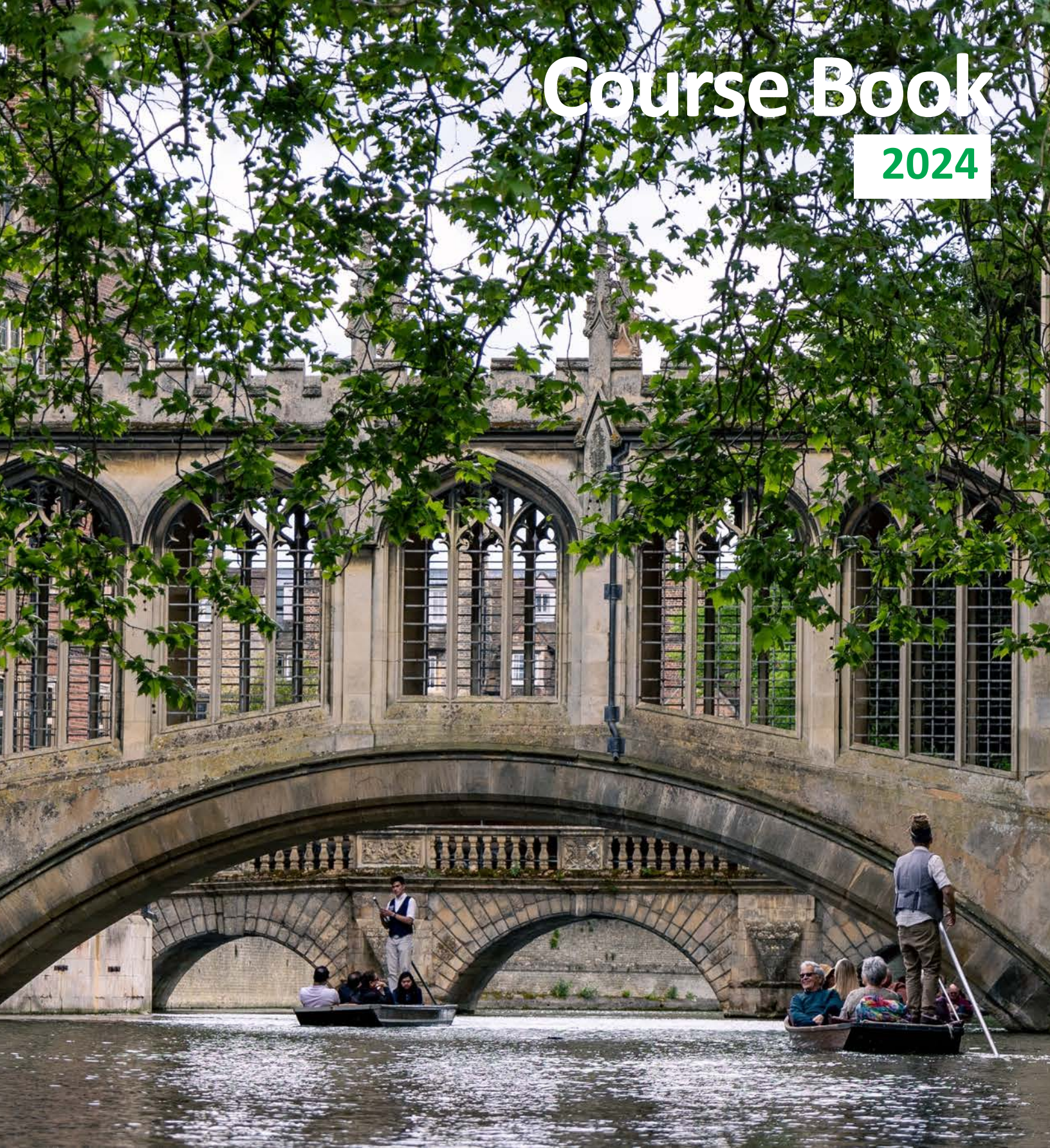


Course Book

2024



summer
discovery

UNIVERSITY OF CAMBRIDGE
HIGH SCHOOL PRE-COLLEGE ENRICHMENT



Table of Contents

- 02** BUSINESS
- 04** HUMANITIES
- 06** SOCIAL SCIENCE
- 08** STEAM



COURSE TITLE

Business Disruptors: Level Up

SUBJECT AREA

Business; Entrepreneurship

COURSE DESCRIPTION

Flying drones, computer chips for artificial intelligence, and engineering the boundaries of Siri are just some of the concepts the people of “Silicon Fen” in Cambridge have been working on. Some of the world’s largest tech powers, engineers, and researchers have set roots in Cambridge. With more than 4,500 high-tech firms in this city, it is the perfect place to study a course that will delve into the ways in which innovative companies have transformed the business landscape. A business disruptor (also known as “disruptive innovators”) refers to a company that introduces a new product, service, technology, or business model that significantly revolutionizes an existing market or industry. We will examine the business models of renowned multinational companies in Silicon Fen such as AVEVA, Cambridge Silicon Radio, along with the largest modern-day disruptors in the global landscape like Amazon, Google/Alphabet, Facebook/Meta, Netflix, Uber, and more. Together, we will explore how their innovative strategies have literally changed the world and influenced the way we think, behave, and approach certain ideas, items, products, and services. Through this course, you will gain a comprehensive understanding of the nature of disruption happening across industries, and how to apply these same techniques in your own business ventures. As part of the final project, you will work in groups to create your own disruptive business, utilizing the framework and skills developed throughout the course. By the end of this course, you will have a deep appreciation for innovation, entrepreneurship, and the potential to lead the next generation of business disruptors. Join us on this exciting journey and discover how to make your mark in the world of business!

COURSE TITLE

Communications: Digital Technology & Social Media

SUBJECT AREA

Business; Advertising & Communications *Marist College Credit

COURSE DESCRIPTION

In today’s digital landscape, the convergence of digital technology is changing how we communicate and experience the world. This course will examine interpersonal communication and investigate new media in the digital age. Develop your personal communication skills and explore the phenomenon of social media as we explore its impact and identify the new opportunities it has created for today’s businesses, brands, and entrepreneurs. Whether you aspire to become the next TikTok sensation, an iconic “mega” brand influencer, or you’re looking to harness the power of digital technology to grow your business – this course will help you navigate this ever-changing realm of communication. In this course, we will explore the foundation of digital communications and technology, and various social media platforms, their unique features, and their role in modern communication. Students will explore real life case studies, where businesses have effectively (and successfully) leveraged social media and digital technology to build their business. #signmeup

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COURSE TITLE

Global Business & Economics

SUBJECT AREA

Business; Finance & Business *Marist College Credit

COURSE DESCRIPTION

Embark on a dynamic exploration of global business and economics. This introductory course will examine the importance of globalization and interdependence in modern economies, and the world-wide impact of recent global events. Delve into key concepts, from international markets to economic policies, and gain insights to thrive in today’s global economy. Students will be introduced to the principles behind macro and micro economic theories and how they are applied in a modern, global business environment. Cambridge is a global leader in economic theory and the course will examine the role of leading theorists such as Marshall and Keynes. Cambridge is also a center of technology, drawing the likes of Microsoft (and its new European research center) to its location. Study businesses large and small to understand the ideas of global marketing, manufacturing and financial services and the part the UK plays in this global economy. Whether you’re an aspiring economist, policy analyst, or simply curious about the forces shaping our world, this course equips you with the knowledge to make informed decisions in the complex landscape of global business and economics.

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COURSE TITLE

International Entrepreneurship: Navigating Strategies & Innovation

SUBJECT AREA

Business; Entrepreneurship

COURSE DESCRIPTION

Experience an engaging and hands-on opportunity where students investigate all aspects of a real-life entrepreneurial venture, starting with opportunity recognition, idea generation, and innovation. Whether you're looking to start your own business or work in a leadership role in an established company, the knowledge and skills you'll gain in this course will be invaluable. Course topics may include persuasive communication, relationship building, overcoming change aversion, marketing and sales, negotiation, financial analysis, and legal structures. Students will also explore the 5 Ps of business: product, price, promotion, place, and people. Understanding these key elements is essential to develop a successful strategy and business plan. From a Cambridge perspective, students will have the opportunity to also focus on international startups. With the global economy constantly evolving, it is essential for entrepreneurs to understand how to navigate international markets and adapt to different cultures and business practices. Through the lens of their own business ideas, students will prepare an elevator pitch and a business one-pager, two essential tools for any entrepreneur looking to attract investors or customers. This program will help you take your entrepreneurial potential to the next level and activate your business mindset to set you up as a successful leader and entrepreneur.



COURSE TITLE

Art & Architecture: A Cambridge Perspective

SUBJECT AREA

Humanities; Art & Design *Marist College Credit

COURSE DESCRIPTION

This course is built around the concept that architecture is the most accurate representation of the society that created it. Architecture is a natural process that reflects the needs, contributions, and philosophy of its time. This course will explore the timeless principles of design, functionality, and aesthetics as we investigate architecture throughout history. Cambridge's architectural legacy spans three millennia and is just as much a part of the city as its prestigious university. The city boasts a diverse range of architectural styles, from ancient to ultra-modern, each with its own unique art and beauty. Architecture in Cambridge often aims to harmonize with the historical and cultural context of the city. This includes respecting existing architectural styles, preserving heritage buildings, and ensuring that new constructions blend seamlessly. Join us on this journey as we explore the grandeur of these buildings and the art within, during numerous field trips - including a visit to the must-see King's College chapel. This stunning building is one of the most breathtaking structures in all of England, with sublime beauty and intricate design. Completed in 1438, it is a testament to the emblematic architecture of Cambridge. The Reubens painting at the altar is worth over £20,000,000. Other sites we'll visit include the Fitzwilliam museum, which houses a collection of Constable and Turner paintings, the church of the Holy Sepulcher (dated 1130), and many other University Colleges and local domestic sites. Our thematic approach to learning will be enhanced through direct observation via photography and drawing, with each student receiving a sketchbook for notes, annotated handouts, and sketches or photographs. *Students completing 10th-12th grade may choose to take designated College Credit courses for credit or not for credit. The decision must be made prior to June 1. After June 1, students may not change the college credit status. There is an additional non-refundable fee of \$395 for each College Credit course. Credit is conferred by Marist College.

COURSE TITLE

Creative Writing Workshop

SUBJECT AREA

Humanities; Writing

COURSE DESCRIPTION

If you're an aspiring writer looking to enhance your writing skills or want to know the secrets behind writing the next best seller, then this course is for you! This creative writing workshop provides a supportive environment for writers to explore and experiment with different forms of writing, such as poetry, fiction, and creative non-fiction. The course covers a range of topics including character development, plot and setting, storylines, voice, and creative language use. You will be guided by experienced writing instructors who will help you revise and enhance your writing to effectively communicate your creative ideas. Students will begin to develop the critical skills that will allow them to read like writers and understand, on a technical level, how accomplished creative writing is produced. Whether you're just starting out or have been writing for years, this creative writing course is the perfect place to unleash your creativity, improve your writing skills, and connect with like-minded individuals who share your passion for the written word.



COURSE TITLE

Mastering Logic: The Key to Critical Thinking

SUBJECT AREA

Humanities; Philosophy

COURSE DESCRIPTION

Join us on an adventure into the world of structured thought, sound reasoning, and informed decision-making. This course will help you master the art of logical reasoning and critical thinking. In today's world, logical and innovative thinking are leadership traits central to academic and career success. Successfully using critical thinking and logic to dissect arguments and reach new conclusions is an artful dance that needs practice. Students will finesse their skill at asking pertinent and probing questions, analyzing arguments with informed perspectives, and applying logic to get to the bottom of an issue being discussed. You will learn how to use inductive and deductive reasoning to assess others' arguments as well as how to draw upon logic and reasoning to construct strong arguments and perspectives of your own. Honing your logic and critical thinking skills can help you become a savvy and confident negotiator, whether it be at the workplace, as a civic leader, or in your personal life. Join us and take your critical thinking skills to the next level!

COURSE TITLE

Travel Blogger: Compelling Content & Social Media

SUBJECT AREA

Humanities; Writing

COURSE DESCRIPTION

Do you dream of exploring new cultures and traveling the world? Or wonder how to turn your passion into a fulfilling career that takes you to the edges of the earth? Get ready to unleash your inner explorer! This class is your first-class ticket to thrive as a professional globetrotting jet-setter, travel blog writer extraordinaire, and "mega" social media influencer. You'll learn how to create your own website and leverage the right social media platform; research how to create unique and engaging content, practice tips and techniques to author compelling blogs; and best of all - how to monetize your content and make it work for you! With the beautiful and historic setting of Cambridge as inspiration, you can put your new skills to practice using the city as your classroom and find your niche. Whether you aspire to travel by celebrity yacht only or plan on roughing it with your backpack in tow, this course will teach you how to make your travel dreams a career reality!



COURSE TITLE

Cognitive Currency: Exploring Behavioral Economics

SUBJECT AREA

Social Science; Economics

COURSE DESCRIPTION

Prepare to unravel the mysteries of human decision-making, biases, and the profound impact they have on our choices and society. Welcome to Behavioral Economics! This course offers a comprehensive introduction to this dynamic field that combines principles from psychology and economics to understand human decision-making and behavior. Behavioral Economics challenges the traditional assumptions of classical economics by acknowledging that individuals often make decisions that are not entirely rational but influenced by emotions and social factors. In this course, you will explore the fundamental concepts, theories, and empirical findings that underpin Behavioral Economics including game theory, cognitive bias, neuroeconomics, intertemporal decision making, and more. Through a blend of lectures, interactive discussions, case studies, and real-world examples, you will gain a deep understanding of how humans truly make decisions, which can have significant implications for businesses, public policy, and personal life choices.

COURSE TITLE

International Relations

SUBJECT AREA

Social Science; International Relations *Marist College Credit

COURSE DESCRIPTION

This course is designed to show how the development of International Relations has changed during the late 20th and 21st Centuries. Through a combination of historical analysis, case studies, and current events, students will learn about the conflicts and collaborations that shape our global landscape. The course will cover comparative political systems and recent developments in political, historic, and modern-day relations between the US, UK, and the rest of the world. Topics will include the Marshall Plan, NATO, nuclear developments and disarmament, economic and cultural relations. Students will analyze the post-Cold War world, the impact of international terrorism, the balance of power, and the global economy. A mixture of teaching, debate, and multimedia will stimulate students and make them question their existing norms.

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COURSE TITLE

Mic Drop Moments: The Secrets of Debate & Public Speaking

SUBJECT AREA

Social Science; Public Speaking

COURSE DESCRIPTION

Spontaneous, acerbic, sarcastic, humorous, rancorous, and always entertaining, the British style of debating enjoys an illustrious history where style is as important as substance. This course will help you become a confident and persuasive speaker in any public speaking setting you find yourself in. Whether faced with a prepared speech to a filled auditorium or sharing your opinion spontaneously with a small group, the ability to communicate articulately yields influence. Learn how to improve your sentence structure, word usage, and test out strategies that attract others to your message. Apply unique techniques of vocal tonalities for earning trust. Investigate proven methods with body language that convey confidence, control, competency, and credibility and put them to test in a commanding voice that will inspire others and make a lasting impression. This course is your pathway to becoming a confident and persuasive communicator, ready to convey your ideas with poise and conviction. Students learn the art of constructing convincing arguments, researching complex issues, and articulating viewpoints effectively through lively discussions, engaging exercises and structured debates.

COURSE TITLE

Psychology Academy

SUBJECT AREA

Social Science; Psychology

COURSE DESCRIPTION

Welcome to the intricate workings of the human mind! Prepare to delve into the depths of cognition, behavior, and the fascinating world of psychological science. From understanding the human psyche and psychological theories, to the mind-body connection and real-world application, we will examine how psychological principles are applied in various contexts. We will explore topics including learning, development, language, personality, and psychopathology as we progress from child to adolescent psychology, and then to normal adult human behavior, and finally to abnormal psychology, understanding psychological disorders and the complexities of mental health. Gain an understanding of the psychology behind why we dream and how sleep affects our mental health. We will also review a multitude of disciplines from clinical psychology and therapy to organizational psychology and marketing. Students will participate in research and experiments that will provide a firsthand understanding of the theories and concepts discussed in class. For example, Bandura's social learning theory and the cognitive perspective will be explored, as well as the biological and physiological perspectives and application theory. Whether you're interested in pursuing a career in psychology or simply want to learn more about this fascinating field, this course is a fantastic place to start. *This course is an all-day Academy.



COURSE TITLE

Applied Data Science: Unlocking Analytic Potential

SUBJECT AREA

STEAM; Computer Science & Technology

COURSE DESCRIPTION

In an era where the most successful business decisions are data-driven, it is essential to harness the latest technologies to effectively apply data to impact real-world scenarios. This course will equip students with the analytic and technical skills to draw meaningful conclusions from data using programming languages such as Python, R, and SQL: all versatile tools for collecting, cleaning, analyzing, and visualizing data. Case studies may examine healthcare (where data analysis is used to identify patterns in patient data and help in the diagnosis and treatment of illnesses), finance (where data science is used to analyze financial data and make investment predictions), and e-commerce (where data science is used for customer segmentation and personalized marketing). In this interactive course, students will extract meaningful insights through statistical analysis techniques, leverage machine learning principles to make predictive models, and solve complex problems. Topics will include data handling, data manipulation, data visualization, data cleaning, deep learning concepts, and data science workflows. Throughout the course, students will work on practical exercises and projects that replicate real-world data science challenges, applying Python to drive insights and solutions. *No prior coding experience required.

COURSE TITLE

Artificial Intelligence (AI): Ethics & Applications

SUBJECT AREA

STEAM; Computer Science & Technology

COURSE DESCRIPTION

Welcome to the intersection of artificial intelligence, ethics, and real-world applications. Get ready as we embark on a thought-provoking journey into the transformative realm of artificial intelligence and the ethical considerations that guide its use. Artificial Intelligence, broadly known as AI, has rapidly gained momentum impacting our daily lives in ways that we are only beginning to comprehend. We will explore the rise of AI technologies, from machine learning to deep learning, and grapple with the ethical dilemmas that emerge when machines make decisions that impact our lives. From predictions to what we consume on social media, to help desks run entirely through AI, to creating written content with chatGPT, as quickly as a new AI innovation arises so do ethical considerations for its impact. You'll be introduced into some of the most prominent areas where AI is currently being used, ranging from public policy predictions and solutions to social and emotional impact on people of all ages. Using case studies in some of the most pressing ethical concerns and predictions based on usage for AI that has yet to be discovered, engage in Socratic discussions to weigh the ethical implementations of this technology. You'll gain insights into fairness, transparency, bias mitigation, and the responsible principles. Consider increasingly complex philosophical debates through the lens of AI and assess how we can harness this technology in socially responsible ways, to be more our friend than our foe.

COURSE TITLE

Brain Games: Exploring Neuroscience

SUBJECT AREA

STEAM; Biological Science

COURSE DESCRIPTION

Join us for an exciting journey as we navigate the pathways of the nervous system to uncover the mind's deepest secrets. We will unravel the mysteries of the brain by decoding its unique language, navigating the intricacies of thought, and understanding the signals that power our every move. Neuroscience is a rapidly expanding integrative discipline that explores solutions to some of the most critical questions in healthcare and science. In this class you'll observe key anatomical features of the brain and analyze the behavior of cells and circuits that impact how we remember, learn, see, and speak. Examine how damage to these structures can lead to trauma, neurodegenerative disease, and deficits. Learn core concepts such as neural development, synaptic transmissions, and neuroanatomy of vertebrates. Discover how the brain processes information, why neurons sometimes misbehave, and why brains have the ability to throw tantrums (like headaches!). Through fundamental computational techniques students will understand the core functions of the nervous system while exploring the historical and philosophical foundations of the discipline. If you aspire to a career in medicine or want to be at the forefront of science research in the 21st Century, this exploratory class is a great place to begin!

COURSE TITLE

Engineering: The Future of Innovation

SUBJECT AREA

STEAM; Engineering

COURSE DESCRIPTION

Cambridge has produced some of the most eminent minds in science such as Sir Isaac Newton and Professor Stephen Hawking and there is no better place for budding engineers than this historic and beautiful city as your inspiration. For students with an interest in engineering, this is an opportunity to unleash your curiosity and dive right in. This course introduces you to the many branches of engineering, proposes the application of physical and mathematical principles to the discipline, drives engagement for solving theoretical and practical engineering problems, and presents what it takes to take products from conception to market. Challenging assignments will build confidence as students expand their vision and innovate on their own ideas. By the end of this course, students will have a basic understanding of how the various branches of engineering contribute innovative solutions to real world problems, and an understanding of how these fundamentals are used to improve and understand the world around us. Students will leave this course with a wide range of options to explore in their continued studies and will understand the challenges facing the modern-day engineer, and the opportunity that exists for solutions, innovation, and a rewarding career.

COURSE TITLE

Genetics: Uniquely You

SUBJECT AREA

STEAM; Genetics *Marist College Credit

COURSE DESCRIPTION

Did you know that every human cell has the capacity to store the information contained in all 30 volumes of the Encyclopedia Britannica, 3 times over? Our DNA carries this vast repository of knowledge and serves as the blueprint for constructing our bodies. Your DNA pattern is entirely unique. No other person living, or dead shares the same DNA pattern you hold. In this course, we'll delve into the fascinating world of genetics, exploring the physical aspects of genes and their incredible role in shaping our lives. We'll also dive into contemporary evolutionary theories and the practical applications of genetics in fields such as medicine, law, and ecology. Prepare to unravel the mysteries of cell division, genetic crosses, gene linkage and mapping, mutations, DNA analysis, diseases, and the captivating realm of genetic engineering. Plus, students will also learn about the pivotal contributions of Cambridge University and the Sanger Institute to the monumental Human Genome Project.

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COURSE TITLE

Taking Flight: Aerospace Engineering

SUBJECT AREA

STEAM; Engineering

COURSE DESCRIPTION

Aerospace Engineering is an exciting and dynamic field that encompasses the design and development of aircraft and spacecraft. This field requires a strong foundation in principles and practices, including aerodynamics, flight mechanics, and spacecraft dynamics. At its core, aerospace engineering is about exploration and pushing the boundaries of what is possible. As an aerospace engineer, you will study the components and design principles of aircraft and spacecraft, as well as the principles of propulsion, including jet engines, rockets, and advanced propulsion systems. You will be at the forefront of technology and innovation, always thinking about what lies ahead in the future of aerospace engineering. One of the most exciting aspects of aerospace engineering is the potential for groundbreaking advancements in space travel. Whether it's the development of flying cars or Mars-bound rockets, the possibilities are endless. Aerospace technology has had a major impact on defense systems, commercial flight, and aeronautics, and this trend is likely to continue in the future. As an aerospace engineer, you will have the opportunity to develop faster and safer solutions for the world of flight and beyond!