NATURAL & APPLIED SCIENCES (NAS)

NAS 110 Human Biology (4 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASC 110
This course introduces students to the essential mechanisms of human biology and their applications. The course builds an understanding of how complex human systems represent consequences of the genes comprising the human genome and their expression, the functions of biological pathways, and the electrochemical properties of cells. An understanding of these mechanisms on a molecular level is applied to explore mechanisms of health and disease, recent scientific discoveries, the development of biopharmaceutical products, and controversies in biomedicine. The emphasis on this course is on the understanding of the broad applicability of basic biological mechanisms to issues of personal, temporal or business interest.

Typically Offered: Fall and Spring

NAS 120 Elements of Living Systems (4 credits)
Formerly NASC 116
This course introduces students to the basic structure and function of biologically important molecules. Students will learn the relationship of how the type of bonding and structure of a molecule dictates its interaction with its surrounding environment, with a particular focus on human systems. Through close examination of metabolic reactions, students will study the underlining thermodynamics that governs the behavior of systems. Finally, students will learn how these fundamental chemical concepts are translated into innovative products and processes in the fields of biomaterials and biotechnology. Additionally, the course involves hands-on laboratory-based scientific research. During the first half of the lab section, students will be trained in techniques for conducting modern-day research. In the second portion of the lab, students will work in groups to design their own experiments, collect data, and present their findings in a formal scientific presentation.

NAS 122 Environmental Chemistry (4 credits)
This course explores the nature of environmental problems through chemistry. Students examine the movement and change of matter in order to understand the relationships among air pollution, water pollution, greenhouse gas emissions, climate change and energy production. In the laboratory, students conduct analyses of air and water samples, and produce alternative fuels like ethanol and biodiesel.

Typically Offered: Fall and Spring

NAS 132 Astronomy: Solar System (4 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASC 100
The astronomer's role has changed drastically during the past two millenia, from analyzing the motions of the planets, to theorizing about Earth's place in the universe, to directly observing and analyzing astronomical objects with telescopes and space probes. Using a variety of approaches, students will examine the tools and methods of the astronomer, and apply them in fully surveying solar system objects. Students will gain insight into the role of modern astronomy, through both telescopes and NASA, in both the scientific world and in areas of business. The Earth's atmosphere, interior, climactic, and 21st-century environmental issues facing our planet will also be covered, as well as how studying other planets provides key insights to better understanding the Earth.

Typically Offered: Spring

NAS 135 Astronomy: Stars and Universe (4 credits)
Formerly NASC 101
Context & Perspectives: Scientific Inquiry
While most students are somewhat familiar with the inhabitants of the solar system planets, moons, and comets very little attention is given to the subject of the stars in the pre-collegiate curriculum. This course introduces the student to a subject that makes up more than two-thirds of the effort of the observational and the theoretical astronomer. It stresses not descriptive detail, but the "detective" aspect of the science: the how, why and what for, and the application of various discoveries to extract further understanding. In addition, astronomy beyond the solar system provides the scientist with a laboratory for energetic phenomena that cannot be reproduced on Earth and can tell us about the ultimate nature of matter both at the subatomic and at the cosmic levels.

Typically Offered: Fall

NAS 140 Energy and The Environment (4 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASC 140
Energy is part of everything we do every day. Energy consumption is also the biggest contributor to air pollution and global warming. This course presents a systems approach to understanding energy consumption and its links with environmental and human health and well-being. It emphasizes using knowledge of these systems to identify and choose among alternative actions in both personal and professional contexts. Course units focus on different aspects of energy efficiency and renewable energy on the Bentley campus.

Typically Offered: Fall and Spring

NAS 145 Principles of Geology (4 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASC 130
This course Introduces the basic principles of geology and the societal relevance of the discipline through classroom discussions and laboratory activities. Exploration centers on the process of scientific inquiry, building around systems of plate tectonics and the rock cycle, followed by an examination of Earth's surficial processes, including the role of water, ice, wind and gravity in breaking down, transporting and depositing Earth materials. Specific topics include the origins and classification of rocks and minerals, earthquakes, volcanoes, geologic time, rivers, glaciers and coastal processes. Throughout the course, students relate Earth processes and materials to human concerns, such as natural hazards, environmental degradation and economic resources.

Typically Offered: Fall and Spring

NAS 150 Environmental Science and Sustainability (4 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASC 150
This course is an introduction to environmental sciences, highlighting issues in environmental and ecological sustainability. This lab-based course places a strong emphasis on understanding how humans are linked to the environment, how humans can modify their interactions with the environment, how humans can learn from past and current environmental issues to address environmental issues of the future, and how environmentally sustainable business practices can help enact positive environmental change. Topics addressed in this course cover a wide-range of major environmental issues, current affairs, and environmental solutions including human population growth and global climate change, marine plastics, biodiversity loss, ecosystem valuation, and understanding the environmental benefit of the triple bottom line. The course is structured through a series of in-class lectures and immersive class activities, laboratory exercises, and is heavily geared towards conducting outdoor research.

Typically Offered: Fall and Spring

NAS 155 Chemistry of Sustainable Products (4 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASC 121
Sustainable chemistry raises awareness of the fundamental processes behind the things we buy and how to create safer and healthier products. The course contains interactive lectures, an integrated research experience, and fun laboratory experiments that enable students to learn about innovations in chemistry and experience them directly. The course is designed to help students describe and understand how and why molecules interact and how these interactions ultimately dictate the molecules utility and toxicity. Students will explore how molecules translate their properties into materials and how these materials ultimately impact consumer product performance and the health of the people using and producing them. Finally, sustainable product design methodologies will be presented as a mechanism to protect and proliferate the prosperity of people, the economy, and our environment.

NAS 160 Environmental Chemistry (4 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASC 122
This course explores the nature of environmental problems through chemistry. Students examine the movement and change of matter in order to understand the relationships among air pollution, water pollution, greenhouse gas emissions, climate change and energy production. In the laboratory, students conduct analyses of air and water samples, and produce alternative fuels like ethanol and biodiesel.

Typically Offered: Fall and Spring

NAS 199 Experimental course in NS (4 credits)
Formerly NASC 199
Experimental courses explore curriculum development, with specific content intended for evolution into a permanent course. A topic may be offered twice before it becomes a permanent course. Students may repeat experimental courses with a different topic for credit.

Typically Offered: As needed

NAS 302 The Science and Business of Biotechnology (3 credits)
Formerly NASE 309
This course integrates science and business in studying all aspects of the current "biotechnology revolution." Using the case study method, the formation, organization, production, financing and marketing of biotech companies, as well as the selling of biotech products are examined. In addition to lectures, case discussions, guest speakers and a field trip to a local biomanufacturing facility, students will be responsible for one short presentation on a biotechnology company as well as for researching and writing their own due diligence analysis report analyzing one specific marketplace. The potential long-range medical, economic, legal and ethical implications of applying this science are also examined.

Typically Offered: Fall and Spring

NAS 304 Innovative Tech & Society (3 credits)
Formerly NASE 363
Innovation in technology is an ever-changing, improving process. A look at the latest news cycle reveals an exciting frontier in technological development. Scientists and engineers harness advanced electronic, chemical, and mechanical properties to make revolutionary technologies. This course introduces students to principles, applications, and societal implications of a selected technology. Students will characterize types of technologies and strategies for fabricating and characterizing materials. In addition, students will evaluate current applications of innovative technologies in many topical areas. Finally, students will evaluate risks, intellectual property, ethical concerns, business implications, and regulatory issues of innovative technologies. Through structuring a business plan and pitch based on an innovative technology, students will demonstrate a viable consumer need, identify a target market, and explain how to operate and manage a technology-based business.

Typically Offered: Every two or more years

NAS 306 Health Communication Campaigns (3 credits)
Context and Perspective: Scientific Inquiry
Campaign messages including, "Just Say No", "Race for the Cure", and "Only you can prevent forest fires" promote behaviors to improve health or prevent disease. This course will provide students with an in-depth examination of strategies to persuade and influence behavior. The question of how people exercise influence using communication has challenged those working in the field for decades. We will discuss when messages work, at what time, and with what audience. The goal of this course is to familiarize students with the process of persuasion and social influence in the context of health. Students will gain a firm understanding of how people can influence the beliefs, attitudes, and behaviors of others. We will explore the current media environment, in which health communication campaigns can utilize a variety of channels including social media and video games. Students will gain practical skills and expertise in persuasive message design.

Typically Offered: Fall

NAS 308 Health of Nations: Anatomy and Function of Health Systems in the United States and Around the World (3 credits)
Context and Perspectives: Institutions and Power
Formerly NASE 308
Good health systems contribute to the prosperity of nations. The U.S. stands nearly alone among developed nations in not providing universal healthcare to its citizens. Although no system is perfect, more than 35 countries rated higher in quality, equity and efficiency than the U.S. according to a World Health Organization assessment conducted in 2001. Yet Americans pay far more per capita for healthcare than citizens of any other country. What factors account for this disparity? This course will examine how healthcare is currently delivered in the U.S., how this differs from other countries, and what we might learn from other countries about improving our system. Thus, we will compare the strengths and weaknesses of the present U.S. healthcare system to the healthcare experiences of selected countries around the world toward learning what works in other places, and what might or might not be applicable here as we move closer to reform.

Typically Offered: Fall and Spring

NAS 314 Human Nutrition: From Science to Life (3 credits)
Formerly NASE 313
Every day we are bombarded with information about diet and health, often confusing and contradictory. As consumers, it is difficult to separate fact from fad, truth from fiction. This science course covers the fundamental principles of nutrition science and its application to personal fitness. The course will provide a foundation in introductory nutrition, including basic anatomy and physiology of the digestive tract, macro and micronutrients, and the development of disease. Emphasis is placed on acquiring both scientific and practical knowledge of the essentials of nutrition with the goal of learning to think critically about nutrition issues as lifelong consumers.

Typically Offered: Fall and Spring

NAS 316 Human Health and Disease in Today's World (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 315
This course examines human health and disease from the structure and function of the human body to its interaction with the environment. The genetic, physiological and behavioral factors that influence the physical and mental well-being of individuals is explored on all levels, including molecules, cells, organs, individuals and communities. Risk factors such as diet, sexuality, occupation, tobacco, alcohol and drugs are similarly evaluated, with an emphasis on behavioral changes that optimize personal health or help manage adverse conditions. Modern challenges such as emerging diseases, pandemic flu and bioterrorism and their potential impact on students' lives are discussed. The healthcare system, from research and development, healthcare markets, access to insurance, and alternative and complementary medicines are presented with the goal of helping students become more discerning consumers.

Typically Offered: Fall and Spring

NAS 318 Global Health Challenges (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 318
The forces of environmental, social and political change are expected to intensify in the decades to come. The reverberations of these inevitable changes will impact not only the magnitude of domestic and global health threats, but also their specific nature. Citizens and health systems must be prepared to deal with public health risks and consequences that they have never had to face before. Yet, as these challenges intensify, healthcare technologies are providing new tools for protecting human health. The balance between these evolving risks and our ability to deal with them will be critical in determining our future quality of life. This course will investigate public health from a community-based, global perspective, looking at health issues beyond our shores as well as the unwelcome risks and intrusions that global phenomena introduce into our lives at home.

Typically Offered: Fall and Spring

NAS 319 Health Risk and Prevention (3 credits)
Context and Perspectives: Scientific Inquiry
The purpose and structure of the American public health system and urgent contemporary issues in public health will be explored in this course. We will ask: what makes health public? How ought we respond to new threats of communicable and non-communicable diseases? What are the larger social and environmental issues that shape the health of the public and how does this happen? What are the most effective strategies to improve the health of populations?
Many people equate epidemiology and public health with the COVID-19 pandemic. However, these fields are more than what we see in the news. This course offers an introduction to the principles, concepts, and methods of population-based epidemiologic research and explores how public health intersects with every facet of our lives: our healthcare systems, our policies and government, our business industries, our communities and our relationships.

NAS 320 Bugs in the System (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 320
Insects may be small, but they ubiquitous and abundant, and as such exert enormous impacts, both positive and negative on all aspects of human livelihood. They consume and destroy crops and stored food, degrade real estate and claim more lives per year than all wars and natural disasters combined. This course will examine in detail the economic importance of insects in all aspects of human endeavor, both in the harm they cause and the many ways they benefit people. Starting with an introduction to the unique biology of these organisms, we examine their role in natural cycles as well as their various impacts on human affairs including health, agriculture, forestry and as natural resources for important materials and food products. Taking advantage of double block sessions, this course will include field excursions and exercises at several sites within walking distance of the Bentley campus and each week will integrate lectures with interactive laboratory sessions.

Typically Offered: Every two or more years

NAS 322 Human Inheritance (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 319
This course introduces students to the basic principles of human inheritance and modern genetics, and the practical applications of this science in understanding one's own characteristics, health, disease risk, and even behaviors. Recent advances in genetics have revolutionized our understanding of human biology as well as many aspects of everyday life including insurance, reproduction and medicine. This course challenges students to examine the personal, medical, social, legal and ethical dilemmas arising from an understanding of human genetics and the human genome.

Typically Offered: Once a year

NAS 324 The Biological Fate of Drugs (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 370
Many of us do not hesitate to take Advil for a headache or Claritin for allergies, yet we rarely think about how these drugs work or how they arrived on the market. This course will analyze how drugs have systemic, whole-body effects, while (hopefully) targeting a specific disease or condition. We will look at what drugs actually are as molecules, and how their chemical structure impacts their ability cause a biological effect. Next, we will investigating how we ensure that drugs are safe and effective. We will look at the clinical information used to drive approval decisions and at how drugs are priced and marketed to the public. The ultimate goal of the course is to introduce you to fundamental mechanisms of biology, structure, and drug design in a way that will enhance your understanding of your own drug response and health, public discourse surrounding drugs, advantages and limitations of the current pharmaceutical market, and avenues for improvement.

Typically Offered: Once a year

NAS 333 Life in the Universe (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 303
To better understand where we should search for life beyond Earth, we must first establish the key astronomical characteristics which support Earths sustained habitability. This quest continues by studying Venus and Mars, the two planets near the Suns habitable zone, as well as several potentially habitable Jovian satellites, using information provided by NASA space probes. Beyond the solar system, stellar and planetary characteristics will be used to evaluate which types of stars might host Earth-like planets, and which of those planets could possibly support life. Incorporating other astronomical, biological, and philosophical concepts, we develop the Drake Equation to estimate the potential number of current, intelligent and communicative civilizations that may exist in the galaxy right now. We will also examine newly discovered exoplanets, and discuss methods that have been used in attempting to detect signals from extraterrestrial civilizations.

Typically Offered: Spring

NAS 334 U.S. Space Program: Going Beyond (3 credits)
Context and Perspectives: Institutions and Power
Formerly NASE 305
The National Aeronautics and Space Administration, better known as NASA, has made substantial contributions to our world, many of which are not known, recognized, understood or fully appreciated by the general public. This course is designed to introduce students to the full scope of the U.S. space program by presenting NASA's organizational structure, strategic plan and exploration policy, by focusing on its current and future projects in various fields of astronomical research, robotic and human exploration, and by carefully examining its many achievements that impact society on a daily basis, at the intersection of science, technology and business.

Typically Offered: Fall

NAS 335 Energy Analytics (3 credits)
Context and Perspective: Scientific Inquiry
Not eligible for students who have completed NAS 140/NASC 140
Energy is part of everything we do every day. Energy consumption is also the biggest contributor to air pollution and global warming. All individuals and companies consume energy, some companies produce energy or related products and services. Energy efficiency and renewable energy are key elements of any organization's sustainability efforts. This course will explore how energy is used and possibilities for on-site renewable energy generation using the Bentley campus as a living laboratory. Throughout the course, students will learn how to apply a multi-criteria approach to energy decision making in personal and organizational contexts. Using data and evidence, students will evaluate different technologies and options for improving the sustainability of energy in operations and investments. Course units focus on different aspects of energy efficiency and renewable energy on the Bentley campus and beyond.

Typically Offered: Fall and Spring

NAS 336 Water and the Environment (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 336
This course examines the origin, distribution and supply of water on the Earth. Topics include field measurement of runoff processes (including stream velocity, discharge and sediment load); bathymetry, temperature, oxygen, and conductivity profiles of a pond or reservoir; and snowpack volume, density and water content (in season). Laboratory exercises include drainage basin analysis and estimation of flood frequency, and magnitude from air photos and topographic maps; experimental groundwater modeling from flow tubes to test Darcy's law; and flow-net construction for prediction of groundwater pollution. Overlying case study concerns "A Civil Action," a famous water contamination court proceeding. This course is offered in both one-week intensive and semester formats.

Typically Offered: Fall

NAS 338 Water Quality (3 credits)
Context and Perspective: Scientific Inquiry
Formerly NASE 328
All of us should be concerned about the quality & cost of our drinking water. Many wars political & physical have historically concerned the use and misuse of drinking water. Drinking water is the focus of this course, which examines the sources, delivery & treatment received as water is delivered to us, as well as the treatment and disposal of wastewater. This course has a lab-oriented project where students select a topic and do specific chemical analysis on their samples and compare them with EPA guidelines. Common water pollutants such as bacteria, heavy metals, pesticides & fertilizers are described and many are tested as part of as part of in-lab activities. Samples from such places as Bentley Pond, the Charles River, and Walden Pond are collected and purified through accepted treatment methods to see if they can be made "drinkable." Water softeners and other in-home filtration methods are examined. Student projects include a lab component, a written paper & an oral presentation.

Typically Offered: Spring

NAS 340 Oceanography (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 335
This course examines chemical and physical aspects of oceans and sea water, including geologic history of ocean basins, ocean currents, waves, tides, composition of sea water, types and movement of marine sediments, natural resources that oceans provide, and human impacts, such as pollution in the coastal and deep marine environment.

Typically Offered: Fall

NAS 342 Ecology: Principles and Applications (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 311
This course introduces the principles of ecology that are relevant to environmental science, including variation in the environment, energy flow, biogeochemical cycling, productivity, population growth and regulation, and interactions between organisms and their environment. The evolutionary nature of species interactions and its implications for conservation biology will be explained. The course will include study and discussion of environmental problems confronting the world, field trips to local environments, exercises designed to teach ecological concepts, and writing assignments, particularly a paper on the application of ecological principles to a current environmental issue. The course will prepare the student to function as an ecologically aware citizen and to appreciate the natural environment more.

Typically Offered: Every two or more years

NAS 344 Energy Alternatives (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 344
This course will introduce students to carbon accounting and science-based strategies for reducing emissions. Students will apply their learning by consulting with an external partner such as city, town or company by evaluating the sources of their emissions. In addition to a historical accounting of energy and emissions, the course will also look forward to identify potential pathways to net zero emissions and their financial, environmental, and social implications.

Typically Offered: Once a year

NAS 345 Science of Sustainability (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 364
This course examines the scientific basis for human development that provides people with a better life without sacrificing and/or depleting Earth's resources or causing environmental impacts that will undercut future generations. Examples of the Earth's resources to be studied include air, water, soil, forests, energy, minerals, fish, wildlife and agriculture. A service-learning project concerning conservation, recycling and reuse of everyday materials and products in the local area is a major component of the course.

Typically Offered: Fall and Spring

NAS 346 Wind Energy (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 346
Why are companies investing in wind energy? Learn about the risks and rewards of investing in this growing and competitive global industry. This course explores the entire lifecycle of a wind energy project from siting and planning to construction and operation to decommissioning. To understand the complete system of these projects, the course will cover the physics of energy conversion, the cost of energy, wind energy policies, environmental impacts, and human factors in developing and operating wind projects. Students will understand the current state of the wind energy industry through real projects, locations and data. The course will equip students to evaluate wind energy projects and policies within the larger energy system by examining each stage of the permitting process and the intersections of technology, the environment and human behavior.

Typically Offered: Once a year

NAS 348 Global Climate Change (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 337
This course examines the basic concepts of weather and climate, such as structure of the atmosphere, ocean and atmospheric circulation, and latitudinal and seasonal changes in relationship to distribution of land and water bodies on Earth. Also considered are temporal changes in large-scale climatic phenomena, such as atmospheric carbon dioxide, glaciations, sea-level change, monsoons, impact of volcanoes, El Niouthern Oscillation (ENSO), greenhouse effect, stratospheric ozone depletion, desertification, as well as human impacts on climat

Typically Offered: Fall and Spring

NAS 349 Plastics - Pollution and Possibilities (3 credits)
Context and Perspective: Scientific Inquiry
Plastics are one of the most controversial materials in society. They enable a wide variety of applications that enable products to be stronger, lighter, and more flexible. However, they carry significant drawbacks due to their contributions to climate change, toxic chemical pollution, and waste disposal problems. In this course, we will explore all these aspects and examine how the next generation of materials may offer solutions to many of the challenges observed today. We will examine several case studies on single-use plastics, plastics in the fashion industry and circular economy, and microplastics in the environment. The course also contains a hands-on experimental laboratory component where students create plastics and test their properties.

Typically Offered: Once a year

NAS 350 Industrial Ecology (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 350
Industrial ecology examines the relationships between the production of material goods and the effect this process has on humans and the environment. The course systematically examine the practices of extraction, processing, production, distribution and consumption of goods by quantifying material and energy flows through every step of the cradle to grave process. Students will examine readings, case-studies and models to assess and develop an understanding of the complex balance between the Earths natural resources and satisfying human wants and needs. The course emphasizes that the solutions to global ecological sustainability are not found in the abandonment of technology, but through the embrace and proliferation of it. Specific topics covered in the course may include a survey of material flow analysis, life cycle assessment, energy policy, urban ecosystems, and the circular economy.

Typically Offered: Every two or more years

NAS 352 Science of Environmental Policy (3 credits)
Context and Perspectives: Scientific Inquiry
Formerly NASE 380
National laws protecting the environment and governing the use, conservation and preservation of natural resources are partly based on current scientific understanding, but almost always affect the way businesses operate profoundly. The U.S. has a long history of attempting to balance economic growth with the preservation of the environment and human health by passing new laws and creating new regulations. This course will explore the science behind environmental and natural resource policy, from its historical roots to bills being debated in the U.S. Congress today. In addition to covering the role of science in the legislative process, specific topics will include major environmental laws and amendments, as well as proposals dealing with energy production and climate change.

Typically Offered: Once a year

NAS 354 Sustainable Food Systems (3 credits)
Context and Perspective: Scientific Inquiry
Food production consumes abundant land, water, and energy resources. This course investigates agricultural systems and the impacts on air, water, and soil. Foundational concepts in ecology, water resources, and soil science are introduced. Sustainable methods to reduce pollution, greenhouse gases, and food waste throughout the supply chain are explored. Food systems are studied and evaluated at the global and local scale, integrating environmental, social, and economic domains.

Typically Offered: Once a year

NAS 397 Experimental Course in NS (3 credits)
Formerly NASE 397
Experimental courses explore curriculum development with specific content intended for evolution into a permanent course. A topic may be offered twice before it becomes a permanent course. Students may repeat experimental courses for credit with a different topic.

Typically Offered: As needed

NAS 398 Experimental Course in Natural Sciences (3 credits)
Experimental courses explore curriculum development, with specific content intended for evolution into a permanent course. A topic may be offered twice before it becomes a permanent course. Students may repeat experimental courses with a different topic for credit.

Typically Offered: As needed

NAS 399 Experimental Course in NAS (3 credits)
Experimental courses explore curriculum development, with specific content intended for evolution into a permanent course. A topic may be offered twice before it becomes a permanent course. Students may repeat experimental courses with a different topic for credit.

Typically Offered: As needed

NAS 400 Directed Study in Natural and Applied Sciences (3 credits)
Formerly NASE 401
Directed Study topics must be submitted for approval by the instructor, chair and associate dean of Arts and Sciences.

Typically Offered: Fall and Spring

NAS 405 Research in Natural and Applied Sciences (1 to 3 credits)
Formerly NASE 415
This course provides the student an opportunity to develop an independent research project on an environmental issue. In this hands-on experience, students will expand analytical and critical-thinking skills, writing ability and computer experience. Students will learn how to operate state-of-the-art laboratory and field equipment if appropriate to the project. Students are expected to exercise their own initiative in both planning the project and relating it to specific issues of environmental science.

Typically Offered: Fall and Spring

NAS 410 Seminar in Natural and Applied Sciences (3 credits)
Formerly NASE 402
The course permits small-group study of selected topics by advanced students. (May be repeated for credit.)

Typically Offered: Every two or more years

NAS 415 Special Topics in Natural and Applied Sciences (3 credits)
Formerly NASE 403
This course examines a different theme or themes during each semester related to natural and applied sciences. Currently planned are topics related to the environment, sustainability, psychology and healthcare.

Typically Offered: Every two or more years

NAS 420 Internship in Natural and Applied Sciences (3 credits)
Formerly NASE 421
This course provides the students with an opportunity to gain on-the-job experience and apply scientific principles and concepts learned in the classroom to specific work environments. Students are required to attend pre-internship workshops sponsored by the Center for Career Services, meet regularly with a faculty advisor, keep weekly logs of activities, write a final paper or complete a special project, and provide an evaluation of the experience at the end of the internship.

Typically Offered: Fall and Spring

NAS 444 Faculty-led Study Abroad Course (3 credits)
Pass/Fail option not available for this course
Faculty-led international courses are 3-credit intensive study abroad experiences offered during semester breaks, usually 10 to 15 days in length during January break, Spring break (as part of a Spring semester course), or in May after exams. The professor leads his/her students on an immersive learning experience in a region of the world where the professor has expertise, offering students the opportunity to combine cultural activities with business, NGO, or other relevant site visits. Students benefit from personal interactions with companies and organizations they would not encounter as a tourist.
The intensive format allows students to study abroad without missing a semester at Bentley.

Please visit https://www.bentley.edu/offices/international-education to learn more.

Typically Offered: As needed