Sustainability and Sustainability related courses

Generally courses starting with 1 are 1st year, with a 2 2nd year, etc.

Sustainability courses

DEPT	SUBJ	COURSE #	SHORT_TITLE	COURSE_DESCRIPTION
ACCT	ACCT	70161	Sustainability: Acct & Report	The scope of sustainability includes the environment, labor, community and product. This course examines a wide range of issues in these areas including current practices of sustainability evaluation and reporting. The greatest focus will be on the environment. Topics in this area include regulations, voluntary disclosures in corporate annual reports or free-standing reports, accounting for emissions trading schemes and end-of-life product disposal and the role of attestation services.
AFST	AFST	30694	Global Activism	This course is about transnational networking, mobilizing, and campaigning for or against social change. Equal attention is paid to conceptual and substantive issues. Conceptual issues include framing, strategies, and actors. Among the substantive issues examined are human rights, women's rights, gay rights and gay marriage, climate change, and global gun control. We are particularly interested in the emergence over the last two decades of a 'global right wing' and the globalization of the culture wars.
AME	AME	46590	Electric Hybrid Veh	Intro to hybrid and electric vehicle concepts.
AMST	AMST	30174	American Wilderness	How is a national park different from a national wilderness area, a city park, the lakes at Notre Dame, or your back yard? Why are some considered wilder than others, and why is wilderness such an attractive idea? Writers, historians, painters, photographers, and politicians have described American landscapes as wild to great effect, in concert with identities of gender, class, race, and nation. This class will explore how the idea of wilderness - and the places associated with that idea - has developed during the 19th and 20th centuries. We will examine how wilderness has supported the growth of a national identity but largely failed to recognize the diversity of the American people. Course themes include: 1) developing the wilderness idea; 2) national parks and the problem of wilderness; 3) wilderness experience and politics; and 4) wilderness narratives. Readings will range from Henry David Thoreau and John Muir to Edward Abbey and Jon Krakauer, and there will be a strong visual culture component. For their final project students will choose a wild place of their own to interpret.
AMST	AMST	30393	Consuming America	This course traces the development of consumer society in the United States from the colonial era through the late twentieth century. It asks how Americans came to define the "good life" as one marked by material abundance and how transformations in buying and selling have shaped American culture, politics, and national identity. One of our aims will be to develop a usable historical definition of consumer society and to evaluate when such a society emerged in the United States. We will examine the role that consumption has played in defining and policing ideals of gender, race, sexuality, and class. We will also consider how Americans have used consumer practices and spaces to advance political claims and notions of citizenship. The course is organized around key turning points in American consumer capitalism: the consumer boom of the eighteenth century; the market revolution and feminization of consumption; the birth of the department store; the rise of mass consumption and commercial leisure; the development of modern advertising and sales; the spread of chain stores and shopping malls; and the globalization of American consumer culture. In addition to recent scholarship and text-based primary sources, we will analyze artifacts of consumer culture, such as advertisements, catalogs, product labels, broadsides, film, and television.
ANTH	ANTH	63108	We Were Never Alone	This course seeks to deeply absorb the literature on the human-other animal entanglements with a diverse theoretical and disciplinary toolkit. Perusing scientific, literary, historical, philosophical and other engagements with the multispecies-ness of the human experience will take center stage via readings, seminars, lectures by scholars, group discussions, and term projects.
ANTH	ANTH	20201	Fundamentals of Bio Anth	This course approaches human evolution from a theoretical point of view that combines both biological and cultural processes into a cohesive bio-cultural model. It begins by tracing the development of modern evolutionary theory and the place of evolutionary studies in anthropology, especially in the sub-field of bioanthropology. These concepts provide the framework for understanding the many lines of evidence that anthropologists use to explore and explain human evolution. These include studies of our primate relatives, through the intricacies of the fossil record, to archaeological evidence for the invention of material culture from the simplest stone tools to the complex cultural world that we live in today. Modern human variation can only be explained as the result of evolutionary forces acting on the complex interplay of biology and culture over millions of years. We continue to be affected by these forces, and this course not only provides information about where we came from, it also provides the scientific backgrounds to help us understand where we might be going as our species continues to evolve.
ANTH	ANTH	30592	Migration, Environment, Change	This course introduces students to the diversity of cultures living in the American Southwest from the earliest Paleoindians (11,500 years ago) to European contact, the establishment of Spanish Missions, and the Pueblo Revolt of 1680-1692. Most of the course is devoted to learning about the complex cultural developments in the Mimbres Valley, Chaco Canyon, Mesa Verde, the Rio Grande, and the Phoenix Basin. Class work and discussions will focus on important issues such as the adoption of agriculture, the development of villages, the transformation of ideological beliefs and political organization, the importance of migration, and the impact of warfare using information on environmental relationships, technology, and other aspects of material culture. Students will also learn about descendant populations living in the Southwest today including the Pueblo peoples (e.g., Hopi, Santa Clara, Acoma) and Tohono O'odham.
ANTH	ANTH	13200	Sustainability and Collapse	Humans deeply affect their social and natural worlds. Their impact reverberates across time and space making it difficult to understand the long-term ramifications of our daily decisions and actions. This seminar enhances our understanding of the complex web of relationships between humans, resources, and climate by exploring the concepts of sustainability and collapse from an anthropological perspective. Key questions guiding this exploration include: What do we mean by sustainability? What is it that want to sustain? How can societies be "sustained" when we know societal collapses happen time and again? Through readings, media, debates, and analysis, we will learn how our culture shapes and promotes both sustainability and collapse and assess whether they can be attained or prevent. And, we will all gain a better understanding of our place in the world around us.
ANTH	ANTH	40808	GLOBES: Humans, Genes Environ	The GLOBES (Global Linkages of Biology, the Environment, and Society) series of courses offered each semester reflect various areas of life science relevant to multiple disciplines. Students should expect to have a different topic offered every semester under the GLOBES heading.
ARCH	ARCH	40411	Environmental Systems I	This course investigates the relationship between architecture and environmental systems. Lectures, readings, and exercises probe topics that include passive energy design, safety systems, water conservation and usage, vertical transportation, heating, ventilating, and air conditioning. Special emphasis is placed on sustainability issues, energy conservation, and public health and safety.
ARCH	ARCH	50419	Environmental Systems II	Study of the basic concepts that lead to the design of the mechanical, acoustical, and illumination services for the control of the architectural environment.
ARCH	ARCH	50438	Teaching Concepts: Env Syst I	Teaching Assistance in ARCH 40411, Environmental Systems I, guiding students in projects and assisting in grading.
ARCH	ARCH	53231	Hist. & Theory of Preservation	This class will introduce students to the history, theory, and practice of architectural historic preservation in Europe and the United States, beginning with the origins of the movement in the late eighteenth century, classic theoretical statements of the nineteenth, and its application by means of legislation and regulation worldwide in the twentieth. Required for students in the Preservation/Restoration Concentration in the B.Arch. degree. Open to all juniors, seniors, fifth-year and graduate students.
ARCH	ARCH	71131	Architectural Design III	Integrative Design Studio: design of a simple program building in detail, allowing students to demonstrate their ability to integrate structural and environmental technologies into their building design.
ASIA	ASIA	30993	The Global Environment	The question that this course asks is which political formations have been most conducive to environmentally sustainable communities and why. Historians have long been interested in political questions about power, state structures, democracy, and economic development, but only now, with the emergence of the global environmental crisis, is the relationship between politics and ecology becoming clearer. This course has four sections. It begins by examining the contemporary phenomenon of "climate collapse" and the problem of how to conceptualize this global problem historically. We then turn to the issue of which social values and modes of production and consumption have caused this dramatic transformation of our planet, tracing the effects of state formation and industrial development. Using major books, essays, and film, we compare capitalist, socialist, and fascist approaches to the nature. The purpose of the course is to provide students with a firm grasp of environmental problems and their relation to political communities.
ASIA	ASIA	43402	Population Dynamics	Demography, the science of population, is concerned with virtually everything that influences, or can be influenced by, population size, distribution, processes, structure, or characteristics. This course pays particular attention to the causes and consequences of population change. Changes in fertility, mortality, migration, technology, lifestyle, and culture have dramatically affected the United States and the other nations of the world. These changes have implications for a number of areas: hunger, the spread of illness and disease, environmental degradation, health services, household formation, the labor force, marriage and divorce, care for the elderly, birth control, poverty, urbanization, business marketing strategies, and political power. An understanding of these is important as business, government, and individuals attempt to deal with the demands of the changing population.
BA	BAET	20300	Intro to Business Ethics	This course is designed to give the student an introduction to the central questions and fundamental character of ethics and morality. The course is focused on a discussion of ethical theories that can help to guide students' problem solving in ethical situations they will encounter in business. Ethical dilemmas faced by business people will be integrated into the class for purposes of discussion and analysis.
BA	BAUG	20500	Entrepreneurial Insights	Entrepreneurial Insights is an interdisciplinary course in which students are introduced to entrepreneurship through a series of weekly lectures offered by guests with in-depth experience across a broad spectrum of industries. Topics vary, but typically include: innovation, opportunity recognition and evaluation, product design and development, technology commercialization, capitalization and funding, legal issues, intellectual property, sales, marketing, and social entrepreneurship. This course serves as an excellent preparation for those who plan to participate in the McCloskey Business Plan Competition. Open to all students except entrepreneurship majors. There are no prerequisites. Grading is based upon attendance, modest reading assignments, and online assessments.
BA	BAET	30510	Sus Develop: Role of Business	In today's interconnected global economy, there is a growing realization that we must restore public trust in business. Integrating environmental, social, and governance issues into corporate management is the overriding purpose of the United Nations Global Compact and its ten principles. This is the heart of the corporate sustainability movement. The objectives of this course are as follows: 1) To introduce the student to the United Nations Global Compact and why its focus on human rights, labor rights, environmental issues, and corruption is so attractive to the many stakeholders of business: 2) To develop the ability to think clearly about how one integrates environmental, social, and governance issues into corporate management: 3) To develop a sensitivity to the moral and ethical values that enable companies to restore public trust in business: 4) To understand how a number of companies are implementing the principles of the Global Compact by examining case studies: 5) To examine and understand the changing role of business in society
BA	BAET	30520	Topics in Sustainable Business	The course will provide an introduction to relevant terms and concepts in the areas of social and environmental sustainability. The course will enhance awareness of corporate sustainability and ESG (environment, social and governance) concepts, explore the role of stakeholders in business decisions, and allow students to learn from "best practices" in these areas, featuring top companies including GE Corporation, PricewaterhouseCoopers, and others. Other relevant initiatives will be included, for example, interacting with the newly-appointed University of Notre Dame Sustainability Director. Concepts to be examined include core sustainability terms such as dematerialization and relocalization, along with a close look at companies who have successfully incorporated such approaches. Frameworks and metrics of sustainability will be a focus of the course to allow an understanding of the importance of practical application of sustainability goals. The course runs concurrent with the MBA-level course in sustainability; shared speakers and opportunities for cross-cultivation may be possible.
BA	BACM	30620	Corp Sustainability Reporting	Corporate sustainability reports give organizations the opportunity to inform stakeholders about the environmental, social, and economic impacts of their operations. This course introduces students to this important, emerging area of corporate communications. Students will learn how companies analyze and engage internal and external stakeholders for their reports, test the materiality of various issues, and determine indicator items to be monitored and reported. Students will discuss the motivations of various stakeholder groups and how sustainability reports are used by investors, NGOs, and consumers. Students will analyze, evaluate, and provide feedback to select companies on their report.
BIOS	BIOS	31312	General Ecology Laboratory	General ecology laboratory is to be taken concurrently with the general ecology lecture. Students may not take lecture alone or laboratory alone.
BIOS	SUS	43000	SUS capstone	This course is required for all seniors in the Minor in Sustainability. During the course, students will present their capstone projects in an interdisciplinary setting, develop strategies to maximize the impact of their capstone projects, and explore ways to apply their experience in the sustainability minor after graduation. The course will meet for one hour per week, scheduled to accommodate students' course schedules each year, and will include weekly readings and assignments.
BIOS	SUS	48001	Capstone Independent Research	This course is required for all seniors in the Minor in Sustainability. Students will work independently on their capstone projects with the guidance of the instructor and their project advisor. There are no class meeting times; advisory meetings will be scheduled individually. Concurrent registration in the Capstone Seminar SUS 43000 is required. Students will enroll in an additional credit of independent study during the spring semester in order to complete their capstone projects.

BIOS	BIOS	20204	Intro Ecological Horticulture	Globally, the agricultural sector is the largest cause of habitat loss, aquifer depletion, and greenhouse gas emissions. The need to transform agricultural systems to meet the needs of the world's growing population while addressing these ecological impacts is one of the 21st century's grand challenges. This course will include principles, concepts and practices of sustainable food production including biodiversity, soil quality, and nutrient, water, pest and disease management, while focusing on a production culture that is environmentally regenerative. Every class meeting will involve experiential learning that will build students' skills in growing healthy food in a way that protects and restores the earth. This class will also address the environmental and social consequences of industrial farming and public health impacts of quality food accessibility in communities.
BIOS	BIOS	35501	Introduction to UNDERC	Open only to students previously accepted into the UNDERC program.
BIOS	BIOS	60206	Case Studies in Global Health	This course is designed to examine the myriad of social, economic, political, and environmental factors that affect global health. We will draw upon experiences from several programs in sub-Saharan Africa and Haiti that aimed to address infectious diseases such as HIV and Ebola as well as a program designed to strengthen health systems.
BIOS	BIOS	60520	GLOBES: Research Integrity	GLOBES training module in research integrity
BIOS	BIOS	60552	Topics in Ecology	The subject of "Topics in Ecology" changes every semester and in each section. Prospective students should consult with the instructor to determine the course topic and credit number. Some, but not all, Topics in Ecology courses fulfill the requirements for the GLOBES (Global Linkages of Biology, the Environment, and Society) program.
BIOS	BIOS	60543	Methods in Ecosystem Ecology	Current methods in ecosystem ecology will be studied.
BIOS	BIOS	60606	Cary Inst Fund Ecosyst Ecol II	BIOS 60606 differs from BIOS 60605 only in that the former is letter-graded. This intensive course covers the concepts, theory, approaches, utility and history of ecosystem ecology, biogeochemical cycles and budgets, ecosystem energetics and trophic structure, and the response of ecosystems to stress and disturbance. The course will include lectures by members of the Cary Institute of Ecosystem Studies scientific staff and will emphasize critical examination of ideas through extensive readings, group discussions and exercises. The course will be held at the Cary Institute of Ecosystem Studies in Millbrook, New York, and is intended for graduate students in ecology, environmental studies, or related fields. A strong background in mathematics and chemistry will be of considerable value.
BIOS	BIOS	35506	Pract in Field Env Bio Galapag	During an ~8-day field trip to the Galápagos archipelago during an intersession period (Fall break or Spring break), this course will introduce and amplify principles of evolutionary biology, ecology, and environmental science that occur in the unique setting of the famed Galápagos Islands. Pre-trip meetings will emphasize background knowledge important to understanding the unique features of the archipelago as they have influenced evolutionary and ecological theory. On-site lectures and activities will cover the historical, geological, and biological features of the archipelago. The trip will include visits to the Charles Darwin Research Station and several scientifically significant sites in the Galápagos archipelago. Post-trip meetings will summarize the major discoveries of the trip as presented by the students. Prerequisites for this practicum include an approved course in evolutionary biology, chosen from among BIOS 30305 or 30310, which may be taken concurrently with this course. Because space is limited to 14 students, permission of the instructors is also needed to enroll in the course. This course is open to any Notre Dame undergraduate. The field trip to the Galápagos is optional, it is not an alternate to class requirements, and it is not a means of earning extra credit in the course.
BIOS	SUS	20350	Sustainability at Notre Dame	This course will address sustainability in the context of the local academic community and its institutions. In light of the recent papal encyclical, Laudato Si', On Care for Our Common Home, this course will provide students interdisciplinary opportunities to explore the challenges of sustainability and to develop collaborative strategies for making our common campus homes more sustainable. This course will be offered concurrently at ND, SMC, and HCC, and will be co-taught by faculty from all three campuses. It will meet in rotation on each of the three campuses once per week for two hours. Students will be invited to examine the course materials in conversation with the mission of the Congregation of Holy Cross through immersion at each of the campuses and encounters with the sisters, brothers, and priests of Holy Cross and with sustainability professionals.
BIOS	GH	60545	Global Health Ethics	This course will focus on bioethical issues from a global perspective in the context of health needs of the global community. We will address the particular practical ethical dilemmas faced by humanitarian workers. We will then cover some examples of ethical quandaries that are most relevant in a global health context, some of which are controversial from a religious perspective, including corruption and weak governance, HIV/AIDS; end of life, mental health and drug resistant tuberculosis. We will also discuss evolving theoretical frameworks for global health ethics, including values in global health, and more specifically social justice, solidarity and sustainability, drawing on named philosophical and theological traditions, including liberation theology.
BIOS	BIOS	10107	Ecology & Environmental Issues	Emphasis will be placed upon today's ecological and environmental problems and the possible effect they may have upon the future evolution of life on Earth. Topics will generally include an overview of the theory of evolution and a discussion of ecological principles as observed at the population, community, and ecosystem levels. The influence of cultural and political factors will also be discussed. Each academic year, one or more sections will be offered; some may be individually subtitled, allowing for one-time presentation of specific topics within the context of "environment and evolution;" in addition to multiple-semester presentations of a specific topic (e.g., Evolutionary Ecology, Freshwater and Society, Environmental Issues and Solutions). Summer. This course counts as general elective credit only for students in the College of Science.
BIOS	BIOS	35502	Pract in Envmtl Field Bio East	Course modules include vertebrate ecology, invertebrate ecology, aquatic ecology and forest ecology with each providing background information, field research exercises, and group research projects designed by the class. Five or more weeks are spent by each student designing and conducting their own field research project under direction of faculty or graduate students.
BIOS	BIOS	35503	Pract in Envmntl Field Bi West	This course is designed to give the student advanced practical laboratory experience in ecological studies in the grasslands and mountains of western Montana on the Flathead Indian Reservation. The ten week learning experience consists of one week modules on grassland/wildlife ecology, montane ecology, and human ecology focusing on ancestral Native American lifeways, and each student conducts an independent research project over the remaining weeks
BIOS	BIOS	30312	General Ecology	The study of populations and communities of organisms and their interrelations with the environment. Fall and spring.
BIOS	BIOS	10112	The Marine Environment	The world ocean makes up 97% of the planet's water and 99% of all living space on earth. Ocean systems and processes have a profound effect on our current and future well-being, yet the ocean remains mysterious to us in many ways. Humans have caused and continue to cause radical changes in ocean chemistry, physics, and biology. It is therefore more critical than ever for us to understand the mechanisms that undergird the physical and biological aspects of the world ocean. This class is divided into three parts: the first provides an introduction to oceanography - the physical aspects of the ocean. The second is an exploration of the incredibly diverse organisms that inhabit the ocean and how they interact with each other and their environment. The last section of the class focuses on human environmental impacts on the world ocean and how human societies and policies can best contribute to ocean health.
BIOS	BIOS	10117	Fundamentals of Conservation	This course is an introductory, non-majors survey of the biological, ecological, environmental, and social factors which have led to an unprecedented increase in extinction rates. We will begin by learning what science is and how it works, and delve into what makes up the field of conservation biology. We will then briefly explore what is biodiversity and the major threats to it, including habitat loss and fragmentation, overexploitation, climate change, and invasive species. We will also discuss how biodiversity is measured, patterns in the distribution and amount of biodiversity, and why it is important to preserve. Examination of conservation methods will include the application of fundamental population and community ecology, as well as the design and management of reserves and conservation of resources on local and global scales. Over the course of the semester we will also go over the history of conservation in the United States as told through the lens of the National Parks system. Virtual lab and chapter activities will also bring a hands-on, active-learning component to emphasize key lessons from lecture (SimBio virtual textbook/lab required for course).
BIOS	BIOS	40522	GLOBES: Humans Global Environ	Globally humans inhabit and alter landscapes creating anthropogenic ecologies impacting all resident organisms. The distribution and structuring of genomes, the movement and virulence of pathogens, and the patterns of coexistence of organisms are all interconnected at multiple levels.This course focuses on the dynamic transactions between organisms and environments at multiple levels, with a specific consideration of impacts on health, interspecies interfaces, and population genetics. It considers theoretical perspectives and specific examples from population genetics, ecology, evolutionary biology, anthropology, and political ecology to examine scenarios of interaction between humans, genes, and the environment.
BIOS	SUS	20010	Sustainability: Princ & Pract	This interdisciplinary course explores the challenges of environmental sustainability through social, economic, scientific, and ethical lenses. Taught jointly by professors from the natural sciences, humanities, and social sciences, the course aims to instill broad, integrative and critical thinking about global environmental problems whose solutions will depend on multidisciplinary approaches. This gateway course to the Minor in Sustainability is open to all students interested in a deep exploration of these critical issues. Students considering the Minor in Sustainability are encouraged to take this course during their sophomore year.
BIOS	BIOS	60605	Cary Inst Fund Ecosystem Ecolo	This intensive course covers the concepts, theory, approaches, utility and history of ecosystem ecology, biogeochemical cycles and budgets, ecosystem energetics and trophic structure, and the response of ecosystems to stress and disturbance. The course will include lectures by members of the Cary Institute of Ecosystem Studies scientific staff and will emphasize critical examination of ideas through extensive readings, group discussions and exercises. The course will be held at the Cary Institute of Ecosystem Studies in Millbrook, New York, and is intended for graduate students in ecology, environmental studies, or related fields. A strong background in mathematics and chemistry will be of considerable value.
BIOS	BIOS	30420	Aquatic Ecology	A study of the structure and function of aquatic systems with emphasis on the behavioral, physiological and morphological adaptations generated by the physical and chemical characteristics of various aquatic habitats. Fall.
BIOS	BIOS	60527	Stream Ecology	This course explores the interaction of biological, chemical, and physical features of streams and rivers. Human impacts on flowing waters are explored, along with current theory of stream ecology. (On demand)
CBE	CBE	40425	Energy, Econ & Environment	Energy, economics, and the environment are irrefutably linked. Many new energy technologies are under development to meet our future needs, as current sources of energy may increase in cost with increased global demand or have undesirable environmental consequences. This course will review current and emerging primary energy sources and energy technologies in three areas: electricity generation and use, transportation, and heating and cooling. A significant focus of the course will be on alternative energy technologies. Life cycle analyses will be used to quantitatively compare energy related practices and technologies. This is a project based course with required group work.
CBE	CBE	40498	Energy and Climate	This course integrates the principles of physical sciences and engineering as they pertain to energy, its sources and uses and the impact of these on the environment. The great majority of energy used by society comes from fossil fuels. The consequences are that carbon dioxide levels in the atmosphere have been increasing and that readily available sources of oil have been depleted. Prospects for sustainable energy use will be discussed including an engineering cost/benefit analysis of different sources. A question that will be examined in particular detail, is the effect of energy use on climate change both now and in the future. To do this we will analyze the complex couplings and feedback mechanisms that operate between the geosphere, the biosphere, the atmosphere, and the hydrosphere as related to global climate change.
CE	CE	23600	Chlg. & Innov. in CE Eng.	This course will focus on examining large scale civil and environmental engineering problems, the technological challenges encountered, and the resulting innovative solutions. The emphasis will be on the engineering systems and will include problems in structural, ocean, hydraulic, groundwater, soils and environmental engineering. Course format: 6-10 lectures per semester presented by senior project engineers, university faculty and researchers who are leaders in the field. Each lecture will be 75 minutes and consist of a 1 hour presentation with 15 minutes for discussion and questions. The lectures will be targeted to tie the problems discussed to concepts emphasized in the current curriculum. Course offered: Each spring and fall semester
CE	CE	11110	Planet Earth Laboratory	This is the laboratory portion of CE 10110.
CE	CE	31300	Intro to Environ Eng. Lab	The laboratory component of the Intro to Environmental Engineering course. Fall.
CE	ENER	37001	Energy Studies Minor Capstone	The Energy Studies Minor requires completion of a capstone project, which is agreed upon between the student and the minor advisor. This course serves to reflect on a student's transcript that he or she has completed this capstone requirement. A student should only register for this course when 1) he or she has met with the minor advisor and agreed upon a project, and 2) when the project will be complete by the end of the semester in which the student is registered.
CE	CE	35620	Community-Based Eng Desn Proj.	This project-based course combines theory and practice to design engineering solutions for real projects with transformative impact in the South Bend region and beyond. Project topics may include, but are not limited to, smart green infrastructure, water management, data analytics, internet of things, and smartphone app development. Students must apply for this course - please contact the TA, Maria Krug, mkrug1@nd.edu by November 10th for details about the application process.
CE	ENER	87001	Energy RET	Registration for this course is limited to teachers participating in the summer Energy RET program at Notre Dame. Teachers will work with faculty mentors and curriculum development specialists to translate laboratory research work in sustainable energy into new classroom materials for use during the school year.
CE	CE	10110	Planet Earth	An introduction to the Earth, its processes, composition, evolution, and structure. The course introduces the student to mineralogy, petrology, structural geology, oceanography, surficial processes, geophysics, environmental geology, and planetology. Lecture and laboratory meetings.
CE	CE	30300	Intro Environmental Engr	An introduction to the fundamental concepts and principles to qualitatively and quantitatively assess complex natural and engineering systems relevant to environmental engineering. This course serves to assist students to identify, evaluate and solve problems involved in the control of water, air, and land pollution and challenges for environmental sustainability. The course introduces how fundamental science and engineering methodology is applied to solve real world environmental problems. This is the first course in the environmental engineering track. Fall.

CE	CE	30455	Environmental Hydrology	An Introduction to the hydrologic cycle and review of the main processes. This includes precipitation, evaporation and transpiration, runoff, infiltration and a brief introduction to ground water. Some concepts and tools commonly used by water resources managers will also be discussed. Transport of pollutants will be introduced. Finally, biological elements of the water cycle will be introduced. Laboratory techniques complement lecture topics.
CE	CE	40341	Biological Process Design	A study of the theory, design, and operation of facilities both for industrial and municipal treatment and disposal. Design of municipal wastewater treatment systems is emphasized. A significant project design component is included with a tutorial section. Fall.
CE	CE	40352	Solid & Hazardous Waste Mngmt	Students will obtain an overall understanding of solid, industrial, and hazardous waste management in order to control and process anthropogenic wastes. A range of topics will be covered including waste management history, regulations, ethics and public involvement, life cycle analysis, risk assessment and toxicology, fate and transport of chemical compounds in the environment, physicochemical and biological treatment strategies, landfill design, waste reduction and recovery, green engineering, and site assessment and remediation. Engineering and science principles will be used to provide management solutions, with a particular focus on case studies and lessons learned from past hazardous waste sites. This course is designed for junior/senior level undergraduate and graduate engineering students, and it is an essential course for the environmental engineering professional engineer (PE) exam.
CE	CE	40365	Paleoclimatology	his class will introduce students to the highly interdisciplinary field of paleoclimatology and focus on Earth?s climate history, particularly the Plio-Pleistocene through the Common Era. We will investigate a wide range of proxies from geologic archives, including records from the oceans, cryosphere, and land. The class will focus on peer-reviewed literature and archived paleoclimate data already available and will involve a combination of short lectures and class discussions. The class assumes a basic understanding of geologic concepts including but not limited to mineralogy, sedimentology, geochemistry, and geomorphology.
CE	ENER	20101	Energy and Society	A course developing the basic ideas of energy and power and their applications from a quantitative and qualitative viewpoint. The fossil fuels (coal, oil, natural gas) are studied together with their societal limitations (pollution, global warming, diminishing supply). Nuclear power is similarly studied in the context of the societal concerns that arise (radiation, reactor accidents, nuclear weapons proliferation, high-level waste disposal). The opportunities as well as the risks presented by alternative energy resources, in particular solar energy, wind, geothermal, and hydropower, together with various aspects of energy conservation, are developed and discussed. This course is designed for the non-specialist.
CE	CE	10300	Global Change, Water & Energy	This course examines the topic of global environmental change and the mechanisms by which global change occurs. Analysis will include the relationships between physical and ecological changes on Earth, and our current understanding of how climate evolves under natural and human influences. Topics covered include the global energy balance, structure and circulation of the atmosphere and oceans, climate variability, and implications of climate change for natural and human systems.
CE	CE	10700	Sustainable Dev in Chang World	World population has doubled in the last 50 years, and sustainable development in the face of global change is the greatest challenge of our time. Through readings, lectures and class discussions by topic (water, energy, resources, waste, environment and related topics), this class provides an overview of the origin, scale and complexity of the challenge, and discusses how we can contribute, as engineers, scientists and professionals to help address it. We will learn the fundamental quantitative tools to measure and evaluate environmental and resources problems, which will be applied in class projects focusing on specific sustainability issues. The course will conclude by studying how environmental and resources policy decisions are made, and discuss the tradeoffs and ethical dilemmas involved.
CE	CE	20320	Environ. Aquatic Chemistry	The fundamentals of water chemistry from both thermodynamic and kinetic standpoints. This course focuses primarily on natural water chemistry with an emphasis on the carbonate system. The course also includes introductions to metal and organic pollutants, as well as atmospheric chemistry as related to the water cycle.
CE	CE	30320	Water Chemistry and Treatment	An introduction to water treatment design, including discussion of basic aquatic chemistry, water quality, environmental policy, and current issues and problems in the industry. Spring.
CFSC	CSC	33401	Animal Welfare & Hum-Anim Bond	Consider the fact that in six short years, one female dog and her offspring can give birth to 67,000 puppies. In seven years, one cat and her young can produce 420,000 kittens. Three to four million dogs and cats are euthanized each year. It is estimated that there are 60 million feral cats in the US. In a society that considers pets as part of their family, watches Animal Planet, and spends millions of dollars on pet products, it is imperative that we acknowledge and educate ourselves on the issues of over population of pet animals in our society. What is our responsibility to these animals, and how can we solve these pressing problems? The focus of this course will be on animal behavior from an evolutionary perspective. The students will learn to recognize both desirable and undesirable behaviors in pet animals. They will learn how to use evolutionary behavior training methods to alter detrimental behaviors and reinforce those that are advantageous. This course will also cover animal welfare issues, and will intimately and meaningfully connect the state of humans, to that of animals. The students will carry out community research projects of their choice and will immerse themselves in an important issue and generate a product that can help the plight of animals (and therefore humans) in our community.
CFSC	CSC	33985	SCS: Energy, Climate & So. Chg	This course will integrate the complex narratives surrounding energy policy and climate change and pursue questions about how these narratives integrate with social change. Students will explore the scientific, environmental, economic, geopolitical, and social implications of current energy technologies, climate adaptation policies, and how these affect the environment - understand as multifaceted in its definition (human life, water, animals, soil, air, etc.). The framing question for the course: How are people and communities affected by energy and climate policies? And, what sorts of efforts and opportunities are there for raising this question to the surface? The course will utilize selected readings, writing assignments, class lectures and discussions, a day long field trip to Chicago (tentative), and a week-long immersion in Washington, DC. During their time in D.C., students will learn to assess the strengths and weaknesses of alternative energy technologies (wind, solar, geothermal, fuel cells, ethanol, improving fossil fuel utilization, etc.), and of the various policies and economics surrounding energy and climate. During the week in Washington, D.C. students will identify the limitations of current energy policies and environmental regulation through visits to industry lobbying groups, policy makers and government officials, environmental organizations, and federal regulatory bodies. Finally, students will begin to understand the relationship between energy consumption and environmental ethics, especially as understood in Catholic social tradition.
CFSC	CSC	33988	Intro to Asset-Based Comm Dev	Community development captures the imagination by being inherently multidisciplinary and drawing from two ambiguous words - 'community' and 'development.' In this course, we will explore the social and cultural elements and the natural and built environments that shape community and how they relate to each other in the building vitality, sustainability, and quality of life in our communities. We begin by a brief exploration of the history of community development in America, with attention to participation, gender, and race. We then focus on the asset-based model. Asset-based community development is the local control and use of assets to improve the quality of life in a community. Drawing from local examples, we will meet with some of the different stakeholders in the community development process, including community-based organizations, community development corporations, and government agencies. We will discuss core community development issues, processes, and strategies - with an emphasis on thinking about practices that bring improvement for the community, not just for the privileged. Community development captures the imagination by being inherently multidisciplinary and drawing from two ambiguous words - 'community' and 'development.' In this course, we will explore the social and cultural elements and the natural and built environments that shape community and how they relate to each other in the building vitality, sustainability, and quality of life in our communities. We begin by a brief exploration of the history of community development in America, with attention to participation, gender, and race. We then focus on the asset-based model. Asset-based community development is the local control and use of assets to improve the quality of life in a community. Drawing from local examples, we will meet with some of the different stakeholders in the community development process, including community-based organizations, community development corporations, and government agencies. We will discuss core community development issues, processes, and strategies - with an emphasis on thinking about practices that bring improvement for the community, not just for the privileged.development corporations, and government agencies. We will discuss core community development issues, processes, and strategies - with an emphasis on thinking about practices that bring improvement for the community, not just for the privileged.
CHEM	CHEM	20204	Environmental Chemistry	Discussion of basic chemical processes occurring in the environment, particularly those relating to the impact of humanity's technological enterprise.
ECON	ECON	70561	Economic Development I	A general introduction to the field of development economics, with concentration initially on questions of a macrostrategic nature. The final topic is macroanalysis of country development programs, examining country studies, and macro models.
EE	EE	40447	Alt Energy Devices & Materials	This course is for upper level undergraduates and early graduate students interested in the scientific challenges of alternative energy generation, storage, and efficient use. The course will cover photovoltaic and solar power in depth, with additional coverage of fuel cells, hydrogen, energy storage, wind power, modern nuclear power, thermoelectrics, geothermal, and more. Upon completion of this course, students should be able to analyze important devices and predict the power output under various conditions, compare their strengths and weaknesses, plan a sustainable power grid, and describe the technical, economic, and political challenges to making each of these alternative energies successful.
EE	EE	40472	Electrical and Hybrid Vehicles	The course in an introduction to modern electric and hybrid-electric vehicles. It covers basic aspects of batteries, electric motors, powertrain systems, and the vehicle-road system. Emphasis will be placed on energy and power flows in electric and hybrid-electric vehicle systems. Optimization of energy usage for given driving cycles will also be addressed in some detail. Some of the commercially available power management schemes will be introduced and potential alternatives will be explored.
FIN	FIN	30710	Land Use Policy and Practice	(Note: This course does not count as a Finance major elective.) This course introduces land use regulation, sustainable development practices, and land conservation practices. Topics considered include land use regulation and history, development entitlement processes, environmental/resource regulation and land use, and sustainable development practices including: conservation/cluster development; smart growth urban/ suburban development; land conservation practices such as rural land conservation; urban green space development/preservation; use preservation practices; and recreational land use. Conservation funding practices will be considered as will special topics such as land use and corporate responsibility, time permitting.
HESB	HESB	40103	Sol: Sci,Pol&Saving the Planet	Studying environmental politics can be a gloomy pursuit. There are a myriad of devastating problems and a seeming scarcity of scientific and technological fixes. Technical fixes aside, there is the even more problematic scarcity of political fixes. Political institutions often seem to obstruct rather than facilitate environmentally sound policies, and the mass public and political leaders often prioritize competing goals and policies. This course is designed to understand whether the pessimism is warranted and to search for the optimism: What are the best opportunities, scientific and political, for saving the planet? What can realistically be accomplished?
HIST	HIST	30122	The Early Modern Climate	This course sweeps the globe, focusing on the relationship between political upheaval and climate change especially during the seventeenth century "Little Ice Age." As average temperatures cooled 1C, famine, war, and chaos followed. In his magisterial Global Crisis, Geoffrey Parker argues that "perhaps one-third of the human population died." But not in Japan. Japan knew peace, prosperity, and even a growing population. This course will consider three issues: (1) why has it taken so long for historians to include environmental factors in their analyses of political and social upheavals, (2) what allowed Japan to weather the dire conditions of the seventeenth century while the rest of the northern hemisphere was in crisis, and (3) are there any lessons to be learned from this earlier period as we consider our current, more radical climate change. We will read Parker, his critics, and examine how his argument plays out in Europe, The Ottoman Empire, China, India, Indonesia, and, of course, Japan.
HIST	HIST	30632	U.S. Environmental History	This course is an introduction to the new field of environmental history. While many people think "The Environment" suddenly became important with the first "Earth Day" in 1970 (or a few years earlier), environmental issues have in fact long been of central importance. In recent decades historians have begun actively to explore the past sensibilities of various groups toward their surroundings and fellow creatures. They have also increasingly paid attention to the ways environmental factors have affected history. This course will range widely, from world history to the story of a single river, from arguments about climate change to the significance of pink flamingos, and will survey a number of types of history including cultural, demographic, religious, and animal.
HIST	HIST	30992	History of Modern Science	Modern Science seems to shape our culture everywhere we look. Scientific techniques and explanations weave into the texture of our daily lives, from the clothes we wear to the food we eat and electronic devices we use. Increasingly, it seems, science and the people who speak for it also tell us what the world around us is, who we are, and even what it all means. Yet the relatively high cultural status accorded to productively manipulating and explaining the natural world is a recent historical development. This course explores important episodes in the history of modern science and its cultural authority from the so-called Scientific Revolution to present-day controversies over science, belief, and public policy. We will read important texts from scientists, as well as sources showing how other writers adopted, repurposed, attacked, or modified scientists' words and ideas. By the end of the course, students will have a better understanding of the main contours of key moments in modern science, as well as the trends and complexities of science in modern society.
IIPS	IIPS	40517	Sol:Sci,Pol&Saving the Planet	Studying environmental politics can be a gloomy pursuit. There are a myriad of devastating problems and a seeming scarcity of scientific and technological fixes. Technical fixes aside, there is the even more problematic scarcity of political fixes. Political institutions often seem to obstruct rather than facilitate environmentally sound policies, and the mass public and political leaders often prioritize competing goals and policies. This course is designed to understand whether the pessimism is warranted and to search for the optimism: What are the best opportunities, scientific and political, for saving the planet? What can realistically be accomplished?

LAW	LAW	70328	Water Law	This two-credit course provides an overview of American water law and policy. Water is an essential resource, yet the law that deals with its protection and allocation is neither coherent nor consistent across the fifty states. Just as population growth and industrial expansion have strained the nation's limited freshwater supplies, so also have they tested the laws established to manage these supplies. Today water law is called upon not only to resolve disputes among competing users, but also to help maintain adequate supplies of clean water in the face of widespread and chronic pollution, disappearing aquifers, and rapidly growing demand. In this course, we will examine these issues by studying, among other things, the classic water allocation doctrines of riparianism and prior appropriation (as well as variations that apply to ground water), interstate controversies over shared water resources, public rights and interests in water resources, and the law governing the major institutions and organizations involved in water allocation and management.
LAW	LAW	70431	International Environmental Lw	Environmental regulation has expanded from a domestic phenomenon to one that has both global impacts and global participants. In this course, we will determine when the international community is likely to act with respect to environmental problems, what legal processes it uses to address these problems, and how to assess the success of these regulatory interventions. In addition to discussing the status quo of international environmental law [IEL], we will also consider how this state of affairs came to be and what alternate policy options exist for handling these problems. Finally, we will aim to identify the most significant challenges for IEL in the coming fifty years and critically assess IEL's ability to confront these challenges.
LAW	LAW	73346	Environmental Law & Dev	This course will explore how environmental interests are balanced in the context of economic development, with a specific focus on the redevelopment of former industrial sites ("Brownfields"). We will engage in an overview of environmental laws that may impact development including the Endangered Species Act, Clean Air Act, Clean Water Act, and CERCLA. We will then undertake a case study of a local brownfield project—the former Studebaker Corporation automotive factory site in downtown South Bend—to explore various legal facets of brownfield redevelopment including environmental counseling, transactional law and litigation. The course will also provide the opportunity for students to develop practical legal skills and strategies in the environmental context including reading and interpreting environmental reports, drafting pleadings and conducting fact and expert discovery. Lastly we will consider the impact of environmental justice, smart growth and sustainability considerations on current and future development efforts.
LAW	LAW	70905	Law & the Entrepreneur	Neither a clinical nor a "drafting" course, Law and the Entrepreneur is an advanced elective intended to provide a "deeper dive" into entrepreneurship for the legal professional, exploring the socio-cultural, economic and legal aspects of startup ventures. The course also provides an opportunity for discussion of the role of entrepreneurial behavior in economic growth, some comparative study of economic and legal systems, and the extent to which these foster or stifle entrepreneurial behavior. Law and the Entrepreneur examines the multiple places along the life cycle of a startup where the law intersects with and impacts new businesses, including choice of entity, intellectual property and technology commercialization, capitalization and finance, immigration, family business, and social entrepreneurship. Emphasis will be placed on public policy as it impacts entrepreneurship, identification of competing interests inherent in these policy debates, and the arguments about the proper balancing of those interests. Reading materials will be provided by the instructor, and will include essays by legal scholars, some social science research, and excerpts from contemporary periodicals, as well as more traditional legal cases and statutory materials. Rules for Growth: Promoting Innovation and Growth Through Legal Reform, Kauffman Task Force on Law, Innovation and Growth (2011), 494 pp. Students' grades in the course will be a function of significant in-class and online participation, and a final research paper on a topic of the student's choice, related to the subject matter of the course. The best student papers will have the opportunity for publication.
LAW	LAW	73340	Scenic Law	Scenic Law (2 credits). For many people, scenic values are the most important reason for protecting the environment. Yet environmental law typically overlooks scenic values in favor of threats to public health (as regulated by the Clean Air Act, the Clean Water Act, and other pollution control statutes) and to ecosystem services (as regulated by the Endangered Species Act and other federal laws that protect biodiversity). This seminar offers an opportunity examine why we regard scenic areas as valuable, how we identify which places are scenic, and the role of the law in protecting scenic landscapes. National parks are our most famous scenic places, but we will also consider other federal lands that contain scenic areas, state regulation of scenic coastlines, and foreign approaches such as Britain's "Areas of Outstanding Natural Beauty." The seminar will require the preparation of two papers: a short paper examining a national park, and a longer seminar paper examining any topic related to scenic preservation.
LAW	LAW	70329	Energy Law	This course introduces students to the many legal and regulatory issues related to the generation, distribution, and consumption of energy in the United States. Particular attention will be given to the emerging law of renewable energy as it compares to the established legal frameworks for energy from fossil fuels. Course readings will include generous coverage of the political, environmental, and economic concerns that shape energy law.
LAW	LAW	70345	Land Use Planning	This course examines the land development process. It explores the various legal tools used to regulate land uses - nuisance, covenants, zoning, subdivision controls, growth management tools, historic preservation regulations, etc. - as well as constitutional limits on land use regulation. Attention will be given to the comparative advantages of different regulatory devices, as well as to the legal, political, and economic factors that influence public and private decisions land uses. There will be an examination.
LAW	LAW	70349	Environmental Law	Surveys federal environmental law, concentrating on the Clean Air Act, the Clean Water Act, CERCLA, NEPA, environmental justice and questions of solid and toxic waste disposal.
MBA	MSMG	60350	Ten Years Hence Lecture Series	This course will explore issues, ideas and trends likely to affect business and society over the next decade. The series of lectures will feature a wide range of experts on economic demography, biotechnology, religious fundamentalism, oil and peace, futurism and work, natural resources and more.
MBA	MBET	70510	United Nations Global Compact	In today's interconnected global economy, there is a growing realization that we must restore public trust in business. Integrating environmental, social and governance issues into corporate management is the overriding purpose of the United Nations Global Compact and its ten principles. This is the heart of the corporate sustainability movement and an effective way to restore trust in business. Take one look at the smog that hangs over the former Olympic host city Beijing and it becomes abundantly clear—globalization and economic expansion come at a price. Resource depletion, worker exploitation, pollution and corruption—this is the dark underbelly of globalization that has raised alarm bells around the world. Thankfully, more and more individuals and organizations are waking up to the social, environmental and ethical costs of a global marketplace and are making a sound business case for a new era of moral capitalism. Leading the way in this regard is the United Nations with its groundbreaking Global Compact initiative. Launched in 2000, the Global Compact now has more than 10,000 participants—including 7,000 businesses in 140 countries around the world—making it the world's largest voluntary corporate social responsibility project.
MBA	MBET	70540	Ethcl Ldrshp Sustnble Entprse	This course will explore how you can create extraordinary business value through ethical leadership. Previously, ethics has been typically viewed as the right thing to do; however, ethics can also be a strategy that helps business create a competitive advantage. Furthermore, ethics - specifically helping society and the environment - can be a way that you can live out your personal values while also doing good business. The course will be structured such that more than half of the time will be experiential including team-based learning, interviews of leaders in the field, and personal exercises. The primary topics explored in this course will be those related to (a) how human behavior (motivation, creativity, relationships) of key stakeholders is positively influenced when working for/with a sustainable enterprise and (b) how you can become a leader that uses sustainable enterprise strategies to create business value.
MBA	MBET	70660	Sustnble Bus: Strat and Sol	We currently face pressing environmental challenges including climate change, water and food scarcity, dwindling supplies of nonrenewable resources, increasing pollution, loss of biodiversity, deforestation, a growing middle class, and population growth. Conducting business as usual is not tenable or responsible in the face of such challenges. What Charles Darwin said of species can be applied to companies that can either continue with business as usual or adapt to new, more sustainable approaches to business: "It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change." An increasing number of leading companies are adapting to change by focusing on sustainability not as a side concern or branding effort, but as integral to their strategic planning, operations, and overall purpose
MGT	BA	20202	The Business of Energy	The course focuses on issues and challenges faced by business entities comprising the largest and most important segment of our economy - energy. Large, integrated oil and gas producers will be highlighted as well as power generators and transmission companies (primarily regulated oil and gas utilities) and producers of alternative fuels. Energy efficiency and related smart grid initiatives will be explored. The course is a requirement for students choosing the Energy Minor.
PHYS	PHYS	10033	Earth Focus	The Earth Focus course develops a narrative that pieces together the history of planet Earth over the last 4.5 billion years. Its violent beginnings, the changing orbital motions and seasons, the development of an atmosphere and oceans, all combined to produce a unique evolutionary history that formed a planet habitable by millions of life forms, including humans. The course introduces the science of natural climate change, including some drastic events that might leave you wondering how life could have survived. Understanding Earth's natural climate change is essential to analyzing and interpreting anthropogenic, i.e., human induced, climate change primarily brought about by the burning of fossil fuels over the last 150 years. The greenhouse effect will be used to explain how Earth has maintained its generally pleasant conditions, and climate models will be used to understand how small changes in CO2 levels can affect those conditions. With the ongoing consumption of fossil fuels, and the resulting addition of greenhouse gases into Earth's atmosphere, mankind is now conducting a unique experiment, one with potentially devastating consequences. Over the last century, the world has become highly industrialized and interconnected. The combustion of fossil fuels has played a major role in this process, and the consequences have become apparent with increasing pollution and climate issues. Earth is already beginning to react badly, e.g., a rise in ocean levels, weather extremes, ocean acidification, and extinction of species. How much the rising CO2 concentration and temperature will affect life on Earth is the question that scientists, politicians, economists, sociologists, as well as the rest of us, must consider in assessing what lies ahead. Decisions need to be made in the foreseeable future that will affect energy use, lifestyles, national economies, and international politics. Renewable and alternative energy sources such as wind, solar, hydroelectric, geothermal, and nuclear are essential components of the energy discussion. A clear understanding of the science involved in the climate warming debate and potential solutions are necessary. It is up to each of us to examine the basic evidence and answer fundamental questions regarding what to do next. The goal of the course is to provide the history, science, and an understanding of the basic energy issues that face us in the 21st century with the goal of finding effective solutions. The focus will be on the facts and the underlying science, but it is also about the options and decisions that we, individually and as a society, must make regarding the very real implications of climate change.
PHYS	PHYS	10063	Radioactivity & Society	This course will provide a broad overview about one of the most divisive scientific topics in our society. Both the scientific and societal aspects of radioactivity will be considered. This provides an understanding of the physical principles for cause and effects of radioactive decay and radiation. It will also provide a basis to evaluate the cost benefit in the growing use of radioactivity as a tool in industry and technology. To cover the broad range of material, the course will be offered in four topical sections that address the science and scientific effects of radioactivity, as well as the environmental consequences and the societal impact of its growing number of applications: 1. The phenomenon of radioactivity 2. The origin of radioactivity 3. The environmental impact of radioactivity 4. Societal impact of radioactivity
PHYS	PHYS	10052	Concepts of Energy & Environmt	A course developing the basic ideas of energy and power and their applications. The fossil fuels are considered together with their limitations, particularly as related to global warming, pollution, and their nonrenewable character. The advantages and disadvantages of nuclear power are studied and compared with alternative energy sources such as solar energy, wind, and geothermal and hydroelectric power. Various aspects of energy storage and energy conservation are also considered. This course is designed for the non-specialist. It is open to first-year students only.
PSY	PSY	33685	Soc. Factors & Sustainability	This course focuses on the interaction between people and the physical environment on human health, well-being, behavior, and sustainability. Social and physical factors across multiple scales - from specific environments (residential, educational, work, healthcare, and commercial), urban and natural settings, to the planet - are explored. Issues of public health, environmental justice, universal design, and culture are included throughout. Lecture and discussion class with hands-on assignments and quizzes. Upper level undergraduate and graduate students from across the University and especially in architecture, the sustainability minor, design, pre-professional studies, social sciences, and business are encouraged to enroll.

REG	PCSE	00240	Confronting Poverty	Mahatma Ghandi says that poverty is the worst form of violence. Jesus says that the poor will always be with us and that they will inherit the kingdom of God. Ronald Reagan says we fought the war on poverty and poverty won. So many religious and political leaders have commented on poverty. What does all this mean? And what should you do about it? In this course, we will address that enduring question: Why are people poor? We will take an interdisciplinary look at poverty to try to understand the forces that maintain poverty and the forces that resist it. From sustainability to social entrepreneurship, from economics to creative writing, we will explore a variety of mindsets and methods for understanding, representing, and assessing poverty. But we will do more than theorize about poverty. We will also engage the local community to understand how poverty persists and is resisted in and around South Bend. We will meet with community leaders who do anti-poverty work and we will serve local residents who live in poverty. We will explore poverty through statistics and stories—the facts and the lived experience of people in poverty.
REG	PCSE	03230	LS - Science,Ethcs,&Respnsblty	Climate change, robotics, drone warfare, cloud computing, and designer medicine. These are a few of the many ways in which science and technology are rapidly transforming our world. It will take a new generation of ethically aware citizen scientists and technically informed citizens to lead the global community through the challenges we will face in the twenty-first century. We will need to reconcile innovations in science and technology with our responsibility to seek health, prosperity, and dignity for all on a sustainable basis.
SC	SC	40500	Scientific Entrepreneurship	This course focuses on innovation and entrepreneurship of embryonic ideas and scientific breakthroughs and how to move them from the laboratory to the marketplace - from invention to venture. All entrepreneurial case studies will be focused on science-based and high-technology examples, such as nano-science, energy science, drug discovery, medical diagnostics, sophisticated algorithms, green technology, etc. The class is project-based, where students will develop a high technology business plan based on discoveries and inventions of Notre Dame science faculty. Students will have the flexibility to choose from a variety of topics for their final projects in biology, biochemistry, chemistry, mathematics, physics, or medicine. Individual or team projects are possible depending on preference. Does not count as science credit for majors in the College of Science.
SC	SC	40491	Current Topics in Environ Sci	Taught by the director of the ES major. Environmental sciences first and second majors only. The course will be divided into various modules taught by experts on campus. The modules will include environmental law, risk assessment, environmental ethics, advancements in environmental and ecological science, current topics of national interest in environmental science, and others. This course is required of all first majors and recommended of all second majors. Fall.
SOC	SOC	43719	Self, Society and Environment	This course focuses on social psychological aspects of relationships between humans and the natural environment. Issues include how humans interact with different environments, symbolic transformations of environments, and competing accounts or claims concerning human-environment relationships. The course is framed in a sociology knowledge perspective and touches on alternative ways of envisioning and valuing individual and institutional perspectives on human-environment relationships with an eye toward implications for social change.
THEO	THEO	33931	Smr Srv Lrn: Soc Ent Mic Intrn	This experiential learning course is restricted to those accepted into the Social Enterprise and Microfinance Internship (SEMI), jointly sponsored by the Center for Social Concerns and Mendoza College of Business. Students who are completing their sophomore or junior year in the Mendoza College of Business are eligible for this course. To apply, please visit the SEMI webpage on the Center for Social Concern's website. Applications available fromDecember 15 until February 10. After classroom sessions in the spring semester, students work for 8-10 weeks of the summer with social enterprise organizations, for-profit or not-for-profit organizations that attend to a financial, social and/or environmental bottom line. Students apply business skills to promote economic development initiatives, assist with feasibility or business planning for a new social enterprise, or guide future growth of an ongoing initiative through capacity building and other strategic activities. The experiential learning is complimented with readings from Catholic social thought. Course requirements include classroom sessions in April, reading and writing assignments during the summer, classroom discussions and a presentation in the fall semester.
THEO	THEO	60651	Prophets & Profits	This course will hold selected texts of Catholic social teaching in conversation with interlocutors from the fields of theology, philosophy, sociology, economics and business. The primary goal will be to develop an account of economic justice rooted in the broader Catholic social tradition, engaging Scripture and the official teaching of the church through the centuries on issues such as private property, usury, and the demands of distributive, social, commutative, contributive, and restorative justice in the context of the common good. Students will become conversant with the concepts and language of Catholic social teaching related to economic justice and will be able to engage in contextual theology to address the ethical aspects of particular cases.
THEO	THEO	40638	Theology for a Fragile Earth	This course will provide a primer in ecotheology. We will use both contemporary and historical theological resources and discuss their relevance for what is arguably the biggest global challenge facing humanity today. The method of ecotheology starts with a particular context -that of the current fragile state of the earth's systems and how they impact the most on vulnerable members of the human community. We will use tools common to ecotheologians, drawing on a re-reading of biblical literature, eco-theologies of liberation, paying particular attention to the most recent encyclical of Pope Francis, Laudato Si. We will discuss Christological and anthropological questions in ecotheology, as well as the practical implications of seeking to implement environmental justice and ecojustice. A learning journal will be part of the assessment method for this course.

Sustainability related courses

ACE	EDU	60685	Science Educ I	The development of class experiences, activities, and content-specific methods for middle and high school classes, along with the integration of literacy (including reading, writing, and discussion) within science, all based on readings selected from the publications of the National Science Teachers Association, the recently published Framework for K-12 Science Education, and current research from peer reviewed literature on theory and practice.
ACE	EDU	60785	Science Educ II	A review of class experiences, activities, and content-specific methods within the context of unit goals and assessments for middle and high school classes, based on readings selected from the publications of the National Science Teachers Association, the recently published Framework for K-12 Science Education, and current research from peer reviewed literature on theory and practice.
ACE	EDU	70621	Operations & Facilities Mgmt	This course further prepares candidates to develop the executive management skills necessary to support school improvement and achieve educational excellence. Candidates learn to establish and lead an administrative team, to delegate and support staff, and to establish priorities and objectives daily, weekly, monthly, and annually. Candidates will learn the technological tools and systems to facilitate communication and collaboration while learning to address controversial issues as the public and political roles of school leaders. This course will also introduce best practices for the safe and efficient operation of the physical plant.
ACMS	ACMS	37020	Projects in Actuarial Science	This course provides students with exposure to real world actuarial science projects, which involve substantial use of probability concepts and financial mathematics throughout. This course will be created in conjunction with an industry partner. Case studies and projects will vary by semester. This course counts for ACMS elective.
ACMS	ACMS	20340	Statistics for Life Sciences	An introduction to the principles of statistical inference following a brief introduction to probability theory. This course does not count as a science or mathematics elective for mathematics majors. NOTE: Students may not take more than one of ACMS 20340, BIOS 40411 and MATH 20340. Not open to students who have taken MATH 30540.
AFST	AFST	20600	World Politics: Intro to Comp	In this course students learn to think more clearly about politics, especially about how and why political life takes place as it does around the world. We study why nation-states are the dominant form of political organization today and why nation-states differ, especially in their economic and political development. Why are some countries democracies? Why are others dictatorships? Why do political movements participate in elections, start civil wars, or engage in terrorism? We develop answers to these questions by focusing on the experiences of Britain, France, Germany, Japan, Russia, China, Iran, India, Mexico, and South Africa.
AFST	AFST	30793	Architecture which hurts/heals	Architects and urban designers typically fail to use assessments that combine input from disciplines such as anthropology, psychology, sociology and health sciences to inform their designs. This course addresses questions about the nature of the relationship between the environment that people inhabit and human experience; and whether building design (both the structure and the interior design) contribute to either negative (hurtful) or positive (healing) effects on those who use that space? Academic component: Developing an understanding of the philosophical and theoretical background to the design and practical administration of programs within the St. Joseph County Juvenile Justice Center (SJJJC) and assessing its effectiveness in achieving the desired outcome (reducing recidivism rates). Identifying and examining best practices institutions recognized for their effectiveness in producing the desired behavioral outcomes in the inhabitants. Community engagement component: In-depth interactions with people (staff and inmates) at the SJJJC as well as those identified for their best practice performance (Bastoy Prison, Norway & the Justice Center, Leoben, Austria)in developing the theoretical and practical foundation for the development of programs to be implemented at the SJJJC. Design and research component: Redesigning of a residential pod in the SJJJC in conjunction with the inmates and staff, the implementation of these changes, and evaluating the effects on the behavior of the inhabitants.
AFST	AFST	33703	Landscapes of Urban Education	This seminar explores the intersection of the physical realities of urban environments, race, and education and will be a question-based seminar. As a group we will work to answer a cluster of questions surrounding the course topic in a systematic, interdisciplinary format. Questions may include: How does the physical landscape/structure of schools matter to urban education? How does the high concentration of poverty and racial segregation impact curriculum, school culture, and neighborhood? How do early childhood programming, college preparatory programs, and after-school programs factor into the landscape of urban education? What are "best practices" involved with teaching in urban environments? The final question we will work on as a group will be: What are the implications of what we know about race and urban landscapes in propelling positive micro- and macro-level change for our educational system? This course demands a high level of class participation and student initiative.
AFST	AFST	30751	Laudato Si in African Context	The course introduces students to the historical, political and economic dimensions of the ecological crisis in Africa. It will also introduce students to hopeful signs and innovative models of sustainable land use, food production and economic entrepreneurship underway in some poor communities in Africa. The course is designed around Pope Francis' two central convictions in Laudato Si namely: (1) the close connection between the cry of the earth and the cry of the poor, and (2) the spiritual "wound" that lies at the heart of the ecological crisis – our inability to live as creatures made from the dust of the earth. The overall objective of the course is to help students to see the connections between the spiritual wound, the ecological crisis and poverty in Africa. It will also help students appreciate how Christian faith and theology can contribute to the healing of the wound, and in so doing inspire fresh experiments of an integrated approach, which fights poverty, protects nature and restores human dignity.
AL	AL	23200	Rsrch Strategies Digital Age	This one-credit course offers an introduction to developing skills for the location, critical evaluation, and ethical use of information in all formats and disciplines. Development of research topics and strategies for finding relevant information will be discussed and practiced. Other topics include the evolution of information throughout history, developing effective research strategies, evaluating information for quality and relevance, organizing information, and ethical issues surrounding the creation and dissemination of information.
AL	PS	35001	Experiential Learning	This is a required course for students choosing to satisfy the experiential learning requirement through 3 designated one-credit Center for Social Concerns seminars (Option A). Enrollment is recommended concurrent with the last seminar credit or no later than the following semester. Students will complete a project or 5-7 page paper intended to show an integration of learning between their community engagement and a broader understanding of poverty.
AL	AL	33201	Geographic Information Systems	This course is aimed to provide a basic understanding of how Geographic Information Systems (GIS) and satellite imagery can be used to visualize and analyze environmental data. Students will learn basic techniques for analyzing, manipulating and creating geospatial data in both pixel-based (satellite imagery and digital terrain models) and vector based (point, line and polygon representation of spatial data) formats. Students will also learn how acquire high resolution satellite imagery and other GIS data from online data servers.
AME	AME	40498	Spc.Stud.Int'l Collab.Indus P	In this course students will work in teams comprised of students from Notre Dame and universities in countries other than in the United States. The teams will complete projects provided by multinational companies working in industries related to aerospace or mechanical engineering. Periodic reporting requirements, design reviews and final project presentations consistent with industrial practice are required both to the academic supervisor as well as the industrial sponsor of the project.
AME	AME	20211	Introduction to Aeronautics	An introduction to the fundamental concepts in fluid mechanics, the science of flight, the atmosphere, and airplane aerodynamics. Applications of the principles of mechanics to aircraft flight performance, stability, control, and design. Fall.
AME	AME	20221	Mechanics I	Introduction to systems of forces and couples, vector mechanics. Equilibrium of rigid bodies. Internal forces and moments, trusses and beams, distributed loads, and properties of areas. Friction and virtual work. Kinematics and kinetics of particle motion. Systems of particles. Fall.

AME	AME	30331	Fluid Mechanics	A basic course in fluid mechanics. Topics include mathematics of fluids, Euler, Navier-Stokes, Bernoulli's equation, control volumes, differential analysis, dimensional analysis and dynamic similarity, aerodynamics, boundary layers and turbulence. Fall."
AME	AME	30341	Aerospace Structures	A study of basic principles and methods for structural analysis of lightweight structures with emphasis on aerospace applications. An introduction to load analysis of aircraft, materials, fatigue, stress/deformation analysis of thin-walled structures, and aeroelasticity. Fall.
AME	AME	30362	Design Methodology	Modeling and analysis of mechanical systems. Automated design decision process, introduction to statistical methods, material engineering, requirements definition, and product specifications. Fall.
AME	AME	40431	Gas Turbines and Propulsion	The mechanics and thermodynamics of gas turbines and air-breathing propulsion devices. The mechanics of various space propulsion systems are also presented, including an introduction to rocket propulsion. Fall.
AME	AME	40451	Aerospace Dynamics	Mechanics and equations of motion, aerodynamics forces, airplane motions, longitudinal and lateral. Introduction to autopilot design. Fall.
AME	AME	50532	Computational Fluid Dynamics	An introduction to the fundamentals of computational aerodynamics/fluid mechanics. Numerical techniques are developed and applied to the solution of several practical fluid mechanics and aeronautics problems.
AME	AME	60624	Continuum Mechanics	Deformation and motion of continua and singular surfaces; general balance equations; stress principle; balance laws for mass, momentum, and energy; thermodynamics of continua; entropy balance; constitutive relationships; material symmetry and invariance theory; linear and nonlinear constitutive models; variational foundations; topics of special interest. (Alternate years)
AME	AME	60632	Physical Gas Dynamics	An introduction to quantum mechanics, internal structure, and quantum energy states of monatomic and diatomic gases. Application to chemical reactions, dissociating gases, and ionized gases. High temperature properties of air. (Alternate spring semesters)
AME	AME	60635	Intermediate Fluid Mechanics	Derivation of governing equations of mass, momentum, and energy for a viscous, compressible fluid; general survey of vortex dynamics, potential flow, viscous flow, and compressible flow.
AME	AME	60649	Molec Lvl Modeling EG App	This graduate level course is intended for engineering graduate students with interests in the simulation of materials and studying their properties at the molecular level using different atomistic simulations techniques. This course will introduce basics of statistical thermodynamics and classical Monte Carlo and molecular dynamics simulations. With the fundamentals, students will learn how to use the knowledge and techniques to study engineering problems such as mass diffusion and heat transfer. It will also emphasize hands-on exercises in which student will use these techniques to model different materials including gas, liquid, solid, the phase transition among these different phases. Structural, flow and thermal properties of materials will also be studied. Students will be required to program their own code for small projects and will be using open source software, such as LAMMPS, for larger projects.
AME	AME	20222	Mechanics II	Introduction to Newtonian dynamics. Kinematics and kinetics (energy, linear, and angular momenta) of particles, systems of particles, and rigid bodies. Spring.
AME	AME	20231	Thermodynamics	Basic concepts of thermodynamics. The first law of thermodynamics. Work, heat, properties of substances and state equations. The second law of thermodynamics. Applications to engineering systems. Spring.
AME	AME	30332	Compressible Aerodynamics	An intermediate course of the study of the dynamics and thermodynamics of compressible flow for both internal and external geometries, including boundary layer effects. Applications of compressible flow principles to propulsive nozzles, flight simulation facilities, and supersonic airfoil problems. Spring.
AME	AME	30334	Heat Transfer	An introductory course covering three modes of heat transfer; steady and unsteady conduction, elementary boundary layer analysis for laminar and turbulent convection and the basic theory of radiation. Spring.
AME	AME	60634	Intermediate Heat Transfer	Fundamentals of heat convection and radiation, scaling and heat transfer analysis in external and internal flows, turbulent heat transfer, thermal radiation properties of ideal and real surfaces, radiative transfer in black and gray enclosures, introduction to radiative transfer with participating media. (Every spring)
AME	AME	20213	Measurements and Data Analysis	Introduction to experimental methods used in aerospace and mechanical engineering, including basic instrumentation, data acquisition, and data analysis techniques. Embedded microprocessors may be used for data acquisition and/or control. Fall and spring.
AME	AME	30333	Theory/Experiment Aerodynamics	Theoretical and applied aerodynamics, airfoil theory, lifting line theory, boundary layer theory, blade element theory, use and operation of a subsonic wind tunnel for aerodynamic measurements.
AMST	AMST	30813	Home and Dome	This introductory seminar, students will be co-learners and analysts with community residents, participating in readings, discussions, applications, and data collection. We will introduce students to Community-Based Research (CBR) as a model for the research process, as well as data collection and analysis for GIS. CBR supports democratic processes, as it engages academic researchers and community partners in addressing community challenges. It is, therefore, a collaborative research process oriented toward community improvement. Our project will be geotagging and creating a data layer in the near northwest neighborhood (NNN) of South Bend. The focus will be on vacant land and property condition for the purpose of facilitating our partners in identifying, prioritizing, planning, and measuring the impact of their improvement projects, as well as 'felt safety' with the residents. The City of South Bend describes the NNN as a 'neighborhood of neighborhoods.' The near northwest 'neighborhood' is large, and it has clusters of areas with dissimilar demographics, incomes, housing types, and housing quality. Classes are Monday 5:15-6:45pm; four Saturday mornings(10a-12p) substituting for Monday late in the semester.
AMST	AMST	30404	Civil Liberties & Civil Rights	How do courts decide cases involving civil liberties and civil rights? What rationales support the different interpretations of constitutional rights? How has the doctrine of incorporation affected our understanding of constitutional rights? Why is the concept of neutrality so important in current jurisprudence? How does the court balance formal assumptions and attention to particular situations?The purpose of this seminar is to help answer these and other questions about the law and politics of basic constitutional rights, including freedom of expression, due process, and equal protection. Course assignments include a critique of a law review article, an essay addressing an issue in civil liberties jurisprudence, and a hypothetical case. This course fulfills a seminar requirement for the Political Science major.
AMST	AMST	30181	American Political/Media Cult	This course is an introductory and interdisciplinary examination of American political and media culture, particularly contemporary political thinking and behavior. Although we will examine the roots and development of U.S. political culture from the nation's founding into the 21st century, a principal concern of this class will be the involvement of the mass media (journalism, broadcasting, advertising, etc.) in our political life since the 1930s. In considering politics, government, and the media, we will attempt to come to terms with the role and influence of different forms of popular communications in modern political culture. Are traditional media forms fading in significance with the rise of social media? What methods of media assessment work most effectively in analyzing political and governmental issues? Does emphasis on a public figure's personality or image--as transmitted by the media--become more important than policy positions in the citizenry's assessment? Students will read several books and individual articles throughout the semester. Grading will be based on a mid-term and a final examination as well as a short paper and a more comprehensive, detailed essay.
AMST	AMST	30428	U.S. Foreign Policy	The United States is the most powerful state in the world today. Its actions are important not just for US citizens, but they also affect whether others go to war, whether they will win their wars, whether they receive economic aid, whether they will go broke, or whether they will starve. What determines US foreign policy? What is the national interest? When do we go to war? Would you send US soldiers into war? If so, into which wars and for what reasons? How do our economic policies affect others? Does trade help or hurt the US economy and its citizens? We first study several theories about foreign policy. We then examine the US foreign policy process, including the President, Congress, the bureaucracy, the media, and public opinion. To see how this all works, we turn to the history of US foreign policy, from Washington's farewell address through the World Wars and the Cold War to the Gulf War. We then study several major issue areas, including weapons of mass destruction, trade and economics, and the environment. Finally, we develop and debate forecasts and strategies for the future.
AMST	AMST	30468	American Politics	This course surveys the basic institutions and practices of American politics. The goal of the course is to gain a more systematic understanding of American politics that will help you become better informed and more articulate. The course examines the institutional and constitutional framework of American politics and identifies the key ideas needed to understand politics today. The reading and writing assignments have been designed not only to inform you, but also to help develop your analytic and research skills. The themes of the course include the logic and consequences of the separation of powers, the build-in biases of institutions and procedures, the origins and consequence of political reforms, and recent changes in American politics in the 21st century. This semester we will emphasize the significance of the upcoming 2016 elections, and the course will include election-related assignments. Although the course counts toward the Political Science major and will prepare prospective majors for further study of American politics, its primary aim is to introduce students of all backgrounds and interests to the information, ideas, and academic skills that will enable them to understand American politics better and help them become more thoughtful and responsible citizens.
AMST	AMST	30108	American Capitalism	This course offers a broad overview of American capitalism from the early nineteenth century to the late 1980s. It introduces students to the cultural and social phenomena that accompanied the economic transformation of the U.S. from a newly-independent British colony to the most influential economic power in the world. The course will consider a wide range of historical developments related to the expansion and contraction of the American capitalism between this period, including: massive population shifts, territorial expansions, technological changes, legal debates, wars, and economic flux. As a class we will examine a mix of scholarly sources and primary materials (including cultural works such as novels and films) to synthesize both the historical and cultural characteristics of American capitalism. In addition to three short writing assignments connecting two or more course readings, students will develop an 8 - 10 page final paper at the end of the semester.
AMST	AMST	30116	American Ruins	American ruins are increasingly visible today, from images of urban decay and piles of debris in Detroit and Gary to movies and novels (The Book of Eli, The Road) depicting post-apocalyptic "ruinscapes" of abandoned towns, derelict factories, crumbling monuments, and deserted shopping malls, variously populated by zombies, vampires, and survivalists. Ruins typical signify "disaster," "failure," "defeat," and "the past." Why, then, in a nation that has repeatedly defined itself in terms of promise, progress, and success-the American Dream-are visions of ruin, real and imagined, so prevalent today? This class explores the history and meaning of American ruins, relating contemporary fascination with ruins ("ruin porn") to currently held attitudes about modernity, technology, citizenship, consumerism, the rule of law, and the environment. Course materials include novels, films, and photographs; coursework includes fieldtrips (to Detroit and Gary), essays, and discussion.
ANTH	ANTH	10109	Introduction to Anthropology	This course deals with the nature of anthropology as a broad and diverse area of study. The anthropological study of humankind will be approached from the perspectives of physical anthropology; prehistory and archaeology; and linguistic anthropology and socio-cultural anthropology. The diversity of humankind will be explored in all its aspects from times past to the present.
ANTH	ANTH	10110	Mysteries of the Past	Can the secrets of the past help us solve our problems in the future? This course uncovers the clues that our ancestors left behind in ruins, abandoned cities, pyramids, and on the earth itself. We will discuss key issues facing humanity today through the lens of the past. How prone are we as a species to degrading our environment? How flexible are we in the face of environmental change? Are humans basically violent, and are we destined to keep killing each other? These are some of the big questions that can be addressed using the archaeological record. The anthropological and archaeological study of past failure (and success) can help us understand the urgent challenges our our own age.
ANTH	ANTH	10209	Humankind Unplugged	This course explores the rise and possible future evolution of the human species beginning with acknowledging what sets us apart, or makes us unique. Relatively speaking the human primate evolved the largest brain which cannot be explained without considering the functional connections between other co-evolved human attributes such as upright posture itself and what language accomplishes, or why we cannot stop ourselves from 'talking' and communicating or 'becoming one' with other human beings. The biological basis of culture and the cultural basis of biology will take center stage and we will be challenged to ask: Do other species have cultures or is it just a matter of how one defines it? Human aggression will be examined alongside our capacity for seemingly unlimited empathy and emotions for optimism, and love itself. We will examine questions like how or if we are "cooperative breeders" and why babies are born the fattest (if not the most vulnerable) mammal of all (before eating their first bite) and why humans are unique insofar as manufacturing tears but join all mammals in being able to cry. Attachment, friendships, sorrow, and grieving will be examined through an evolutionary, bicultural lens, and how and why we may be more similar to marmoset monkeys when it comes to fathering behavior than we are to apes with whom we share a closer evolutionary affinity. Altogether this course will produce a perspective on the origins, behavioral evolution and development of human attributes that gave rise to one of the most versatile species whose success at inhabiting diverse environments, at least within the primate world, is second to none.
ANTH	ANTH	13181	Soc Science University Seminar	Anthropology, the holistic study of humans and their societies and cultures, is the focus of this seminar course. Through discussion and analysis of a variety of anthropology texts, this seminar course aims to develop writing skills among first-year students while exposing them to some central problems and issues within anthropology. Adopting an approach that reflects the four-field character of anthropology, the seminar will encourage students to explore topics such as: (1) anthropology as a way of knowing; (2) anthropology as an encounter with, and effort to explain, human diversity; (3) anthropology as a discipline that uniquely contributes to our understanding of the symbolic dimensions of human behavior and communication; (4) anthropology as a discipline that uniquely contributes to our understanding of human strategies for subsistence and survival; and (5) anthropology as a discipline that uniquely contributes to our understanding of human biological and cultural origins.
ANTH	ANTH	20112	Biocultural Approaches to Food	Food is a central component of human life - it plays a significant role in biologically sustaining us, but also is a very meaningful cultural practice that is reinforced everyday. This course is going to look at the topic of food through the anthropological lenses of biology and culture; as we will discover, both of these perspectives are necessary to thoroughly understand human foodways.

ANTH	ANTH	20203	Fundamntls Social/Culturl Anth	This course introduces students to the field of social-cultural anthropology. Cultural anthropologists are primarily interested in exploring issues of human cultural diversity across cultures and through time. This course will explore key theoretical, topical, and ethical issues of interest to cultural anthropologists. We will examine diverse ways in which people around the globe have constructed social organizations (such as kinship, and political and economic systems) and cultural identities (such as gender, ethnicity, nationality, race, and class) and we will consider the impact of increasing globalization on such processes. Throughout the course we will consider how different anthropologists go about their work as they engage in research and as they represent others through the writing of ethnographies.
ANTH	ANTH	40400	Perspectivs in Anthro Analysis	Anthropology attempts to make sense of an infinitely complicated world by organizing its observations, inquiries, and explanations. Some of these are grand, while others are modest. Still, all anthropological work involves some kind of analysis. All analysis stems from a view of what is basic and of what is related most centrally. This course introduces the most powerful analytic perspectives in the four subdisciplines of anthropology, preparing students to encounter and situate anthropological works of all sorts. The seminar format encourages student involvement not only in reading and writing but also in discussion and analysis of the works under consideration. Written and spoken assignments will permit students to try their hand at a wide range of anthropological practice. Required of all Anthropology majors.
ANTH	ANTH	43375	Anthropology of Poverty	What is poverty? What does it mean to be poor, destitute and powerless? Does poverty in the developed world refer to the same conditions and factors that determine poverty in developing and undeveloped countries? What does genteel poverty mean? Does the ability to possess material goods and to consume indicate lack of poverty? What is the cycle of poverty? Can one break out of it? This course will address these and other questions on poverty through anthropological analysis. The course is divided into two parts: a) poverty in the pre-industrial era, and b) poverty in contemporary societies. Topics covered in the first part include the beginnings of poverty and social inequality in the earliest complex urban societies of the Middle East, Africa and South Asia, urbanism, production, distribution and poverty in various time periods including classical Greece and Rome, the Middle Ages and the Early Modern Era, and slavery, colonialism and poverty. The second part will address issues such as the relationship between industrialism, colonialism and poverty in 19th and 20th centuries, instituted poverty in post-colonial and post-industrial societies, and global manifestations of poverty in the 21st century. The course materials include readings from anthropology (archaeology, cultural anthropology, and biological anthropology), history, economics, theology, political science, as well as documentaries and films.
ANTH	ANTH	60201	Orientations to Bio Anth	This course will review, engage and analyze major themes, perspectives, and methodologies in biological anthropology and illustrate their connectivity and integration into a broader anthropological approach. The seminar will contain a heavy reading load of historical and current theoretical and practical applications of evolutionary, ecological, physiological, endocrinological, molecular and morphological approaches in the study of humans and other primates, past and present.
ANTH	ANTH	33206	Tales of the South Pacific	The Pacific Ocean, an expanse of 162 million square kilometers, covers nearly 32% of the Earth's surface, and is the site of an island world of diverse ecosystems, languages, and cultures. While humans first settled the western edge of this vast ocean about 55,000 years ago, much of the Pacific had been settled for less than a millennium at the time of first historical documentation, marking the most recent expansions of our species into new territory. The peoples of the Pacific and their cultures have provided important anthropological and archaeological studies of a range of institutions including kinship, economy, language, religion, warfare, and adaptation to diverse and sometimes fragile ecosystems. At the same time, the people of the Pacific have often been stereotyped on the one hand as warlike, superstitious, and isolated, and on the other as noble savages corrupted by the modern world. Using case studies drawn form across the Pacific Islands, the course will address broad topics such as gender, warfare, sustainability, and social structure. This course will explore the realities of life in a unique island environment and the lessons that can be learned form studying its people about what it means to be human.
ANTH	ANTH	33302	Animal Encounters	How do animals relate to non-human animals across cultures? Does culture make a difference in how humans relate to animals and the natural world? What are the roles that animals play in different societies - as food, as religious figures, as companions, as kin, as laborers? From its origins as a discipline, anthropology has examined human-animal relations in a variety of social and geographic settings. This course will review some of the classic examples of cross-cultural relations with animals, and bring these examples into conversation with current debates about race and classification, animal ethics, biotechnology, and food politics. Students will engage with texts, films,and other media from anthropology as well as philosophy, history, and feminist science studies. We will approach these materials from an anthropological perspective that focuses on how our diverse and dynamic expressions of identity and culture shape, and are shaped by, how we engage with other species - whether as beings to think with, live with, love, kill, and/or consume.
ANTH	ANTH	43406	Food and Culture	All humans eat, but the variations in what, how, and why we eat are dazzling. This course examines the many roles that food played in a variety of cultures. We consider food choices and taboos, religious and symbolic meanings of food, dining and social interactions, obesity and thinness, and the political and industrial issues of fast food and the slow food movement. There will be practical and field studies associated with the course.
ARCH	ARCH	40511	Structr'l Design-for Architect	The application of the principles of mechanics to the stress and deformation analysis and design of reinforced concrete structural elements and framing systems. Fall.
ARCH	ARCH	57122	Independent Studies, Design	Special projects in urban and or architectural design, jointly chosen by the student and instructor. The project, an architectural, landscape and urban study, will serve as a foundation for future course work.
ARCH	ARCH	60411	Bldg Tech I	Qualitative and quantitative principles of modern building assembly and detailing in concrete, steel and glass.
ARCH	ARCH	60511	Structures I	Basic principles of building structures with a focus on statics. General topics include structural stability, dynamics and lateral loads, structure types and materials. Computational subjects involve vectors and forces, torque, shear, bending moments, spanning cnoditions, beams, columns, funicular structures, arches, and domes.
ARCH	ARCH	70311	Urban Elements and Principles	A required theory course for all graduate students, entailing a broad survey--both typological and historical--of the physical characteristics of traditional western cities and their development, with special emphasis upon urban form as a cooperative human artifact embodying particular cultural values and ideals.
ARCH	ARCH	70531	Structures III: Wood and Steel	The study of wood and steel structures. Studies include beams, columns, frames and connections. Additional topics address vertical loading, bracing, moment resistive structures and wind forces.
ARCH	ARCH	40421	Building Technology II	A study of building construction methods and materials.
ARCH	ARCH	50511	Preservation Practice	The examination of the practice of historic preservation within an architectural firm or other professional pursuits. Through a project-based approach, the course will integrate preservation philosophies, programs, financial incentives, project research, documentation, and design through the lenses of private, non-profit and governmental roles.
ARCH	ARCH	53612	Emergency Housing	Addressing housing and community design needs of those impacted by natural and man-made disasters is a seminal challenge of our lifetime. Climate changes is increasing the frequency and magnifying the impact of natural disasters throughout the world, while mass migration due to war and unrest grows exponentially by the day. How we address emergency housing needs to rebuild communities will define who we are as a society. Disasters are great equalizers. They are us and we are them. We must rise above the least common denominator typically employed in disaster situations and seek dignified solutions. Not because it 'looks' good, but because employing solutions that address needs of today while building for the future makes the best financial sense, as well as being for the common good. Dignified housing is not only a basic human right. It is a fiscal benefit to a community. This course will research and analyze the practical and pragmatic: what is the current state of emergency housing, how did we get here? As well as the ideal, what are the fundamental principles of architecture and town planning which might inform solutions for the future? We will look beyond design to the influences and decision makers who determine what is built; and study leadership and change management models to see how we can each as individuals influence change. Finally, we will propose a solution, not simply a design, but also a playbook, explaining how to addresses immediate, short-term and long-term needs for communities in need.
ARCH	ARCH	60512	Special Studies--Structures	Special studies in structural principles with application to architectural projects.
ARCH	ARCH	73421	Historic Preservation and Cons	This course explores the knowledge that leads to successful preservation of historic construction. The study of materials, methods and resources available to architects from antiquity, through the early twentieth century is requisite for all rational choices made for preservation structures today. Historic Preservation and Construction will provide preservation professionals with information needed to analyze, modify, and certify historic buildings for modern use. Demonstrations of production or fabrication methods for stone, brick, mortar, paints and wood framing and trim will give first-hand knowledge to preservation specialists. Acceptable practices for structural rehabilitation will be discussed and evaluated. Students completing this course will have the basis for understanding the process used to build historic structures and the means to preserve them. Course requirements consist of attendance of seminars, completion of required readings and assignments. There will be a midterm and final exam.
ARCH	ARCH	61111	Architectural Design I	Introduction to classical design principles and to principles of traditional urbanism. Projects involve drawing the orders, their application to architecture, and the creation of traditional urbanism in the context of existing American settings. (Fall)
ARCH	ARCH	81151	Urban Design II	Part two of a two-studio sequence for students concentrating in urban design, entailing an on-site real-world charrette to create a neighborhood or town plan and the graphic documents and legal mechanisms needed to implement it.
ART	ARHI	40150	Topography of Ancient Rome	The course examines in detail the buildings and monuments of ancient Rome from the Archaic Period to the beginning of Late Antiquity (8th century B.C. to 4th century A.D.). The primary aim of the course is to consider the problems related to the identification, reconstruction, chronology, and scholarly interpretation(s) of Rome's ancient structures. Students will investigate the history of excavations in Rome, analyze ancient literary sources, evaluate ancient art and architecture, and examine epigraphic, numismatic, and other material evidence related to Rome's ancient physical makeup. This close examination of the city of ancient Rome in its historical context also explores how urban organization, civic infrastructure, public monuments, and domestic buildings reflect the social, political, and religious outlook of Roman society.
ART	ARHI	40470	Architecture-Twentieth Century	This course is a survey of the significant themes, movements, buildings, and architects in 20th-century architecture. Rather than validate a single design ideology such as Modernism, Postmodernism, or Classicism, this account portrays the history of architecture as the manifestation-in design terms-of a continuing debate concerning what constitutes an appropriate architecture for this century. Topics include developments in building technologies, attempts to integrate political and architectural ideologies, the evolution of design theories, modern urbanism, and important building types in modern architecture such as factories, skyscrapers, and housing. Class format consists of lecture and discussion with assigned readings, one midterm exam, a final exam, and one written assignment.
ART	DESN	40100	VCD 8: Social Design	This advanced course in visual communication illustrates how design can make a demonstrable difference by informing and educating the public. Class projects focus on design's ability to affect positive social change. The class also benefits students who intend to pursue the field of graphic design after graduation, preparing them both creatively and technically for professional practice by focusing on research-based assignments. These projects will allow students to address various issues affecting contemporary society while simultaneously building their portfolio. DESN 20101 (VCD1) is recommended, but not required
ART	DESN	40101	VCD 9: Professional Practice	MATERIALS FEE. Development of environmental graphics and design systems for three-dimensional spaces. Work collaboratively to adapt design skills for the built environment, connecting people to the spaces they navigate and inhabit through visual messaging. Emphasis placed on developing skills for professional practice, including portfolio preparation and presentation.
ART	DESN	40201	ID: Collab. Design Development	This cross-disciplinary course will develop and harness useful innovation through an association of expertise from business/marketing, management entrepreneurship, chemistry, engineering, anthropology, graphic design, and industrial design. Collaborating teams of graduate and undergraduate students will engage several product development cycles, beginning with an identification of need or opportunity and concluding with comprehensive proof of concept, tests of function, specified manufacturing processes, and an appropriately resolved, aesthetically pleasing product or system. All collaborative team members will be engaged throughout the research and developmental process. Each participant will share in rotating leadership responsibilities, providing direction within their specific areas of expertise and in the context of a sequential course outline.
ART	DESN	40200	ID3:AdvProdDev-Social Design	This advanced course in industrial design explores contemporary issues related to designing objects for social good to positively impact the lives of people, society and the environment in an innovative way. Working within a human centered design process including the identification of real world problems, direct research of user needs, as well as business and technological realities, we will design product solutions and build innovation around people's experiences. Class projects will focus on designing and testing solutions that help people, but also how those ideas are brought forth and effectively executed in the complex world of today.
BA	BAUG	40506	Social Enterprise Consulting	Social Enterprise Consulting melds social and microentrepreneurial theory, techniques and tools with practical application through service learning. The course provides a practicum experience focused on the creation of marketing, financial and/or operational plans, culminating in a feasibility analysis and/or business plan. The course also covers issues relating to community, regional, and international economic development; business modeling, including on-line business models; domestic and international microfinance and funding, and business law.
BIOS	BIOS	11161	Biological Sciences I - Lab	The laboratory sessions are an integral part of the lecture courses, which will complement the lectures. The lab sessions will also offer the student direct experience in using the scientific method and simultaneously introduce numerous biological and analytical techniques. In addition, students learn to present their findings during the course of the two semesters of laboratory as they would for a journal article or a scientific meeting (seminar and poster presentations).

BIOS	GH	60591	Global Health Challenges	This is the foundational course for Master of Science in Global Health students. It is intended to give students an overview of the key topics, activities, goals and challenges that comprise the global health enterprise. The course will be very forward-looking with respect to understanding the goals of the global health community in the context of: global partnerships, governance and leadership; health equity and social justice; approaches to problem-solving; ethical reasoning; systems thinking; and personal, social, economic and environmental determinants of health. On completion of the course, students will understand the major goals and challenges related achieving health with a focus on the poorest and most marginalized in the context of the complex determinants of health. Students will have the skills to analyze and think critically in tackling problems in global health.
BIOS	BIOS	10115	Microbes and Man	The course will provide a survey of relationships between man and microorganisms. General information about microbial physiology, biochemistry, and ecology will support more detailed discussions of interesting topics in food, medical, and applied microbial biology. Included will be subjects of general and historical interest, as well as current newsworthy topics. The student should get a better understanding of the role of microorganisms in disease, the production of common foods, relevant environmental issues, and biotechnology. This course counts as general elective credit only for students in the College of Science.
BIOS	BIOS	10161	Biological Sciences I	This is a two-semester course with three lectures and one three-hour laboratory a week for first-year students contemplating a career in biology, medicine, or related areas of life science. The first semester presents a description of biologically important molecules and then proceeds to cell structure, energy metabolism, and classical and modern genetics. The topics presented in the second semester in the context of modern evolutionary theory include biological diversity, ecology, and organismal physiology. BIOS 10161 and 10162 are not typical survey courses; they go into greater depth, especially in modern molecular biology. When followed by BIOS 20241 and BIOS 20250, they will provide biology and biochemistry majors, including premedical intents, with a thorough in-depth overview of basic concepts of modern biology.
BIOS	BIOS	10191	Biology's Impact in Our World	Students explore core principles in biology that are encountered on a daily basis in the news as they relate to changes in our lives and society in general. These are controversial issues that society is debating, because they affect social policy. Several foci emerge from this debate. First, what is the role of biotechnology on our lives? This includes issues with the widespread use of antibiotics and genetically modified foods, genetic testing, cancer treatment and pharmaceutical development. Second, what happens when biology challenges the beliefs and activities of people? This includes issues dealing with stem cell technology, the origin and evolution of life, the preservation of biodiversity, and human impact on the biosphere. Each week a different issue is investigated using a multifaceted approach to increase student awareness of the underlying controversy. First, a basic knowledge of the biological principle is pursued via in- and out-of-class lecture and readings. Next, in-class problem-solving and discussion of the controversy is undertaken. And finally, a student run debate is held to more fully appreciate the underlying reasoning and passion of opposing viewpoints.
BIOS	BIOS	40569	Topics in Global Health	Global health is concerned with both the interconnectedness and multidimensionality of health as well as with disparities in human disease across the world. The burden of disease occurs unevenly between and within countries; tackling these differences requires a critical understanding of the multivariate and complex determinants of health that range from the genetic background of individuals and populations through exposure to different environments and pathogens, social conditions, economic development, health systems and governance, and individual beliefs, attitudes and behaviour. It is also an example of a "messy" social problem, which requires new thinking regarding how best to intervene and transform such problems.This course is based on a mix of lectures, student-led seminars and group presentations, and is designed to introduce and critically examine the complex multidimensality of global health, as well as provide frameworks and skill sets to discover innovation and new governance measures to reduce its ill impacts.
BIOS	BIOS	30310	The History of Life	This course explores the origin, history, and systematics of life on Earth, starting from hypotheses examining life's origin(s) and including current thinking concerning the systematic relationships of organisms and the evolution of humans. The class will be taught primarily from a macroevolutionary perspective. BIOS 30310 therefore represents the complement to BIOS 30305 (Evolution), which concentrates on processes generating gene frequency changes within populations (i.e., microevolution). Fall.
CBE	CBE	20255	Intro to Chemical Engineering	This is a foundation course in which the students learn to apply the concepts of material and energy balances to problems involving chemical processes, biological systems and environmental phenomena. Within this context, they learn problem-solving techniques and acquire a working knowledge of phase equilibria, physical properties, and computer applications.
CBE	CBE	20260	Chemical Engng Thermodyn I	The course provides an introduction to modern applied thermodynamics, with a focus on aspects relevant to chemical engineers. It begins with the first law energy balance, followed by the development of the second law entropy balance. Thermodynamic constitutive equations for gases and liquids are developed from a molecular-level perspective, followed by applications involving thermodynamic cycles and energy conversion.
CBE	CBE	30355	Transport Phenomena I	Basic conservation principles of energy, mass, and momentum are used to derive the integral and differential forms of the transport equations. These equations are used to solve fluid flow problems of both fundamental and practical interest.
CBE	CBE	30361	Science of Eng. Materials	This is an introductory course that examines the relationship between the structure, processing, and properties of engineering materials. Common engineering materials, including steel, concrete, ceramics, and polymers are discussed. Mechanical, chemical, electrical, and magnetic properties of various materials are examined. The process dependence of microstructural development and defects levels are described.
CBE	CBE	30367	Chemical Engineering Thermo II	Principles of phase and chemical equilibria are defined and used in the solution of chemical engineering problems drawn from the traditional process industries, biological systems, materials processing, pharmaceutical manufacturing and other industries.
CBE	CBE	40435	Electrochemistry/Echemical Eng	This course addresses the fundamentals and applications of technologies that rely on heterogeneous electron transfer reactions. The first part of the course addresses fundamental aspects of electron transfer reactions at electrified interfaces, including band structure of metals and semiconductors, electrochemical potentials, electron transfer kinetics and Marcus theory, potential step and potential sweep experiments, hydrodynamic electrochemistry, potentiometry and ion-selective electrodes, impedance measurements, and electrochemical instrumentation. The second part of the course addresses applications to energy storage (batteries, fuel cells, supercapacitors), energy conversion (photovoltaics), bioelectrochemistry, including neurochemistry, corrosion, and electrolysis and electroplating.
CBE	CBE	40445	Chemical Reaction Engineering	The basic concepts of chemical rate processes are applied to the theory of the design and operation of the various types of commercial reactors for both noncatalytic and catalytic reactions. Topics covered include mole balances, rate laws and stoichiometry, collection and analysis of rate data, multiple reactions, isothermal and nonisothermal reactor design, catalysis and catalytic reactors.
CBE	CBE	60542	Math Methods Engineering I	Rigorous development of tools of mathematical analysis and application of these to solve engineering problems. Topics include matrices, linear and nonlinear ordinary differential equations, special functions, and modeling. (Fall)
CBE	CBE	60553	Adv. Chm. Engnr Thermodynamics	This course is focused on an advanced treatment of thermodynamic concepts. An introduction to molecular thermodynamics is given, followed by detailed treatments of phase equilibrium, equation-of-state development and activity coefficient models.
CBE	CBE	30386	Intro to Bioengineering	This course provides basic science knowledge and engineering practices used by biomedical engineers toward solving problems in human medicine. Topics will include an overview of bioengineering and modern biology, introduction of cell/molecular/genetic engineering principles and the use of engineering analysis to describe living systems, starting with mass and energy balances to understand cell growth and signal transduction. Examples will include the use of general accounting equations (i.e., mass, energy, momentum and charge) toward problems from selected medical engineering fields.
CBE	CBE	40448	Chemical Process Design	This course represents a capstone in the chemical engineering curriculum. In this course students will have the opportunity to apply the basic concepts learned in previous courses to the design and analysis of a chemical processing system. This will be done primarily through the design project. Supporting material to be covered in lectures includes the following: computer-aided design (process simulation), economic analysis, process safety, flowsheet synthesis (conceptual design), and decision-making analysis (optimization). The AspenONE software package is used.
CBE	CBE	40477	Nanoscience and Technology	This course focuses on the unique scientific phenomena that accrue to matter with characteristic nanometer-scale dimensions and on the technologies which can be constructed from them. Special optical, electronic, magnetic, fluidic, structural and dynamic properties characteristic of nanostructures will be addressed.
CBE	CBE	40725	Principles of Molecular Eng	The objective of this course, intended for both upper level undergraduate and graduate students, is to illustrate the emerging field of molecular engineering. By fusing concepts from chemistry and materials science, molecular engineering seeks rational design of chemical building blocks for organized systems and materials. Students will gain a fundamental perspective for how non-covalent interactions and designed molecular motifs can dictate the structure, function, and properties of resulting engineered systems. This will include an appreciation for the role on intermolecular forces in governing the behavior of these molecules as they interact with each other and with their environment (typically a solvent). Additionally, illustrative examples will point to the power of strategies rooted in principles of molecular engineering to create highly controlled and functional materials. topics will include: non-covalent interactions, molecular design, thermodynamic driving forces, solvent effects, molecular self-assembly, supramolecular chemistry, molecular & materials characterization techniques, and applications of molecular engineering for diverse uses in energy, medicine, computing, formulation science, industrial applications, and food sciences.
CBE	CBE	60625	Princ Heterogeneous Catalysis	This course will provide a comprehensive overview of heterogeneous catalysis with particular focus on catalyst synthesis, modern characterization techniques, kinetics, and reaction mechanisms for energy-related applications. Emphasis will be placed on 1) understanding the synthesis and properties of a variety of solid catalysts including carbides, phosphides, zeolites, bimetallic catalysts, tethered catalysts, and metal-organic frameworks, and 2) in-situ/operando techniques to aid in the design of new materials.
CBE	CBE	60727	Ambient Methods Surface Charac	This course develops fundamental principles for characterizing surfaces and interfaces, particularly thin films, using infrared spectroscopy, ellipsometry, electrochemistry, and contact angle measurements. The material will cover reflection of light from surfaces, which is relevant to surface infrared spectroscopy, surface plasmon resonance and ellipsometry, surface energies, adsorption isotherms, and some fundamental aspects of electrical double layers, zeta potentials, and mass transport in electrochemistry.
CDT	CDT	40640	Data Science	Data mining uses methods from multiple fields including but not limited to: machine learning, pattern recognition, databases, probability and statistics, information theory and visualization. The focus of this course will primarily be the machine learning component, with relevant inclusions and references from probability, statistics, pattern recognition, and information theory. The course will give students an opportunity to implement and experiment with some of the concepts, and also apply them to the real world data sets. It will also touch upon some of the advances in related fields such as web mining, intrusion detection, bioinformatics, etc. In addition, we will discuss the role of data mining in the society.
CE	CE	62400	Envrnmtal Fluid Dynamics Pract	In this course, graduate students will formally present their research or conduct a critical review of a journal paper related to their research. This will be commented upon by participating faculty or peers for content and improvements.
CE	CE	63400	Envirmntl Fluid Dynamics Sem	This weekly seminar series is intended for graduate students who conduct research in the area of fluid mechanics with particular relevance to motions in the environment (atmosphere, oceans and solid earth). A good fraction of the lectures will be dedicated for invited speakers from other institutions and the rest will be given by Notre Dame Speakers. These seminars are expected to expose graduate students and research faculty to a wide swath of research problems as well as to state-of-the-art analytical, numerical and experimental tools.
CE	CE	45610	Eng Inter Development 1	Engineering for International Development I Engineering for International Development I partners students with community organizations to put their engineering skills into service, in this case Bridges2Prosperity, a nonprofit organization providing pedestrian bridges to communities worldwide who lack such basic infrastructure. Under the banner of the ND SEED (Notre Dame Students Empowering Engineering Development), up to a dozen students will be accepted each academic year for this course and will supervise all aspects of bridge design and construction, including fundraising and international study via site surveys over Fall Break and construction in May following the spring semester. To join this course in the fall of any academic year, students must apply and be accepted by ND SEED in the prior spring semester. Students are expected to participate in the course for a full academic year, through bridge construction in May. The project is also affiliated with the Center for Social Concerns International Summer Service Learning Program (ISSLP) and has additional curricular requirements through ISSLP.
CE	CE	45620	Eng International Devel II	Engineering for International Development II partners students with community organizations to put their engineering skills into service, in this case students work with Engineering2Empower (E2E). E2E started as an organization committed to exploring new approaches and solutions to the Haitian urban housing problem. Through its work with various university and non-university partners, the organization has broadened its focus to seek holistic solutions to hazard mitigation in developing settings. Undergraduate students lead all facets of Research and Development for the organization through this course, focusing on prototype frame and panel design and construction/production for the housing solutions promoted, but also programming for Community Awareness and Engagement. Through partnerships with the Kellogg Institute, students have the opportunity, on a case by case basis, to travel to Haiti to directly implement their work.
CE	CE	40300	Geochemistry	An introduction to the use of chemical thermodynamics and chemical kinetics in modeling geochemical processes. Special emphasis is placed on water-rock interactions of environmental interest.
CE	CE	40465	Environmental Fluid Mechanics	This course covers fluid dynamics framework of environmental fluid motions, in particular, the application of the equations of motion to predict them. A special emphasis will be made on the effects of earth's rotation and background density stratification, both of which give rise to intriguing natural phenomena. The modification of environmental motions by human influence will be described paying particular attention to engineering applications. Some necessary mathematical tools such as tensors will be covered to some extent.
CE	CE	40620	Transportation Engineering	The planning, design, operation, safety, and economics of transportation systems. Spring.
CE	CE	60250	Structural Dynamics	Introduction to dynamics of civil infrastructure; Dynamics of single and multiple degree-of-freedom systems and distributed/continuous systems; Dynamic analysis of structural systems; introduction to wind, waves and earthquake dynamic load effects; treatment of dynamic effects in building codes

CE	CE	30560	Dynamic Earth	This course focuses on the study of the fundamentals of Earth processes that help explain the formation of the ambient landscape and natural hazards such as earthquakes and volcanic eruptions. Processes and mechanisms of rock deformation in the Earth's crust are discussed based on the principles of stress, strain and rheology. The plate tectonics framework of a dynamic Earth is central to the discussion, as it relates to the occurrence of geological structures on a regional and global scale.
CE	CE	40350	Environmental Microbiology	Bacteria are everywhere. They survive in extreme environments that include the deepest ocean regions, hot springs (like Old Faithful), Antarctica, and Death Valley. These organisms span the gamut of utility as some bacteria are absolutely required to maintain our own health while other bacteria display pathogenicity where the smallest of doses can kill. Separate from these extremes, there are other bacteria being utilized everyday in various industries to generate chemicals, antibiotics, food products, and clean water. This course will address the fundamental processes used by all bacteria, the chemical reactions and molecular interactions mediated by bacteria to function and survive, and the diversity and specific characteristics of several specific bacterial genera and species.
CE	CE	40360	Geomicrobiology	This course explores current research involving the interaction between microbes and geologic systems, focusing on the ability of microbes to affect mass transport in fluid-rock systems. Readings concentrate on laboratory, field, and modeling studies of environmental and/or geologic interest.
CE	CE	40410	Advanced Fluid Dynamics	This course is designed to provide an in-depth understanding of fundamental principals and concepts of fluid mechanics for beginning graduate students and upper level undergraduate students. It will be a useful precursor to advance courses in turbulence, environmental fluid mechanics, stability theory, waves, oceanography and meteorology.
CE	CE	40420	Reactive Transport	This course examines the advection, diffusion, and reaction processes of materials moving in the atmosphere, surface water systems, and groundwater systems. Particle based as well as continuum based approaches are examined.
CE	CE	40450	Hydraulics	Theory, analysis and design of pipe flow, sewer flow, open channel flow, and reservoirs and pumping facilities for water distribution and wastewater collection. Student team design of water distribution and sewer collection systems is emphasized. Fall.
CE	CE	40456	Analysis and Modeling of Hydro	This is an intermediate-to-advanced graduate course covering a wide range of approaches to the analysis and modeling of hydrologic systems, including statistical analysis, Monte Carlo approaches, simulation modeling, and optimization. The course is aimed at PhD students in engineering and environmental sciences whose research involves the advanced analysis of hydrologic systems. The course is primarily project-based, and projects will include construction of a reservoir operations model for use in climate change assessment, and a final project of the student's choosing making use of linear programming
CE	CE	60430	Fundamentals of Turbulence	This course deals with basic forms of turbulent motions, such as isotropic and homogenous turbulence and mathematical treatment of such motions based on fundamental equations of fluid motion. It will introduce tools for analysis of turbulent motions, such as phenomenological, similarity, spectral and statistical methods. Applications to environmental and engineering flow situations will also be described. A graduate fluid mechanics background is needed to take this course.
CE	CE	40460	Groundwater Hydrology	Lectures and laboratory cover the fundamentals of flow and transport in porous media. Methods of analysis for development of groundwater resources. Fall.
CE	CE	30540	Petrology/Earth Materials	Origin and identification of igneous and metamorphic rocks within a plate tectonics framework. Geochemistry and petrography are used to investigate mineral equilibria, magma generation and crystallization, pressure and temperatures of deformation, and the interior of the earth.
CFSC	CSC	33458	México-U.S. Border Immersion	This seminar and experiential-learning course is broken into two parts. In the fall (for two credits), students will participate in a seminar that will expose them to various perspectives about immigration issues, especially those related to the México-U.S. border. During our in-class meetings in the fall, (approximately 1 hr. & 40 min. per week), we will discuss scholarly and journalistic accounts of why migrants leave their home countries, the struggles they face during the journey, how U.S. citizens are responding, and possible policy solutions. In the spring (for one credit), students will participate in an immersion trip to the Southern Arizona borderlands during the first week of January and in follow-up classroom meetings (approximately 50 min. per week) during the spring semester to process the immersion experience. During the immersion trip, we will observe Operation Streamline legal proceedings, be trained for and participate in humanitarian efforts, tour a Border Patrol and detention facility, visit the border wall and learn about its environmental impact, hear from faith leaders about their current and past border activism, and visit Nogales to experience everyday life in a border community. Throughout the course, particular focus will be given to the intersection of religion - especially Catholic Social Teachings?and border and immigration issues. To be eligible, students must complete an application, linked here:https://www3.nd.edu/~csc/application/sem_application.php?s=Fall&y=2016. Enrollment is competitive. The 15 available spots will be chosen based on the application responses, with preference given to those submitting earliest. Students will be notified about their status within a week of submitting the application. There are fees associated with this seminar (also see CSC website for information). This is a graded course. Department approval is required. [Note: Due to the overlap in content, students who have completed the one-credit version (CSC 33966/SOC 33066/ILS 30804/THEO 33966) cannot take this course.]
CFSC	CSC	33950	Soc Con Sem: Appalachia	This seminar involves experiential learning during the semester break. The course is centered on a service-learning immersion in the region of Appalachia and provides preparation for and follow-up to that experience. Students may focus on particular themes at various sites while learning about the region and rural issues.
CFSC	CSC	33952	Soc Con Sem: Social Change	This seminar allows students to participate in an experiential opportunity designed to examine contemporary social problems. Emphasis will be placed on understanding issues/conflicts from the perspective of the various participants. Preparation and follow-up sessions are tailored to the specific opportunity.
CFSC	CSC	33975	Poverty & Development in Chile	THEO 33975/CSC 33975 (1.0 credit) serves as the required orientation course for all students who will participate in the Approaches to Poverty and Development course offered through the Universidad Alberto Hurtado in Santiago, Chile as part of the Santiago study abroad program. The course will provide students with information regarding many of the themes and topics that will be explored further in the UAH course. This one-credit preparatory course will provide the necessary information to facilitate a richer and more meaningful experience while in Chile. Students must first be accepted into the Santiago semester abroad program through the Office of International Studies before being able to apply for this course.
CFSC	CSC	33984	SCS: Working Side by Side	This new seminar will focus on key elements that make-up the field of service-learning in the 21st century, helping students understand the differences between volunteering, service -learning, and community-based learning and both the long and short term implications of this work on students and communities. The seminar will take place over an 8-week period with a practicum immersion taking place at fall break. Students will be able to choose between 3-4 different immersion sites this fall: Possible immersion sites: My Brother's Keeper in Easton Mass, Father McKenna Center/ The Pilgrimage in DC, L'Arche Community local (Midwest), Heifer International Ranch in Arkansas. The course itself will walk students through the key elements of service-learning and community-based learning in the 21st century and implications, and additionally will engage students many of the following topics: Mutually beneficial partnership with communities, Impact (short and long term) on community and students, Right attitudes for service-learning,Consent of communities, The experience of suffering and the other, Process reflection and social analysis, Theological reflection, symbols, and ultimate questions, The importance of a framework - Catholic Social Teaching, Creative problem solving and the role of innovation, Modern Philanthropy and Innovation: The work of Charity and Justice in the 21st century (what does that look like?), The importance of student participation and leadership in social change.
CFSC	CSC	33900	Advocacy for the Common Good	This one credit course aims to develop a shared understanding of advocacy and the common good, and to cultivate skills to help strengthen students' advocacy planning and action in pursuit of social justice. This course is co-facilitated by seasoned advocates and organizers from Catholic Relief Services. The opening weekend workshop (January 20-21) will introduce students to advocacy tools and skills, including mapping power, navigating the legislative process, mobilizing, developing effective messaging and influencing decision makers. Students will then form groups and spend twelve weeks to research, develop and implement advocacy campaigns on a particular issue. There will be four check-in class sessions and a final class session in which each group will share its campaign phases - research, media use, public meeting - and address challenges as well as celebrate successes. Non Traditional Meeting Days/Dates/Times: Opening Training: Fri, Jan 20th, 5:00pm-9:00pm & Sat, Jan 21st, 9:00am-4:15pm; Check-ins: Mondays 1/30, 2/13, 3/5, 3/27, and 4/10 from 5:00 to 6:30pm.
CFSC	CSC	33902	SCS: Science Policy Ethics	Offered jointly with the College of Science, this Social Concerns Seminar will examine ethical responsibilities within science funding allocations and the regulation of basic and translational research. In the framework of Catholic Social Teaching, students will explore science policy development, government funding for science, and the regulation of both basic science and translational research, including special concerns for neglected disease and global health research. The course aims to explore how and why the government invests in research, how those funds are distributed to scientists, and ultimately how new discoveries are translated to new technologies, ultimately for the good of the general public. Working with Notre Dame's Federal Relations Team in Washington, D.C. over spring break, students will meet with scientists, multiple federal agencies, and policy makers. In preparation for meetings in Washington, 5 panel sessions will feature speakers with experience in research ethics and integrity, advocating for funding for science, distributing those funds, or working at the intersections of government policy, basic science, physics and engineering technology, environmental science, and clinical and translational research. This course poses a unique opportunity for students to network with various federal funding agencies and policy makers in Washington, D.C. Open to undergraduate and graduate students.
CFSC	CSC	33967	Soc Con Sem:Migrant Experience	This seminar offers a unique immersion into the lives of migrant farm workers in Florida during the spring harvest.
CFSC	CSC	33973	SCS: Realities of Race	This seminar will take a close look at the realities of race in the United States in the 21st century. How can Catholic Social Teaching inform our conversation and response to the realities? The classes before immersion will seek honest dialogue about the complexities of race with regard to history, current events, racism, and privilege. Participants will travel together over spring break to urban centers to further the conversation and learning in St. Louis and Chicago. Upon return, we will consider the local racial realities in South Bend and Notre Dame communities.
CFSC	CSC	63953	Civic Engagmnt & Social Respon	This seminar allows graduate students to participate in an experiential learning opportunity designed to concentrate on civic engagement and social responsibility. Emphasis will be placed on understanding issues/conflicts from the perspective of the various participants. Preparation and follow-up sessions are tailored to the specific opportunity.
CFSC	CSC	60693	Common Good Initiative-Haiti	Common Good Initiative: Haiti is a 2-credit, graduate-level, community-based learning course that prepares students for, immerses them in, and reflects on the struggle for social justice, with particular attention to issues of global health, education, and development in the context of Haitian poverty. The objective of the course is to formulate personal and structural responses in light of the preferential option for the poor that advance the common good, especially as that takes shape in the amelioration, prevention, and eradication of disease, poverty, and systemic injustice. The course's methodology lies at the nexus of social analysis, theological reflection, and interdisciplinary dialogue, each of which is predicated on the experiential learning of the immersion in Haiti itself (up to 8 days of travel over the Mid-Term Break). Learning goals include: awareness of beliefs, values, and interests; analysis of complex social realities and points of view; the synthesis and integration of experientially- and textually-based knowledge; and critical reflection on Catholic social tradition.
CHEM	CHEM	60526	Biochemical Equilibria	CHEM 60526 is a new graduate course offering, the first in a sequence of four sequential courses to be taught during fall semester -- 60526, 60527, 60528, 60529. Discussion and analysis of equilibria underlying biochemical processes. Topics include intermolecular binding interactions, conformational equilibria, coupling between linked processes, and environmental dependencies.
CHEM	CHEM	21274	Across the Periodic Table Lab	Advanced theory supplemented with literature and data simulations. Experiments to accompany CHEM 20274.
CHEM	CHEM	31322	Physical Chemistry II Lab	A course in the experimental aspects of physical chemistry using modern techniques of measurement. The laboratory includes thermodynamic, kinetic measurements, spectroscopic measurements, and measurements in reaction dynamics.
CHEM	CHEM	90625	Molecular Biophysics	An investigation of the forces that drive intra- and inter-molecular recognition, including hydrophobicity, electrostatics, and configurational entropy. Topics include the thermodynamics of protein folding and ligand binding and their relationships to chemical properties and three-dimensional structure; mathematical treatment of folding, binding, and linkage via partition functions; and the determinants of ligand binding specificity and kinetics. Advanced theory supplemented with primary literature.
CHEM	CHEM	10101	Foundations of Chemistry	This course covers forms, properties, and separation of matter; atomic structure and periodicity; nuclear chemistry; chemical bonding and structure; reactivity with applications to acid-base and oxidation-reduction reactions; and chemistry of carbon and living systems. This course is not open to students who have taken the equivalent of CHEM 10171 or 10181.
CHEM	CHEM	30321	Physical Chemistry I	A rigorous course in the fundamentals of physical chemistry, including chemical thermodynamics, kinetics, quantum mechanics, and the elements of atomic and molecular structure.
CHEM	CHEM	30337	Physical Chemstry Life Science	Introduction to the fundamental principles of physical chemistry with application to modern biological problems. Emphases will include classical and statistical thermodynamics and a survey of biological spectroscopy.
CHEM	CHEM	20274	Advanced General Chemistry	Chemistry course which completes the 2-year chemistry sequence for students in the College of Science, Chemical Engineers, and pre-professional students. Extends principles of chemistry with an in-depth look at the periodic table and an emphasis on bioinorganic chemistry. Topics include: bonding across the periodic table, chemistry of the s and p block elements, d-block elements and coordination chemistry, and kinetics, catalysis, and redox/electrochemistry with applications to biological systems. This course is generally taken in the Spring semester with the laboratory CHEM 21274.
CHEM	CHEM	20284	Chemistry Across PeriodicTable	This course will extend general principles of chemistry with an in-depth view of the rest of the periodic table. Topics covered include: bonding across the periodic table, chemistry of the s- and p-blocks, d-block and coordination chemistry, as well as chemical reactivity, kinetics, catalysis, and redox/electrochemistry.
CHEM	CHEM	30322	Physical Chemistry II	For science majors only. Second semester of Physical Chemistry. A rigorous course in the fundamentals of physical chemistry, including chemical thermodynamics, kinetics, quantum mechanics, and the elements of atomic and molecular structure.
CHEM	CHEM	30324	Physical Chem for Engineers	A course in the fundamentals of physical chemistry, emphasizing theoretical and experimental aspects of reaction kinetics, an introduction to quantum theory and a critical appreciation of the nature of the chemical bond. The course also explores how spectroscopic techniques allow us to gain insight into the structure and properties of molecules.

CHEM	CHEM	30338	Physical Biochemistry	This course provides a rigorous grounding in physical chemistry for the undergraduate biochemistry majors at Notre Dame. The course introduces core concepts of physical chemistry pertinent to the behavior of biological molecules. The emphasis is on thermal physics, with an introduction to biological spectroscopy. Students will learn how the principles of molecular physics illuminate the mechanisms and evolution of biological molecules and our abilities to manipulate them.
CHEM	CHEM	40438	Polymer: Principle to Practice	This course offers the basic physical and organic chemistry knowledge in polymerization reactions. Topics to be covered include mechanisms of polymerization reactions; polymerization kinetics and thermodynamics; relationship of physical properties to structure and composition; correlations of applications with chemical constitution; functional polymers for medicines and electronics. The course is recommended for students with special interest in polymer materials and future plan on polymer research and professional studies.
CHEM	CHEM	40560	Chemical Biology	This graduate course will approach biological subjects with an intension of integrating them with chemistry in a seamless manner. Knowledge of biology at the freshman level and of one year of organic chemistry will be a pre-requisite. This course is intended for graduate students aspiring to do studies at the interface of chemistry, biochemistry and biology. The course is also open to advanced undergraduates (senior level).
CHEM	CHEM	10171	Intro to Chemical Principles	This one-semester course, offered in the Fall, provides a thorough grounding in the fundamental principles governing chemical structure and reactivity. It is accompanied by laboratory work and by a tutorial section. Topics to be discussed include the quantum mechanical structure of atoms, models of chemical bonding, chemical equilibrium, acidity and basicity, and thermochemistry and thermodynamics. Recommended for students in the College of Engineering, College of Science, and for all pre-professional students.
CSE	CSE	20600	CSE Service Projects	Engineering projects in community service.
ECON	ECON	10011	Principles of Microeconomics	An introduction to economics, with particular attention to the pricing mechanism, competitive and monopolistic markets, government regulation of the economy, labor-management relations and programs, income determination and public policy, trade and the international economy.
ECON	ECON	10020	Principles of Macroeconomics	A continuation of introduction to economics with emphasis on the measurement of national economic perfomance, alternative explanations of short-run economic fluctuations and long-run economic growth, money and credit, fiscal and monetary policy.
ECON	ECON	30010	Intermediate Micro Theory	An examination of the language and analytical tools of microeconomics, emphasizing the functional relationship between the factor and product markets and resource allocation.
ECON	ECON	30020	Intermediate Macro Theory	An intensive examination of Macroeconomics with particular reference to the determination of economic growth, national income, employment and the general price level.
ECON	ECON	30330	Statistics for Economics	This course seeks to introduce the student to the principles of probability and statistical theory appropriate for the study of economics. The emphasis of the course will be on hypothesis testing and regression analysis.
ECON	ECON	30331	Econometrics	Provides students with an understanding of when and how to use basic econometric methods in their work as an economists, including the ability to recognize which econometric technique is appropriate in a given situation as well as what explicit and implicit assumptions are being made using the method. Topics covered include estimation and hypothesis testing using basic regression analysis, problems with basic regression analysis, alternative econometric methods, limited dependent variables, and simultaneous equation models.
ECON	ECON	30541	Public Economics	This course examines the role of the government as defined by economic theory in the creation of public policy. Under ideal market conditions, competition promotes economic efficiency, leaving little to no role for the government with the possible of exception of policy to alter the distribution of income. Nevertheless, in many cases markets fail and government intervention may be necessary. The course will focus on concepts from microeconomics such as externalities, public goods, merit goods, asymmetric information, and income redistribution to understand how governments may construct policies to address economic problems and how government interventions will in turn affect the economy and distribution of well being.
ECON	ECON	33150	Intro to Econ&Catholic Thought	This course is the seminar version of 30150. In this course we will discuss the relationship between economics and Catholic social teaching. We will learn about key principles in Catholic social thought, read key Papal encyclicals and other writings. We will then discuss key economic concepts and empirical facts known from the field of economics, and how these relate to Catholic social teaching. Finally, we will apply these ideas to discussions on labor, capital, finance, the environment, globalization, and development
ECON	ECON	40040	Market Design	While economics has traditionally studied how existing markets work, the problem of designing and repairing such institutions has become increasingly important as fast, efficient, and robust markets become a key feature of modern life. This discipline, Market Design, draws on a variety of tools from economics, statistics, and mathematics to engage with real business and policy problems, from how Google arranges search results to how children are matched to public schools in Boston and New York City. We will study the core tools used in practice (game theory, mechanism design, and matching theory) as well as applied examples of their use (spectrum auctions, e-commerce, public school matching, kidney exchange). A final project will focus on proposing redesigns for a real-world market.
ECON	ECON	40260	Political Economy of Develop	The course will focus on why and how political institutions affect economic development. The goal is to understand core theoretical concepts in political economy, discuss the political determinants of economic policy choices and learn how to understand and evaluate empirical evidence. The course will use evidence and examples from both developed and developing countries. Topics will include the determinants of economic development, the role of historical circumstances and political leaders, the role of politics in creating or resolving economic crises and the constraints posed by corruption and political instability. Readings for the class will comprise selected academic papers, case studies and sections from books. Class assignments will include problem sets, exams and short paper/book reports.
ECON	ECON	40850	Econ of Innovation, sci resear	We will use simple microeconomics principles to understand how and why innovation happens, how innovation is related to basic scientific research, what factors influence the production and diffusion of new ideas, and how government policy can help or hinder innovation. We will also study the relationship between innovation and economic welfare using recent macroeconomic models. Intermediate microeconomics and at least one semester of econometrics are recommended, though not required. There will be two midterms and a final exam, as well as written homework assignments
ECON	ECON	43810	Empirical Methods Development	This is an advanced undergraduate economics course that will provide a broad introduction to development economics, with an emphasis on the application of modern econometric techniques to questions in development. This course will survey recent literature that examines the factors that explain poverty in the developing world. In particular, we will consider the relative roles of government failures, market failures, history, geography, culture and technology among others. This course will briefly survey 'classic' theories in development and then focus on understanding recent journal articles in detail. We will explore these questions primarily from a microeconomic perspective, paying careful attention to understanding, evaluating and applying econometric techniques. The goal of this course is to introduce students to modern research in development economics and produce an original empirical research paper
ECON	ECON	70566	International Economics I	Theoretical and empirical analysis of international trade and factor movements. Ricardian and Hechscher-Ohiln models, increasing returns, welfare implications of trade policies, global trading arrangements.
ECON	ECON	73001	Research Seminar -Micro	This is a course is intended to provide students with insights into current research topics, to help them learn to formulate their own research topics, to stimulate them to engage in independent research, and to offer a forum in which they can learn to present their own research and discuss research presented by others.
ECON	ECON	43025	International Macroeconomics	This is the seminar version of Econ 40025. "This course provides students with an introduction to open-economy macroeconomics. Discussed are theories of trade, exchange rates, business cycles in emerging markets, international financial crises, and sovereign debt. The course is primarily model-based, giving students an analytic framework in which to understand international economic issues. However, current events and policy issues are integrated to give context."
ECON	ECON	60101	Microeconomic Theory I	This course begins by covering the basic tools of nonlinear optimization. Students will then study partial equilibrium analyses of economic topics that include producer behavior, consumer behavior, choice under uncertainty, and an introduction to welfare analysis.
ECON	ECON	60201	Macroeconomic Theory I	An introduction to the foundations of macroeconomic theory. Basic tools for time series analysis, including ARMA models, VARs, and detrending. The tools of dynamic programming and optimal control are developed, with applications to consumption theory, capital theory, the analysis of labor markets and the theory of economic growth. Analytic and numerical solution techniques are introduced.
ECON	ECON	60302	Econometrics I	Properties of estimators, methods of estimation, general linear regression model, maximum likelihood estimation, nonlinear regression models, Karnaugh maps, hypotheses testing with likelihood ratio, Wald, Rao tests, ANOVA, and spline regression methods.
EDIN	ESS	30632	Policy/Values/Practices STEM	Science education occupies a unique position among the school-based disciplines. Across many sectors, the perceived role of science education is to prepare students to enter into and succeed in scientific fields. It is argued that if an advanced economy, like the United States, wishes to maintain its economic relevance, than each generation must be prepared to engage in scientific and technological innovation and that school science is responsible in fulfilling this obligation. But only approximately 5% of all occupations are STEM related - what happens to the 95% of students who wish not to pursue STEM careers? What are the needs of an educated citizen in today's society? Although most goals for science education focus on the development of students' understanding of the material world, this focus on canonical science often presents the discipline as a 'rhetoric of conclusions' rather than a messy, complex, highly creative, and tentative enterprise. The consequence has been that many students are alienated from science, thus undermining one of the fundamental aims of science education. This course explores the complex and contested terrain of policy and practice in science education by focusing on four major themes: 1) The nature of science and the nature of school science; 2) Policies surrounding science curriculum; 3) The practice of science education; and 4) New approaches to science education.
EE	EE	30372	Electric Machinery & Power Sys	Introduction to electric power systems and electro-mechanical energy conversion, including generators, transformers, three-phase circuits, AC and DC motors, transmission lines, power flow, and fault analysis. Spring.
EG	EG	10111	Intro to Engineering Systems I	The first of a two-part sequence intended to introduce engineering to first-year intents and to establish a foundation for their studies in any of the engineering disciplines. Team-oriented design projects are used to provide a multidisciplinary view of engineering systems and to present the engineering method. Structured programming is introduced, and computing skills are developed for engineering analysis, synthesis, and technical communication. Fall.
EG	EG	10112	Intro to Engineerng Systems II	The second of a two-course sequence intended to continue the introduction of first-year intents to the engineering disciplines. Multidisciplinary projects are used to illustrate the application of engineering modeling, analysis, and design principles to solve a variety of practical problems. The projects are intended to span areas of interest in all departments of the College of Engineering. Structured programming and software skills are further developed. Spring.
ENGL	ENGL	20194	The American Lit of Discovery	The American Renaissance is often characterized by the flourishing of arts and culture. Yet, for the new nation, the nineteenth-century can also be perceived as an age of exploration in which the United States sought to re-imagine itself not as a Europeandiscovery, but rather as independent discoverers. In a series of official and unofficial scientific expeditions, Americans expanded and explored their new domain - contributing to multiple scientific disciplines in the process. Authors of the American Renaissance were inspired by accounts of scientific exploration, and the progress of science emerges as a prominent theme in many of their works. This class considers the impact of scientific exploration on major authors of the American Renaissance, including Herman Melville, Walt Whitman, Nathaniel Hawthorne, James Fenimore Cooper, Henry David Thoreau, and Edgar Allen Poe. The course concludes by tracing the impact of the discovery genre as a predecessor for contemporary science fiction. The final section will incorporate television and film, including classical science fiction such as War of the Worlds and Star Trek, along with more recent films including Alien and Interstellar.
ENGL	ENGL	20616	Dystopias and the Family	This course will focus on how the family emerged from the apocalypse of the post-war era. We will particularly pay attention to how real and imagined dystopian worlds envision the family. In "Dystopias," we will primarily be looking at American and English literature, film, television, and YouTube videos (i.e. After Hours by Cracked) in order to explore this change. In the first half of the semester we will explore the "real" catastrophes of post-war life. From terrible mothers in Small Island to incestuous fathers in Sunset Song, we will examine how 20th- and 21st-century fears of the future play out in family dynamics. The second half of the semester will be devoted to fantastic dystopias. From childbearing vessels in Margaret Atwood's The Handmaid's Tale to the massacre of children in the dystopian worlds of Suzanne Collins' Hunger Games and James Dashner's The Maze Runner, we will explore how these works comment on the problems of today. By exploring these various genres, we will attempt to answer what the "literary" can do that other forms of communication cannot and vice versa.
ENGL	ENGL	40609	American Transcendentalism	America's first great literature, and its first great reform movement, were born together just before the Civil War in the group of writers named "the Transcendentalists." The name was intended to mock their romantic ideas, but it stuck, and with it has come 150 years of debate. Were they fired more by religion, literary ambition, or social reform? Were they American nationalists or international cosmopolitans? While some of them - Emerson, Thoreau, Fuller, Alcott - wrote some great books, and they inspired the likes of Hawthorne, Whitman, Poe and Melville, their goal was not to write great literature but to change the course of American society. Did they succeed? We may not settle this debate, but in taking it on, we will find haunting lessons for our own time as well. Readings to include selected essays by Emerson, Brownson, and Fuller, Thoreau's Walden, poems by Whitman and Dickinson, Hawthorne's Blithedale Romance, Louisa May Alcott's Little Women, and a variety of shorter readings by a range of supporters, participants, and detractors.

FTT	FTT	30802	Lighting Design	This class will teach you what is involved in creating and executing a lighting design. We will cover lighting equipment and safety. You will design and draft a light plot, and you will learn how to write and use paperwork. Most importantly, the goal of this class will be to teach you how to see light. There will be lectures, videos, projects (take-home and in-class), hands-on training, and required attendance at TWO performances. The semester culminates with a final design project, as well as written components.
FTT	FTT	40433	That Eighties Class	This course explores the media culture of 1980s America. We will explore such topics as the rise of "high concept" blockbuster Hollywood, prime-time television at the peak of the broadcast network era, the emergence of Fox, the widespread adoption of cable television service, the development of the 24 hour news cycle, and media industry consolidation. In addition to studying these dominant industry practices and media forms, we will also explore such secondary and alternative media cultures as independent cinema, music subcultures, and video games. Our emphasis throughout will be on the interplay between shifting technologies, industrial modes of production and distribution, and cultural practices.
FWP	WR	13200	Community Writing & Rhetoric	In cooperation with the Center for Social Concerns, these sections of composition place students in learning situations in the wider community where they are in contact with people who are dealing with the specific content issue of their section. We welcome students with commitment to social justice and community service to enroll.
FY	FYS	10101	Moreau First Year Experience	This two semester sequence helps new students to make a meaningful transition to collegiate life at Notre Dame by integrating their academic, co-curricular, and residential experiences. Through weekly small-group meetings, students in the course will explore university resources and opportunities and will examine topics such as: orientation to the university; community standards; health and wellness; strategies for academic success; spiritual life; discernment; and cultural competence. Students will use ePortfolios to reflect on their own intellectual, creative, professional, and personal development. This course is required of all first-year students. FYS 10101 is taken in the fall and FYS 10102 is taken in the spring.
HESB	HESB	20010	Introduction to Public Policy	This course introduces students to fundamentals of public policy by examining the policy process, reviewing tools for policy analysis, and delving in to substantive policy areas. In our exploration of the policymaking process, we will examine how government structure shapes that process, as well as the role and influence of various actors, including special interests. The course will provide students with insight and relevant tools for policy analysis, including writing. Additionally, the course will delve into several substantive policy areas including healthcare, the environment, economic and social policy. This course is the gateway to the Hesburgh Minor in Public Service, but students from all majors and Colleges are welcome.
HESB	HESB	30231	Moral Problems	An introduction to the field of moral philosophy, with major emphasis on contemporary moral issues.
HESB	HESB	30300	Immigration Politics & Policy	Immigration is an issue of increasing importance in the United States. Few issues have generated as much debate and emotion as the immigration policy. The goal of this course is to provide students with an overview of the critical normative and academic questions in political science regarding immigration in the U.S. What factors have affected contemporary and historical immigration policy in the United States? In particular how have economics, demographics, politics, religion, culture, environmental concerns, and ethnic and nationalist interests impacted the nature of immigration politics and policy? How have groups leveraged political influence for desired immigration policy outcomes? We will study the impact of worldwide immigration and population trends on the formulation of American policy. The emphasis will be on an academic understanding of how immigration policy has been affected by domestic and international demographic and political factors
HESB	HESB	30303	Social Entrepreneurship	Some of the most dynamic and successful businesses are aspiring to a "double" or "triple bottom line": profitability, beneficial human impact, and environmental sustainability. This course exposes students to a new and growing trend in leadership, venture creation, product design, and service delivery which uses the basic entrepreneurial template to transform the landscape of both for-profit and not-for-profit ventures.
HESB	HESB	30427	American Political Parties	Political parties play many vital roles in American politics: They educate potential voters about political processes, policy issues, and civic duties. They mobilize citizens into political activity and involvement. They provide vital information about public debates. They control the choices--candidates and platforms that voters face at the ballot box. They influence and organize the activities of government officials. Most importantly, by providing a link between government and the governed, they are a central mechanism of representation. These roles--how well they are performed, what bias exists, how they shape outcomes, how they have changed over time--have consequences for the working of the American political system.
HESB	HESB	30499	Public Opinion & Pol Behavior	A principle tenet underlying democratic governance is the belief that public opinion or the "will of the people" should dictate governmental behavior. To the extent this belief is a realistic consideration, difficult questions remain concerning the capacity for citizens to develop reasoned opinions and how to conceptualize and measure opinion. This course explores the foundations of political and social attitudes and the methodology used to observe what people think about politics.
HESB	HESB	30638	Media and Politics	Although the mass media is not formally part of the U.S. government, it is arguably the most powerful institution shaping public attitudes, creating and producing information, and communicating political information to individual citizens. Almost all exposure to politics comes not from direct experience but from mediated stories. And, with the rise of the Internet, the growth of 24-hour cable news, and the decline of the "Big Three" television networks has created, a more diffuse media environment has been created. The primary purpose of this course is to analyze the role of the media in American politics and its relationship with the public, government, and candidates for office in a democratic society.
HIST	HIST	30061	History of Modern Africa	This course is an introduction to the history of the peoples of Africa from the late nineteenth century to the present day. During the term, we will consider the ways in which Africans shaped and were shaped by the transformative events of the period. In the second half of the nineteenth century, European powers conquered and colonized much of the continent. Over the next sixty years, Africans lived and died under the yoke of European rule; some resisted, others collaborated, but all influenced the nature of colonialism and its eventual collapse. By the 1960s, most Africans were free of foreign rule. Since then the peoples of Africa have endeavored to achieve political stability, navigate Cold War politics, harness development aid, and adapt to a globalizing economy. In recent years, they have succumbed to brutal wars and endured devastating famines, but they have also inspired the world with their triumph over apartheid, emerging vibrant democracies, rich cultures, and deep history. In this class, we will identify, problematize, and debate these major themes in Modern African history. We also will make use of a variety of texts, from historical documents to classic academic works to works of African art, film, and fiction.
HIST	HIST	30407	World War 2: A Global History	"The Second World War is the largest single event in human history, fought across six of the world's seven continents and all its oceans. It killed fifty million human beings, left hundreds of millions of others wounded in mind or body and materially devastated much of the heartland of civilization." The above quote, from historian John Keegan, summarizes the focus--and points to the significance--of this course. World War II is an event that "defined an entire epoch in human history," according to historian Thomas Childers. This summer, we shall investigate the causes, course, and consequences of the greatest conflict in human history. The focus of the course will be global, addressing most of the geographic areas involved, the major diplomatic, political and military events, and some of the key figures of the war. Students are expected to actively participate in debates and discussions; to write two to three short papers, and to take a final exam. This course satisfies the university history requirement and is open to all students; no previous knowledge of the topic is required.
HIST	HIST	30002	History of Science 1	This course is intended as the first of a two-part survey of Western science. We begin with a survey of the heritage of ancient (largely Greek) contributions to natural philosophy, mathematics, and medicine. We will continue with medieval studies of mathematics, motion, the heavens, living things, optics, materials, and alchemy in Arabic and Latin cultures. Given the importance of religion to the formation of these historical cultures, we will pay particular attention to the relations between broader philosophy, theology, and the emerging activities bearing the hallmarks of naturalistic and rational approaches we often distinguish as "science." Changing institutional homes for the study of nature also contextualize our study of key ideas and methods, from early philosophical schools to monasteries, universities, courts, and academies. Ultimately, we will consider whether there was such a thing as "the Scientific Revolution," and, if there was, what was so revolutionary about it.
HIST	HIST	43614	20th C. US Cultural History	The primary goal of this capstone course is to produce a 25-page research paper in twentieth-century U.S. history. Through this "American Century," the United States became an empire, participated in two world wars, a cold war, and claimed the status of world power. These developments shaped and were shaped by transformations of the U.S. economy and the state, migration patterns, and the demands for rights and recognition by workers, women, African Americans, and a host of other groups. In the first third of the course, students will read and discuss secondary sources that explore how Americans grappled with these broad transformations. We will consider the history of social formations, including class, race, and gender, together with the history of cultural formations—American popular and political culture, intellectual life, and forms of identity. In the following two thirds of the course, students will select a topic for further study, conduct research, and write and re-write a substantial paper. All topics in 20th century U.S. history will be welcome so long as the student engages with the social and/or cultural context of the period. Through the semester, we will use class meetings to explore resources available at the Hesburgh Library and to discuss research and writing strategies.
HIST	HIST	83604	Coll: US History since 1890	The colloquium is an intensive survey of recent historical writing on the United States from the late nineteenth century forward. Topics will include Progressive reform, gender and the early 20th century State, the culture of consumption, the new environmental history, the meaning of bohemia, the character of New Deal liberalism, the origins of the cold war and the shifting nature of American race relations.
HPS	HPS	83801	Philosophy of Science	Science is full of surprising predictions, shocking revolutions, and stupendous results that few science fiction writers have ever dreamed of. What makes science so special? This survey course is an introduction to the philosophical underpinnings of modern science. We will cover the central issues in the philosophy of science from logical empiricism to the present day. The topics we will cover include: the nature of scientific knowledge; the structure of scientific theories; progress in science; realism and antirealism; science and metaphysics; reductionism; laws of nature; explanation and confirmation; probability; the applicability of mathematics; causation; conceptual issues that arise in specific sciences (physics and biology); and the role of values and sociological factors in scientific research. The readings will be a mixture of the old classics and contemporary research in the field. The teaching will be a mixture of short lectures and structured discussions.
HPS	HPS	93820	Einstein's Phil. of Science	This course will survey the development and impact of Einstein's philosophy of science, highlighting the close connections between philosophy and physics in Einstein's work. We will examine in detail the philosophical aspects of Einstein's work on the relativity and quantum theories. We will pay special attention to Einstein's close involvement in the development of logical empiricism in the early twentieth century and his eventual disavowal of that program. Toward the end of the semester we will also take a brief look at Einstein's social philosophy and his thoughts on religion and science. We will from both Einstein's original papers, manuscripts, and correspondence, and from secondary literature. No specific background in physics will be assumed, and technical tutorials will be provided for those who need them.
HPS	HPS	93983	Models and Representation	Scientists construct models of atoms, elementary particles, polymers, populations, economies, rational decisions, airplanes, earthquakes, forest fires, irrigation systems, and the world's climate. There is hardly a domain of inquiry without models and they are essential for the acquisition and organisation of scientific knowledge. This graduate seminar is a philosophical investigation into these models: what are they and how do they work? Topics that we will cover include: the relationship between models and scientific theories; the ontology of models; their representational function; the roles of mathematics, abstraction, and idealisation in their construction and use; non-standard applications of models; and the relationship between representation in science and representation in other fields (primarily as discussed in the philosophy of language and art). Students will independently investigate a specific case of model-based science and use it to illustrate a philosophical problem or position.
IIPS	IIPS	20501	International Relations	This course provides an introduction to the study of international relations and will cover several theoretical approaches to and empirical issues in the field of IR. Readings have been selected to highlight both traditional approaches to and more recent developments in world politics. The first half of the course focuses on contending theories of IR, while the second half of the course deals with more substantive issues. Empirical topics and subjects covered include: international security (nuclear weapons, ethnic conflict, and terrorism) - international political economy (trade, international finance, and globalization) - and 20th Century History (WWI, WWII, and the Cold War). In addition, we will examine several contemporary topics in international organization and law, including the environment, nongovernmental organizations, and human rights. We conclude by discussing the future of international relations in the 21st Century.
IIPS	IIPS	30408	Religion in Int'l, Global Rels	What is the relation between religion and conflict in international and global relations? What is the relation between religion and peacebuilding, locally and globally? The so-called resurgence of religion to global politics, conventionally dating back to the Iranian Revolution of 1979, challenged the secularist myopia that informed policy makers and theorists of international relations. But it took the events of September 11th, 2001 to fully catalyze a process of rethinking the role of religion, on both the levels of theory and practice within the contexts of international relations. Both theorists and practitioners in the arenas of international relations are trying to decipher how to theorize religion into the existing explanatory paradigms of realism, liberalism, and constructivism. The course will examine these conversations, dating back to Westphalia of 1648 and the historical role of religion in the construction of the international system of nation-states. The course will also discuss the explicit integration of the imperative to engage religious communities and promote religious freedom into explicit strategies of American foreign policy and combating violent extremism at home. These issues will be discussed through a consideration of the history of orientalism and Islamophobia as well as the legacy of colonialism.
IIPS	IIPS	70205	Qualitative Research Methods	This course surveys some of the key issues in qualitative methods and research design. Major sections of the course deal with causal complexity, necessary and sufficient conditions, concepts, case study methodology, case selection, within-case causal inference, and philosophy of causation. Students will do 8-10 page projects on (1) causal complexity, (2) concepts, (3) case selection or case studies. These papers require the student to examine the issue in some particular area of application, and put together the three papers can form most of a research design or dissertation prospectus.

KI	IDS	20500	Intro Intl Development Studies	An introduction to the field of international development, with particular focus on the various disciplines that have contributed to and shaped the development discourse. Readings, lectures, and discussions will draw from various disciplines, including economics, political science, sociology, anthropology, environmental and technological sciences, public health, law, and gender studies, among others. We will examine debates on the meaning and measurement of development; alternative approaches to, and methods in, the study of development; and attempts to address some of the main development challenges facing the world today. There will be a central focus on understanding "what works" in development. Working together in teams, students will conceptualize and design an international development project using "real world" constraints.
KI	IDS	30513	Intn'l Development in Practice	This class aspires to develop relevant knowledge and practical skills for students interested in engaging in positive change in a complex world. In this course on international development, students will: 1) examine the processes that bring about individual and societal change in an international context;2) explore the roles, complexities, opportunities and constraints of development projects in areas such as poverty reduction, social development, health and education; and, 3) develop practical skills related to project design, planning, management, negotiations, communications, and the evaluation of international development projects. A central theme of the course is to understand what have we learned over the past decades from systematic research and from experience in the field about "what works." The course makes use of cases studies and draws lessons from instructive stories of failure as well as inspirational stories of change. The course focuses significant attention on "bright spots" in development- specific interventions that have made meaningful contributions. The course aspires to help train students to think like creative, effective, and thoughtful development professionals. A central feature of the course will be the opportunity to work throughout the semester as a member of a "Development Advisory Team" directly with an international development organization client who has identified a specific problem or opportunity. Development clients for the class are organizations in Bangladesh, Chile, Haiti, and India, among others.
LAW	LAW	75740	Jrnl Intl & Comp Law	The mission of the Journal of International and Comparative Law is to provide a forum of discussion for international, comparative, and human rights law; to educate students about international legal issues; to provide open and equal access to our publications; to be economically efficient, environmentally sustainable, and immediately responsive to current events in the field of international law; and to inspire our readers to work on these issues.
LAW	LAW	70401	International Law	The immediate images evoked by the expression "international law" today are those of United Nations assemblies, opposition to wars (or a skeptical observation of the "lack thereof"), and promotion of peace and human rights. However, "international law" today is a label that covers a much broader spectrum of legal realities, that often have not yet captured the public imagination. International law, in fact, encompasses many topics, which are all fundamental to understanding contemporary society: the simple term "international law" can, to a trained ear, sound as broad and generic as a class on "American Law". Protection of the environment; facilitation of global trade; remedies for human rights violations; diplomatic rights; self-determination of peoples; accountability of corporations in business transactions; bank standards; law of the sea; and double-taxation issues are just a few examples of areas regulated by international treaties, institutions, and courts. Not only governments, but also consulting firms in New York, Paris, DC, Buenos Aires, London, and etc. are constantly dealing with treaties and supranational rules and the problems arising from their application. This course is intended to provide students with the fundamental background that will give them access to this vital field of law, and give them the tools necessary to be able to face the variety of topics it covers.
LAW	LAW	70318	Legislation & Regulation	This course seeks to provide the understanding of the legislative and administrative process that is needed to practice law in the United States in the twenty-first century. It is based on a course that students are required to take in their first year at the Harvard Law School in order "to bring the first-year law school curriculum more in line with the realities of modern legal practice and the structure of our legal system - in particular, the centrality of statutes and regulations," and "to teach students how judges and administrative interpreters construe these legal materials." The course includes three sections: (1) an initial overview of the law of the lawmaking process; (2) an introduction to statutory interpretation; and (3) an analysis of the regulatory process. It also includes several skills components requiring the drafting of a proposed statute and commenting on proposed administrative regulations. The course thus provides a foundation for the numerous classes that study specific statutory and regulatory schemes. There is no prerequisite for the course. Students who have already taken either Statutory Interpretation or Administrative Law may not take Legislation & Regulation.
LAW	LAW	70433	Law of International Trade	International Trade: This course analyzes the national and international constitutional framework of the complicated regulatory legal system affecting international economic relations, including questions regarding the WTO, NAFTA, the executive-congressional relationship in the United States, and the process of formulation and adoption of United States trade legislation. The course will take up various regulatory legal principles and how they operate at both the national and international level, dealing with subjects such as trade dispute resolution, tariffs and tariff negotiations, quotas, normal trade relation clauses, national treatment clauses, escape clauses, dumping and antidumping duties, export subsidies, countervailing duties, investment, and other topics. The course will also address trade linkage questions, such as the relationship between trade and labor, the environment, intellectual property, and human rights. The goal of the course is to give a rounded appreciation of the interplay between national and international rules as they affect government actions, which influence private international transactions.
MBA	FIN	60220	US and Global Economy	A critical foundation for managing business is an understanding of the global macroeconomic environment in which managers make business decisions. Understanding the linkages between prices, sales, output, interest rates and exchange rates is a necessity in a rapidly changing international economic and financial environment, and the focus of this course. The economic and social importance of the emerging markets in the global economy is tremendous and still growing. The business opportunities in the emerging markets are great; so are the obstacles and challenges. In this course, we examine both the business challenges and the opportunities facing companies operating in the emerging markets. We will devote special attention to sub-Saharan Africa, which a recent McKinsey Quarterly article projected as "the developing world's next great success story." We will also give attention to emerging markets in Latin America, Asia and elsewhere.
MBA	MBET	70620	Ethics in Emerging Markets	The course will take a case- and discussion-based approach to ethical challenges and opportunities on the personal, organizational and societal levels of moral behavior. It is hoped that by the end of the course students will be better equipped to ethically navigate the difficulties and capitalize on the opportunities of doing business in emerging markets. It also hoped that students will see how exercising business leadership in the global arena can represent a great opportunity to make a positive difference consistently with the values and beliefs that incline them to ask ever more of business and of themselves.
MBA	MGT	70420	Innovation and Design	"Innovation and Design": We will explore how to do innovation, both at the individual level - how can we become more innovative - and organizationally - how can we make the organizations we lead more innovative. We will start with a very basic definition of innovation as, "new ideas that matter," and then we will spend the semester developing a much richer and more nuanced understanding of what that means and how to do it well. We are going to learn about innovation as much by living it as by studying it. Innovation requires heightened abilities to notice, remember, unlearn, see, hear, recognize, and understand. Innovation involves curiosity, wonderment, inquisitiveness, synthesizing, linking, probing, exploring, experimentation and prototyping. It also involves risk taking. Nothing ventured, nothing gained applies to innovation too.
MBA	MBET	60330	International Business Ethics	International business raises enormous ethical challenges in terms of globalization, environment, development, corruption and cultural and religious diversity. This course focuses on these challenges in the context of corporate decision-making. Students are encouraged to enhance their sensitivity for differing, sometimes conflicting, values and to develop ethical reasoning abilities. Various methods are discussed to formulate and implement ethical corporate policies for international business.
MBA	MGT	70740	Sourcing and Procurement	With globalization and the rise of outsourcing, procurement (sourcing) organizations are increasingly taking on a more strategic role within the modern firm. Supply management professionals are not only responsible for sourcing traditional product categories, but have also expanded their reach into sourcing a range of business services. While sourcing professionals have the opportunity to deliver significant value to their organization, they also face tremendous uncertainty and complexity. In this course, we will review the demands placed on procurement and supply management from the firm's stakeholders, demonstrate the impact of procurement and supply management on the competitive success and profitability of the organization, and recognize the expanding strategic nature of procurement. We will take an in-depth look at the key stages of the strategic sourcing process, including but not limited to: spend analysis, developing a sourcing strategy, supplier selection, and on-going supplier performance management.
MGT	MGT	40750	Quantitative Decision Modeling	Whether it is picking an investment portfolio, moving goods through a supply chain, staffing a customer support center, or deciding how many reservations an airline or hotel should take, business decisions involve substantial quantitative analysis. We'll learn how spreadsheets (using them with powerful add-ins) can help solve these sorts of problems. In particular, we'll learn how the techniques of simulation and optimization can help make a variety of businesses more competitive. Only a basic familiarity with spreadsheets is assumed.
MGT	BA	30310	JrRsrch:Foresight Busnss&Socty	The Foresight course challenges students to engage in the process of identifying and evaluating major issues and trends impacting society in the future and exploring potential business implications that can drive sustainable innovation. The course is designed to facilitate three core thinking skills (critical, systems and creative) within a framework of foresight tools and methods for assessing change, forecasting future scenarios and analyzing implications of future change. Students apply these thinking skills and the foresight framework in a semester-long team project on a topic of their choice to develop insights on emerging opportunities and provide recommendations on how business can positively influence future change and create resilient strategies to enable success in an uncertain future.
MNA	MNA	70410	Ethics in Nonprofit Orgs	This course exams ethical issues and value dilemmas facing the nonprofit manager and the nonprofit organization. Emphasis is on the formulation and implementation of organizational social policy, the development of sensitivity to moral and economic values within situations, and enhancing the ability to examine complex ethical situations and make action decisions. The role of the nonprofit manager as both a professional and an ethical leader is explored through case studies which examine ethical issues in contemporary nonprofit organizations.
MNA	MNA	70610	Planning & Policy	This course is designed to integrate the knowledge, skills and techniques obtained from previous courses. Emphasis is placed on the formation of a nonprofit organizational strategy through the development of a mission statement, strategic objectives and plans for implementation of the strategy.
PHIL	PHIL	20101	Introduction to Philosophy	A general introduction to philosophy, with emphasis on perennial problems such as the existence of God, human freedom, and moral obligation. The course is also intended to sharpen the student's skills of critical thinking.
PHIL	PHIL	20202	Existentialist Themes	Existentialism is one of the most important European philosophical movements of the 19th and 20th centuries. In this class, we will aim to understand the progression and evolution of claims and arguments in the existentialist tradition, reading authors such Kierkegaard, Dostoevsky, Nietzsche, Heidegger, Marcel, Camus, and Sartre, paying close attention to their persuasiveness and implications for our lives. Through a close study of important existentialist texts, we will pose and attempt to answer such questions as: Which concepts can help us understand the meaning of everyday experience? What are the sources of value in life, and what are their limits? Who am I? What can I hope for? Can I be free?
PHIL	PHIL	20811	Dostoevsky & Philosophy	Fyodor Dostoevsky wrote philosophically dense fiction that was deeply engaged with the philosophical ideas, arguments, and movements of his time, especially insofar as these related to the "eternal questions" of God, immortality, freedom, and conscience. In this class we will read his fiction with an eye to understanding his literary and dialectical engagement with philosophical themes and trying to see both his contributions to debates over these questions and his critiques of traditional philosophical approaches to resolving them. Possible texts include his short fiction, Poor Folk, Notes from Underground, Crime and Punishment, The Idiot, Demons, A Raw Youth, Brothers Karamazov, and selections from Dostoevsky's non-fiction, such as A Writer's Diary.
PHIL	PHIL	10103	Intro to Phil: Phil & Science	This course will be an introduction to philosophy with a special focus on issues at the intersection of philosophy and science and in the philosophy of science. Topics to be discussed may include the nature and limits of scientific knowledge and the scientific method, the metaphysical foundations of science, puzzles to do with quantum mechanics and relativity theory, science and values, and the place of science in society and culture.
PHIL	PHIL	10105	Intro to Phil: Ethics & Polit.	This course will be an introduction to philosophy with a special focus on issues in moral and political philosophy. Topics to be discussed may include justice, the nature of the good, eudaemonic and hedonic conceptions of happiness, virtue, ethical theory, moral relativism, feminist ethics, liberty, equality, and the foundations of rights, as well as particular applied topics in moral and political philosophy (such as economic justice and the ethics of war).
PHIL	PHIL	20606	Science, Technology & Society	This course focuses on the many ways in which science and technology interact with society and explores the character of the value-laden controversies that such interaction frequently produces.
PHIL	PHIL	20608	Philosophy of Technology	Philosophy of Technology considers the nature of technology and its relationship to social values, economics, the natural environment, human values and science, among other things. It considers questions such as how the existing social context affects the development and adoption of technology, how technology affects the evolution of society, and to what extent we control our technology and to what extent our technology controls us. Specific themes and and questions vary from term to term.
PHYS	PHYS	31210	Physics I Laboratory	The laboratory is a corequisite for PHYS 30210
PHYS	PHYS	31220	Physics II Laboratory	The laboratory is a corequisite for PHYS 30220
PHYS	PHYS	11411	General Physics A-M/Mech Lab	The laboratory is a corequisite for PHYS 10411
PHYS	PHYS	68699	DirRsrch-Prtcl Physcs-QuarkNet	Directed research course for high school teachers (nondoctoral students) combining coverage of topics in particle physics with participation in experimental research in ongoing experiments conducted by particle physics faculty. Students will maintain a research logbook and submit a written research summary at the conclusion of the research period.
PHYS	PHYS	83700	Nuclear Physics Seminar	Discussions of research and current literature in nuclear physics. (Every semester)

PHYS	PHYS	30210	Physics I	The basic principles of mechanics, fluid mechanics, thermal physics, wave motion, and sound. Primarily for students in the life sciences. Laboratory meetings each week. This is the first semester of a 2 semester calculus based course.
PHYS	PHYS	30220	Physics II	The basic principles of electricity, magnetism, optics, and modern physics. Primarily for students in the life sciences. Laboratory meetings each week. This is the second semester of a 2 semester calculus based course.
PHYS	PHYS	77031	Review of Fund. Physics I	Discussions of topics of current interest in physics.
PHYS	PHYS	77032	Review of Fund. Physics II	Discussion of topics of current interest in physics. (Offered as needed)
PHYS	PHYS	10111	Principles of Physics I	PHYS 10111 is a prerequisite to PHYS 10122. A course intended for students who desire a grounding in all the major principles of physics but who plan to major in some area other than science or engineering. The ability to apply these principles to the solution of problems is a major goal of the course. The following topics are normally included; kinematics and dynamics of a particle, work, energy, momentum, harmonic motion, gravitation, and circular orbits; wave motion, interference, standing waves, the Doppler effect; and temperature, heat, first law of thermodynamics, and kinetic theory of gases. Additional material will be at the discretion of the instructor. The division between PHYS 10111 and 10122 will depend on the order of presentation.
PHYS	PHYS	10411	General Physics A-M/Mechanics	The first semester of a three-semester sequence in general physics. Topics include the kinematics and mechanics of a particle; work, energy, and momentum, and associated conservation laws; rotation, torque, and angular momentum; oscillations and wave motions. A course designed for students intending to enter the Department of Physics. Laboratory meetings each week.
PHYS	PHYS	20433	GenPhys C-Waves,Thermo,SpRel	The third semester of the a three -semester course in general physics. Topics include classical thermodynamics, fluids and acoustics;wave motions, geometric and physical optics; special relativity. The course is intended primarily for physics majors but is open to other qualified students.
PHYS	PHYS	20481	Intro to Astrnmy & Astrophyscs	This one-semester course uses basic physical principals of mechanics, optics, and radiation to provide an introduction to modern astronomy and astrophysics. Topics include the solar system, stars, interstellar matter, galaxies, and cosmology. The underlying observations (from radio to gamma rays) are used to provide a fundamental understanding topics and their historical background. Several observing projects will be completed at the observatory in the Jordan Hall of Science. (This course is offer in the fall of even years.)
PHYS	PHYS	30461	Thermal Physics	The first half of this course covers classical thermodynamics, from ideal gases to thermodynamic potentials, finishing with phase transitions. The second half is devoted to statistical mechanics as the basis of thermodynamics. Classical and quantum distributions will be introduced to explain the collective behavior of particles, ending with Bose-Einstein condensation.
PHYS	PHYS	30465	Topics in Modern Physics II	A continuation of Modern Physics I. Topics in quantum physics. Molecular bonding and spin valence. Molecular spectra. Bonding, energy levels and band structure in solids. Ionic crystals, metals and semiconductors. Thermal, electric, magnetic and optical properties of solids. Quantum numbers of particles, basic forces, the particle zoo. Stable nuclei, nuclear structure and models, nuclear decay and reactions, energy levels, fission, fusion. Particle scattering. Production, detection and properties of elementary particles.
PHYS	PHYS	41441	Modern Physics I Laboratory	The laboratory is a co-requisite for PHYS 40441
PHYS	PHYS	50201	Physics of Astrophysics	A study of the physical problems associated with stellar motions; energy generation and radiation; astronomical distances; celestial mechanics; galactic dynamics; cosmic rays; interstellar matter; thermodynamics; and equations of state of various stellar models. Observational techniques and methods of computation will be discussed. An elective course for senior physics majors and other qualified students.
PHYS	PHYS	50501	Intro to Solid State Physics	The course is intended to introduce the principles of the behavior electrons and phonons in solids, advanced concepts and applications, such as low-dimensional systems and superconductivity, and set the conceptual framework needed for future study and graduate research in condensed matter physics or technology-related industry. Topics will iiinclude: cystal structure and diffraction, phonons and heat capacity, free electron gas and elementary band theory, semiconductors, magnetism, and superconductivity
PHYS	PHYS	60410	Patterns of Life	This course focuses on the mathematical principles underlying the spatiotemporal patterns emerging in biological populations. Students are expected to be comfortable with multi-variable calculus, differential equations, linear algebra, and basic probability theory. The first part of the course focuses primarily on population genetics and evolutionary biology, while the second part will focus on reaction diffusion equations and pattern formation. Students will be expected to solve quantitative problems and will be guided towards developing research projects related to theoretical and computational biology. Open to students in all departments.
PHYS	PHYS	80001	Electrodynamics	Scattering and diffraction; special relativity; covariant formulation; radiation from charges; multipole expansions; radiation damping; wave guides and RF cavities; basic elements of a classical field theory. (Every year, core requirement.)
PHYS	PHYS	80002	Statistical Thermodynamics	Review of basic elements of phenomenological thermodynamics; kinetic theory and transport equation; dilute gases in equilibrium; classical statistical mechanics; microcanonical, canonical and grand canonical ensembles; quantum statistical mechanics; and phase transitions. Optional topics include the renormalization group, critical phenomena and the Ising model. (Every year, core requirement.)
PHYS	PHYS	80701	Nuclear Physics	Study of the nucleus as a many-body problem, starting with basic properties of nuclei, followed by study of the nucleon-nucleon interaction, the independent-particle and interacting shell model, Hartree-Fock self-consistent field theory, and collective excitations. Also studied: Nuclear reaction theory and nuclear decays (electromagnetic, weak, and strong). Research topics in nuclear physics are introduced, including nuclear astrophysics, neutrinos and fundamental interactions, nucleon structure, and relativistic heavy ion collisions.
PHYS	PHYS	10062	Science Literacy	A course that provides the tools for a basic understanding of scientific developments and their potential consequences. Developments in many areas of science will be discussed, including biology, chemistry, physics, astronomy, engineering, and computer science, with the view that basic physical laws serving as a common thread among them. Topics covered include the mechanisms of scientific discovery, the impact of scientific discoveries on society, science and ethics, and the tools of contemporary science. The course focuses on concepts rather than formulas and concentrates primarily on examples taken from current scientific developments. If taken by science or engineering students, this course counts as a general elective.
PHYS	PHYS	10222	Physics of Civilization	This non-calculus-based course is intended for students seeking an understanding of principles of physics beyond those discussed in a one-semester course. The course covers topics useful to but not limited to students in architecture and designed for students who plan to major in some area other than science or engineering. Among the topics discussed are phases of matter, thermodynamics, heat exchange, energy storage, vibrations and acoustics, and basic electricity and magnetism. The course will emphasize applications to practical problems and will explore challenges such as light pollution, earthquake-proofing, and energy conservation.
PHYS	PHYS	10262	PhysMethods in Art/Archaeology	A course that gives an overview of the various physics-based analysis and dating techniques used in art and archaeology. The course will cover topics such as X-ray fluorescence and X-ray absorption, proton-induced X-ray emission, neutron-induced activation analysis, radiocarbon dating, accelerator mass spectroscopy, luminescence dating, and methods of archeometry. Multiple examples of the use of the techniques in art and archaeology will be given, e.g., under X-ray techniques and accelerator mass spectrometry, the analysis of ancient coins and violin varnish and the Iceman and the Turin Shroud are used respectively as examples. Physics principles of the methods and techniques will be taught in a descriptive manner.
PHYS	PHYS	10342	Modern Phys: Quarks to Quasars	Restricted to first-year Arts and Letters intents in the Honors Program. This course emphasizes themes of modern physics and will be organized around the concepts of symmetry and physical laws. For example, how do symmetries observed in nature lead to fundamental laws of conservation of energy and momentum? Examples from areas of modern physics such as cosmology and astrophysics are used to bring these topics to life. We consider questions such as: "What happens if one travels alongside a beam of light?" (which leads us into special relativity); "Why is the night sky so dark?" (the Big Bang); "What is matter?"; "What is mass"; "What are forces?" The course is a mix of lecture, discussions, and lab/demonstrations.
PHYS	PHYS	20464	Modern Physics I	Special relativity, foundations of quantum concepts. Properties of atoms. Interactions of electromagnetic fields with atoms. Wave mechanics and the Schroedinger equation. Atomic structure and atomic spectra. Atomic wave functions. Fine structure and Zeeman effect. Multiplet analysis. Exclusion principle, periodic table and spectra of multielectron atoms. Introduction to the statistical physics of quantum mechanical systems.
PHYS	PHYS	40432	Biological Physics	The functioning of cells at the molecular level will be discussed on the basis of basic physics principles including Newtonian mechanics, thermodynamics, statistical mechanics, and electrical transport. The course covers diverse topics including cell energy balance, molecular machines, nerve impulse propagation, self-assembly; electrical properties of molecules. This is an approved science elective.
PHYS	PHYS	41442	Modern Physics II Laboratory	A two-semester laboratory course stressing experiments in atomic, nuclear, and solid-state physics. The course is designed to introduce the student to experiments and methods closely related to modern-day research. Students will be introduced to the fundamentals of semiconductor devices and the construction and use of such devices. 3.000 Credit hours 0.000 Lecture hours 3.000 Lab hours
PHYS	PHYS	50701	Intro to Nuclear Physics	This course will introduce students to the goals and history of nuclear physics, including: nuclear properties (size, shape, mass, lifetime and decay modes); the nuclear shell model; basic mechanisms for decay, reactions and fission of nuclei; and current problems and open questions.
PHYS	PHYS	80202	Astrophysics: Stars	A study of the physics and dynamics of stars. Topics include: stellar evolution and nucleosynthesis; energy transport in stars; stellar convection; star and planet formation; stellar atmospheres and spectra; interstellar medium; thermodynamics, opacities, and equations of state; stellar remnants, including white dwarfs, neutron stars, black holes; novae and supernovae.
PHYS	PHYS	90704	Nuclear Reactions	Discussions of topics in nuclear physics (e.g., nuclear dynamics and reaction theory).
PHYS	PHYS	20330	General Physics III	A third semester in general physics. Topics include 1) interference and diffraction; 2) quanta and the wave-particle duality; 3) introduction to quantum mechanics; 4) atomic, nuclear, and particle physics; 5) physics of the solid state; and 6) astrophysics and cosmology. A course designed for students of science and engineering. Laboratory meetings in alternating weeks only.
PHYS	PHYS	10320	General Physics II	The second course in a two-semester calculus-based sequence in general physics. Topics include electrostatics, electric current, and circuits; magnetism, electromagnetic induction, and waves; and geometrical optics. A course designed for students of science and engineering. Laboratory meetings in alternating weeks only. Weekly tutorial sessions.
PLS	PLS	30411	Sci Inq: Theories & Practices	Using major historical texts as primary material, students will investigate crucial philosophical and methodological issues that arise in modern scientific inquiry, especially in the physical and life sciences. What can cause scientists to adopt (or resist) new theories? What relationships has science held to other intellectual disciplines, and how have those relationships changed over time? What fundamental assumptions about the natural world are adopted in much of modern science? What methods have scientists advocated for creating reliable knowledge? Students will grapple with these questions as we study and discuss central texts in the development of modern science, including the works of Ptolemy, Copernicus, Galileo, Descartes, and Newton.
PLS	PLS	20412	Fund Concepts of Nat Sci	This course raises questions fundamental to our experience of the physical world. Questions such as "What is space?" and "What is time?" and broader issues about the nature of life are initially raised through a close reading of Plato's Timaeus and Aristotle's Physics, along with excerpts from other ancient texts. In attempting to answer these questions over the course of the semester, we will read a wide variety of sources: principally ancient and modern primary texts, with some secondary readings. These readings will include Euclid's Elements, Descartes' Principles of Philosophy, and Einstein's Theories of Relativity. Spring.
PLS	PLS	40412	Sci, Society & Human Person	In this course students will explore what can science tell us about human nature and human social interactions. By reading and discussing important historical and contemporary texts, students will engage the conundrums, challenges and insights created through the scientific study of human beings and society. Readings will include works by Charles Darwin, William James, and Jean Piaget. Spring.
POLS	POLS	30440	Intro to Political Economy	The globalization of markets has reshaped polities and economies over the last two hundred years, and in the post-World War II period in particular. This class is designed to introduce student to a broad range of issues and theoretical debates about how politics shapes markets, and vice versa. Students will have the chance to read a few classical works in political economy, such as Smith and Polnayi, but the class will largely focus on contemporary issues and debates. We will cover a range of concerns, including industrialization/de-industrialization, economic development, varieties of capitalism, the changing nature of the welfare state, and the role of public and private regulation. The class will also familiarize students with the economic systems of a range of countries, including the US, Japan, Russia and India. No prior classes in economics or political science are required, but an interest in economic issues and economic policy is desirable.
POLS	POLS	40485	Leadership and Social Change	This course is intended to introduce participants to major themes in leadership. Through readings, presentations, and other media (such as film and interaction with visitors), the course aims to provide critical reflections on the nature and sources of different types of leadership and authority, and a deeper understanding of the vocation to lead. This is a by-permission only class, contact Terri Howells at terri.howells@nd.edu

POLS	POLS	60043	American Political Behavior	This is the core course on American political behavior-a central focus of empirical political science for nearly 70 years. We will begin by considering normative questions about the role that ordinary citizens should play and realistically can be expected to play in a democratic polity. We then will turn to American public opinion, examining the sophistication of citizen opinion, the factors structuring opinion change, the social-group bases of U.S. public opinion, and the influence of public opinion on public policy. We will devote the second half of the course to American voting behavior. We will discuss the major theoretical models of vote choice; the factors shaping voter turnout; the role of parties, groups, and candidates in shaping voting behavior; long-term change in the parties' electoral coalitions, and the impact of political campaigns on electoral choice. We will conclude the course by discussing the growth of party polarization in the American electorate and the causes and consequences of that growth. The goal for the course is not only to immerse students in the vast literature on American political behavior, but also to provide the foundation for original research. To that end, we will spend a fair amount of time discussing research methods and approaches. Students also will be expected to offer critiques of the ideas and methodologies presented in the literature, with an eye toward improving and finding new directions in research on political behavior. Finally, each student will do original research using data from one or more surveys of the American electorate.
POLS	POLS	60217	Theories of Intl Relations	This graduate seminar provides a survey of major theoretical traditions and their applications in the study of international relations. The course explores recent changes in and debates on the key theoretical approaches (realism, liberalism, and constructivism) with a particular emphasis on identifying and criticizing their central assumptions and causal logics. A second objective of the course is to clarify and assess various methodological perspectives, ranging from empiricism to constructivism, and their consequences for the design and conduct of research.
POLS	POLS	60883	Establishing Causal Inference	Social scientists are centrally concerned with making inferences regarding causal relationships in their research. Unfortunately, making valid causal inferences is one of the most challenging problems in the social sciences. In this course, we will examine the nature of the problem, and learn different strategies for making credible inferences about causality in our data. We will focus on "big picture" issues such as, what do we mean by a "causal effect" in the social sciences? This course is both statistical and methodological. In terms of methodology, we will learn about research designs that can help us make strong causal inferences. In terms of statistics, we will learn analytical techniques that help us eliminate threats to internal validity in non-experimental data. We will focus heavily on the importance and use of panel (or "longitudinal") data to make causal inferences, and we will learn commonly used techniques in making causal inferences, such as: random/mixed effects models, fixed effect models, propensity score matching, and selection/instrumental variable models. (Note: students will learn multilevel modeling [aka "HLM"] in this course, in the context of analyzing panel data.) Students will learn how to perform all of these statistical techniques in Stata.
POLS	POLS	30029	AmPublic Opinion&Voting Behav	A central tenet of democracy is that citizens exert some degree of control over the actions of government, a requirement that places responsibilities on both government office holders and citizens. In this course, we will focus on whether American citizens live up to their end of the democratic bargain both in the depth and breadth of their political opinions and in the quantity and quality of their participation in American elections. We will assess the degree to which citizens hold real opinions on political issues and how those opinions are formed, the extent to which they turn out to vote in elections and the factors determining voter turnout, the nature of voting behavior in various types of elections, the characteristics of the parties' electoral coalitions, and long-term changes in those coalitions.
POLS	POLS	60046	State Politics and Policy	This course examines the politics and policy making of sub-national governments in the U.S. We will examine all fifty states, considering their similarities and differences, and focusing on how these similarities and differences help us understand general theories about politics. The topics that we will cover fall into three primary areas: political behavior, political institutions, and public policy. The behavioral section focuses on the forces in society that try to influence government, including political parties, interest groups, and individual citizens. The institutional component of the course will focus on the basic players involved in state government, such as governors, legislatures, and courts. Finally, we will examine the causes and consequences of state and local government public policy.
PP	SCPP	23100	Interdisciplinary Science Sem.	This course objective for this seminar is to provide an opportunity for students to interact with community leaders and top interdisciplinary faculty members throughout the University who will describe how their research or work impacts biomedical research. Students typically do not have much interaction with faculty outside their home department. They may not be aware that many faculty members from diverse departments such as physics, math, and engineering are making important advancements in the biomedical field. This seminar would expose the students to different career opportunities, provide them with the opportunity for faculty interactions they would otherwise not have, and give them a better understanding of the most current and significant advances in the field. For interdisciplinary science students in particular, a broader understanding of the biomedical field is helpful in interviews for professional schools.
PSY	PSY	20010	Psych: Sci,Practice,Policy	This one-credit seminar introduces the department's programs and faculty research interests as well as the profession of psychology. The goal is to encourage more active reflection on how psychology can be useful, both personally and professionally; also to present the major tensions within contemporary psychology as well as its potential impact on public policies in the decade ahead.
REG	GRED	60501	Teaching Engrng Tutorials/Labs	This course is intended for teaching assistants in engineering disciplines. It will address aspects of professionalism, learning styles, classroom procedures, characteristics of Notre Dame Undergraduates, sensitivity to diversity, etc. A short presentation of a topic in your discipline is a course requirement.
REG	GRED	60601	Acad Career in Phys/Math/Engnr	This course will cover major issues in teaching and career development for students in science, mathematics, and engineering. Topics to be discussed include: (1) Preparing for an academic career (2) Finding academic employment (3) How academia works: postdocs, networking, publishing, and tenure (4) Teaching science, mathematics, and engineering at a university (5) Course and syllabus design (6) How to engage students in the classroom (7) How to gauge student learning (8) Balancing teaching and research Students will be expected to give a short presentation on a topic of their choice within their own disciplines.
REG	GRED	60701	Social Resp. of Researchers	This course is only for participants in the NSF-funded SRR training program in the Reilly Center. It focuses on larger-scale social and ethical issues related to scientific and technological research, including the impacts of research on society at large. It combines training in ethics and leadership with social engagement and communication. An in-service project is required.
REG	GRED	60801	Ethical Leaders in STEM	Ethical leadership training program funded by the NSF. Selected students only.
REG	PCSE	00241	Astronomy	This course will introduce students to the basics of astronomy, with an emphasis on analyzing observational data and using the Digital Visualization Theatre (DVT) to communicate the results. Topics will include exoplanets, the life-cycle of stars, galaxies, cosmology, and the fate of the universe. Students will learn data analysis techniques using astronomical software. This course will make heavy use of the DVT by the instructors, and will culminate in students creating their own short DVT presentation to explain the results of the their own explorations. Students will also perform their own observations with the 1.3 m Sarah L. Krizmanich telescope on the roof of Jordan Hall of Science and take a day trip to the Adler Planetarium in Chicago.
REG	PCSE	03220	LS - Globl Issues:A Just Peace	Global Issues Towards a Just Peace Seminar is based on the premise that the problems facing the world in the 21st century—from climate change, resource wars, and ethnic and religious conflict to poverty, discrimination and human rights — cannot be addressed by any one nation, religion, academic discipline or social movement, but by collaboration across boundaries of all kinds. How are these problems interwoven, and how can we craft workable solutions to them? How can actors (individuals, movements and institutions) from religious and secular communities, developed and developing worlds, science and the arts, politics and economics work together to address these complexities with compassion and creativity? And what is Notre Dame's role in such collaboration? With the help of Notre Dame faculty, from several disciplines, we will explore these knotty questions together and sketch some ways forward.
REG	PCSE	03240	LS - Amercn Art,Pop Cltr,Chnge	This seminar explores the roles that novelists, playwrights, filmmakers, poets, actors, painters, and other artists play in inspiring social change in the United States. Although some see the arts and popular culture as mere entertainment, we will examine these modes of representation as critical responses to social problems such as poverty, racial and gender inequality, stereotypes, and violence. How do the creators of artistic and popular texts engage with social problems and inspire action among the public? What are artists' commitments and responsibilities to society and to their local communities? How can we—as budding scholars, artists, and critical thinkers—use the arts and popular culture to instigate social change? In our quest to answer these questions (and many others, including those devised by the students), this seminar will immerse students in a wide range of activities, from an improvisation class with an award-winning acting teacher to a studio visit with a renowned visual arts professor to a critical study of race in contemporary American cinema.
REG	GRED	60702	Social Resp. of Researchers II	This course is only for participants in the NSF-funded SRR training program in the Reilly Center. It focuses on larger-scale social and ethical issues related to scientific and technological research, including the impacts of research on society at large. It combines training in ethics and leadership with social engagement and communication. An in-service project is required. The Fall course includes bi-weekly meetings.
REG	GRED	60703	Social Resp of Researchers III	This course is only for participants in the NSF-funded SRR training program in the Reilly Center. It focuses on larger scale social and ethical issues related to scientific and technological research, including the impacts of research on society at large. It combines training in ethics and leadership with social engagement and communication. An in-service project is required. The Spring course includes biweekly meetings.
REG	GRED	60500	Scientific Writing	This course aims at improving the technical writing skills for students in the science, engineering and social science disciplines. It introduces to students all the key elements for preparing publications in scientific journals and conference proceedings. It covers topics including structure and organization, critical thinking and logical explanation, illustration and reference preparation, etc. It also exposes students to a collection of basic writing styles such as emphasis and concision, cohesion and coherence, action and characters, etc. The course follows a workshop format where each lecture includes both short presentations and in-class, group exercises. Some of the lectures will be given by guest lecturers (professors from science, engineering and social science fields).
REG	GRED	60640	Tchng 1st Biol or Chem Course	This course is for continuing graduate students, primarily in Biology and Chemistry, who want to improve their effectiveness in teaching in the science classroom and laboratory. It is also intended as a preparation for those graduate students who intend to have a significant teaching component in their future career. Topics covered will include: • Steps in progressing from being a graduate student to a faculty member • What is expected when you start a new faculty position • Developing the fundamental tools for your first class: outline, syllabus, course materials • Learning to deliver clear and engaging lectures • Fostering critical thinking and problem solving skills • Incorporating collaborative learning • Using technology well • Standard, flipped, hybrid and online courses • Assessments: what it means for the student and the instructor • Designing a laboratory course and the appropriate experiments Students will be asked to actively participate in the course through discussions, designing and delivering short lectures, and short writing assignments. This course is required for the completion of the Teaching Development Certification Program in Biological Sciences
SC	SC	53320	Diversity, Culture, Religion	Diversity, Culture, Religion, in Science will introduce students to the role of cultural and religious diversity in science, its importance in an era of globalization, and the interesting questions that it raises. We want our students to be thought leaders in these discussions as they develop. We will recruit top speakers to talk about science and culture, religion and diversity from a sophisticated and scientific level - how these issues have shaped their careers, and how the issues are shaping the world of the future. The course will conclude with a talk on science and religion that demonstrates the vital connections of all these areas and brings them together to prepare our students for that world. Open to all graduate and undergraduate students. Requirements: attendance and one 3-5 page paper reflecting on one of the topics presented. S/U grade. General elective credit only.

SOC	SOC	63588	The State in the Global South	This course will focus on understanding what affects state capacity, including the state's relationship with development. The course will focus on work on Africa, Latin America, and Asia, but unlike much work on the Global South that focuses more on failures, we will disproportionately engage scholarship about what is working. Readings will be selected from a list provided by the professor, which will include a combination of geography, scholarly periods (classic works, contemporary great pieces, and neglected insights that might be ripe for a come-back), and disciplines (political science, sociology, history and anthropology). Finalized reading will be decided on the basis of votes by registered students and will include approximately 6 books (or the equivalent in articles). We will meet for the 13 hours required of a one-credit course, and I propose to meet once for one hour and then every other week for two hours.
SOC	SOC	63578	Training Sem:Soc Mov and Poli	Seminar for graduate students conducting research in the areas of politics and social movements. The course focuses on presentation of on-going research projects and structured feedback about those projects. Participants will also read and discuss recent contributions to the social movements literature.
SOC	SOC	10002	Understanding Societies	Welcome to Understanding Societies. This course introduces students to the exciting field of sociology in order to enable them to more clearly understand how people's behaviors and life outcomes are deeply influenced by social structures, as well as how their own actions help to perpetuate and change these social structures. Course readings and discussion will focus on a variety of topics including socialization, social inequality, race, class, gender, education, law and crime, and cultural globalization. Through this course, students will gain skills and knowledge that will enable them to better understand and critique the society in which they live and the ways that it impacts their own lives.
SOC	SOC	20410	Health, Medicine, and Society	This course is a comprehensive introduction to the sociology of health and of medicine. First we will examine how sociological variables affect people's health. Research is rapidly accumulating which shows that sociological variables have a huge impact on people's susceptibility to various illnesses, on their access to health care, and on their compliance with medical advice. Such variables include people's neighborhoods, occupations, and lifestyles; their social class, education, race, ethnicity, and gender - and the density of "social networks", whose importance for health was predicted by one of sociology's founders over 100 years ago. Second we will examine medicine, both the practice of medicine by individual health care professionals, viewed sociologically, and the operation of the increasingly large and bureaucratic medical institutions in which health care professionals must work. In addition, we will examine sociological issues that overlap "medicine", such as radically long shifts; the rapid increase in the proportion of female doctors; and increasing concern with work/family balance among practitioners. Third, we will examine health and medicine in relation to other dimensions of society, such as the modern economy, the media, law, the internet, government and politics. Health and medicine are intrinsically social and they cannot be isolated from the effects of the rest of society, many of which run counter to strictly "medical" considerations. Finally, we will examine health and medicine globally. We will compare health and medicine in a number of societies to see and explain how they are similar and how they differ - for example, how different societies pay for medical care. And we will examine global trends with implications for health and medicine that require cooperation among societies, such as the way in which global air travel both increases the danger of global pandemics and makes possible "medical tourism."
SOC	SOC	23111	Sociology of Consumption	This introductory level course provides an overview of sociological theory and methods. Beginning with the early sociological theorists, we will trace a path through different sociological understandings of why people consume the things that they do and how consumption objects come to be defined. We will consider the objects and services we buy and the activities we like to engage in during our free time and see what these suggest about us and our society. Students will examine the place of goods and commodities in social life, moving beyond the narrow economic aspects of purchasing consumptive items to exploring the value of the activities surrounding such goods for achieving status, pleasure, sociability, identity formation, and value-expression. Drawing on daily practices such as shopping, food and drink, clothing and fashion, the course examines the various as well as contradictory roles that consumption plays in contemporary society.
SOC	SOC	30514	Social Movements	How is social change possible? This is one of the central questions for the study of social movements, as well as the organizing theme of this course. In this course we will consider how sociology has contributed to our understandings of social movements. We address questions about the forces that shape social movement emergence and that affect their possibilities for impacting social change at local as well as national and global levels. While movements may have limited impact on specific policies, there are many other ways they can affect individuals as well as the larger cultural contexts. We therefore will also consider the effects of social movements and the organizations they generate on collective identities, networks, and larger public discourses and culture.
SOC	SOC	63572	Social Movmnts & Collctve Bhvr	This course will introduce students to major theories, topics, debates, and cases in the field of social movements and collective action. In this course, we will answer, among other things, what defines a social movement? Under what conditions do social movements emerge, thrive, and decline? Why do people get involved in social movements? What effects do social movements have on the lives of people who participate in them? On governmental policies, elected officials, and broader cultural expressions? How do social movements spread? What is the relationship between mobilization and repression and mobilization and countermobilization? As these questions indicate, the primary goal of this course is to explain the various processes and dynamics involved in social movements and collective action. To achieve this goal, we will draw on both classical and contemporary theoretical perspectives and empirical analysis, covering such important cases of collective action as the U.S. civil rights movement, the U.S. Central America peace movement, the East German revolution, anti-nuclear movements, animal rights movements, gay and lesbian movements, abortion activism, and terrorism. This course will also help students prepare for the comprehensive examination in social movements and collective action.
STV	STV	20461	Nuclear Warfare	Nuclear phenomena; nuclear fission and fusion. Nuclear weapons. Effects of blast, shock, thermal radiation, prompt and delayed nuclear radiation. Fire, fallout, ozone-layer depletion, electromagnetic pulse, "nuclear winter." Medical consequences, physical damage, effects on the individual and on society. Defensive measures and their feasibility. Scenarios for war and peace, proliferation of nuclear weapons material, recent diplomatic history. US Bishops' Pastoral Letter. The course counts for science majors as a general elective credit.
THEO	CST	23467	Soul of Development	Populorum Progressio by Pope Paul VI is widely regarded as the "magna carta of development" as it provided the basis for many of the Catholic Church's policies on integral human development. The Soul of Development: 50th Anniversary of Populorum Progressio course will address the thematic social justice issues in this seminal modern Catholic social thought document, especially those in the encyclical such as economic justice, international development, solidarity with the poor, peacebuilding and globalization, all of which gave rise to liberation theology and integral human development practices. Students are required to participate in the Soul of Development: 50th Anniversary of Populorum Progressio conference March 23-25, 2017, and to attend at least three of the four keynote addresses (see conference website, link below). Full participation in the conference is strongly encouraged. Participation in the conference will constitute 60% of the grade. Registering for the conference (in addition to registering for the course) is mandatory for participation in this colloquium. Please review all conference information including the schedule. Follow the link provided on the conference website to officially register for the conference. Students will write an 8 page paper analyzing the keynote presentations and how they build on expanding the Catholic Social Tradition for the future (for more information on the Catholic Social Tradition visit the CST Minor website at cstminor.nd.edu). Conference website: http://socialconcerns.nd.edu/cst-conference-2017
THEO	THEO	60652	Renewing Moral Theo: Holiness	Vatican II's call for the renewal of moral theology invited the reintegration of spirituality and morality in reflection on the Christian moral life. To better understand recent developments in moral theology, the class will examine contemporary scholarship in theological ethics on the relationship between spirituality and morality. With this framework, the class will evaluate classic texts from the Christian spiritual tradition and their implications for the Christian moral life. The rules of Augustine, Benedict and Francis will provide articulations of communal values that inform Catholic institutions sponsored by communities that follow these rules. Recognizing that women's contributions to Catholic theological ethics have primarily occurred since the Second Vatican Council, some classic texts from women doctors of the church will be examined for their possible contributions to contemporary theological ethics.
THEO	THEO	60899	Theology of Creation	This course examines the theological implications of the doctrine of creation. Drawing on the text of Scripture and the Tradition, including the recent papal encyclical Laudato Si', we will address topics ranging from God's essence and Trinitarian life to the ecological implications of the Christian faith.
THEO	CST	20625	Discipleship: Loving Action	This course is designed for students who have completed a Summer Service Project Internship (SSLP or ISSLP) or Social Enterprise Microfinance Internship (SEMI). It affords students the opportunity to re-engage their immersion experiences. Students will employ tools of social analysis, theological reflection, and rhetoric relative to both topics such as hunger, homelessness, poverty, incarceration, and immigration, and themes such as freedom, solidarity, mimesis, power, and the preferential option for the poor. The goal of the course is to develop a theology of discipleship to which justice is integral, including considerations of worship, sustainability, social reconciliation and restorative justice.
THEO	THEO	20888	Science, Theology, & Creation	This course investigates the Christian understanding of creation and how this doctrine relates to contemporary scientific issues. We will examine the development of the doctrine beginning with Scripture and the Creed and progressing through the early Church period into the Medieval and Scholastic era, focusing on the concepts of creation ex nihilo, creation continua, divine Providence, and divine action in the world. With the rise of the modern era, we will analyze the origin of and principles involved with the purported conflict between science and theology. We will bring the doctrine of creation into dialogue with three contemporary issues in the sciences: cosmology, evolution, and ecology. Integral to this course will be the relationship and response of humankind to God and to creation. This course will have a special appeal to students interested in the intersection of science and theology.
THEO	THEO	40632	Heart's Desire & Social Change	Beyond financial prosperity and material gain, many people today speak about the hunger to find purpose and meaningful work that has lasting impact on society, culture, and the global community. We not only want to find lucrative employment but to discover a way of life that resonates with the deepest part of ourselves. When we experience a consistent flow between our life's energies and our daily tasks, we are the most alive, engaged and at peace. But how can we find a way to integrate our inner and outer lives? This course will help students clarify their deepest passions in life that facilitate personal formation and social transformation. At its core it will explore the process of self-awareness and self-development that lead ultimately to self-gift. Some of the major themes we will look at include: values, spirituality, discernment, identity, true self/false self, justice, flow, freedom, Catholic Social Teaching and mission.