

# SA.680 (ENERGY, RESOURCES & ENVIRONMENT)

## SA.680.697. Global Energy Fundamentals. 4 Credits.

This class is geared to provide a good energy background to students who have previously not had much exposure to the wide array of issues that encompass the energy policy arena. Topics covered include: oil; gas; electricity (including traditional and new generation resources); alternative transportation fuels; energy efficiency options across the transportation, industrial, and buildings economic sectors; climate change, and energy in developing countries. . Students learn how to make “back-of-the-envelope” calculations regarding the scope of a given problem or a proposed solution. They also learn how to evaluate problems and suggest solutions within a two-page policy format that is used widely both in the public and private sectors. The class will be taught in an innovative format called the flipped class where students will be asked to view the online lectures outside the class. Class time will be devoted to more interactive group activities as well as professor-student interaction providing students a higher critical understanding of policy issues related to energy. First and second year ERE primary concentrators will have seating priority.<a href='http://bit.ly/2usTNAI' target='\_blank'>Click here to see a video introduction for the course.</a><a href='https://jh.app.box.com/EREQuiz' target='\_blank'>Click here for the self-diagnosis quiz</a> - developed to assist students in diagnosing whether they already have the level of knowledge taught in this class.<a href='http://bit.ly/1beb5s' target='\_blank'>Click here to see evaluations, syllabi, and faculty bios</a>

**Prerequisite(s):** SA.680.600[C] &lt;a href='http://www.sais-jhu.edu/sites/default/files/SelfEnroll%20ERE%20BE%2007172018.pdf' target='\_blank'&gt;Click here for 680.600 self-enroll instructions.&lt;/a&gt;

## SA.680.698. Global Environment Fundamentals. 4 Credits.

One of the two gateway courses of the ERE Program, this course exposes students to the basics of the global environment in three sections: science and values of the environment, top global environmental challenges, and major solutions. It provides the fundamentals necessary for students to have a broad and accurate understanding of the human-environmental system and its implications for sustainable development policies and actions. It builds the skills of students to gain reliable scientific information and bridge that to human concerns and policy instruments. There will be several integrated guest lectures that cover scientific knowledge essential for policy making, concrete real-world examples, and introductions to multiple SAIS courses on specific environmental topics. First and second year ERE primary concentrators will have seating priority.<a href='http://bit.ly/2a09btj' target='\_blank'>Click here to see a video introduction for the course.</a><a href='http://bit.ly/1beb5s' target='\_blank'>Click here to see evaluations, syllabi, and faculty bios</a>

## SA.680.710. Sci, Tech And Intl Rela. 4 Credits.

## SA.680.714. Energy, Environment & Development in Developing Countries. 4 Credits.

Surveys the situation in developing countries, where energy demand is projected to outpace capital resources for expanding energy services. Examines traditional and modern energy-consuming- sectors from both supply and demand perspectives, and assesses the resulting economic, social and environmental implications. Evaluates policy options to minimize adverse impacts. Emphasizes the role of energy efficiency and alternative fuels. Requires a term paper for a specific developing country that assesses energy problems facing that country and puts forward policy solutions to them. <a href='http://bit.ly/2if2Zq1' target='\_blank'>Click here to see a video introduction for the course.</a><a href='http://bit.ly/1beb5s' target='\_blank'>Click here to see evaluations, syllabi, and faculty bios</a>

## SA.680.722. Energy and Climate Change. 4 Credits.

This class provides an interdisciplinary introduction to the technology, economics, and politics of energy use. We investigate specific technologies and discuss their impact on geopolitics the environment and mitigating the effects of climate change. In doing so we seek to address these questions, among others: What is the role of energy in national security? What is the future of oil? What role can nuclear power serve for the next century? Do wind and solar power have the potential to supplant other energy sources? What will climate change mean for our energy mix? How do developing countries view energy differently? What is the proper balance of regulation and free market operation in energy markets? What new technologies are on the horizon, and how promising are they? The class will be run primarily as a lecture and discussion format with some student presentations on particular energy technologies.

## SA.680.730. Global Electricity Markets. 4 Credits.

This course is designed to provide an introduction to the electric power industry. The focus is on the policy, technology, institutional, and regulatory factors affecting the industry, major current issues, and the prospects for the industry's future development and sustainability. Students are not required to have a background in engineering, economics, finance, etc, although these disciplines are woven into the discussion. The course is anchored in the US market experience , but e emerging and OECD markets will also be discussed. The overall objective of the course is to provide students with the knowledge to understand, analyze and formulate policy paths that address the questions of industry reform and meeting the challenges of demand and global climate change. This course is a good complement to the “Innovation in the Electric Power Sector” course, which addresses challenges facing the global industry as well as innovative approaches to rural electrification in the advanced developing nations.<a href='http://bit.ly/2ajyAnj' target='\_blank'>Click here to see a video introduction for the course.</a><a href='http://bit.ly/1beb5s' target='\_blank'>Click here to see evaluations, syllabi, and faculty bios</a>

**Prerequisite(s):** SA.680.600[C] &lt;a href='https://www.dropbox.com/s/84wpcyx54wtvgrw/SelfEnroll%20ERE%20BE%20and%20BEv%207.31.2019.pdf?dl=0' target='\_blank'&gt;Click here for 680.600 self-enroll instructions.&lt;/a&gt;

**SA.680.738. International Water: Issues and Policies. 4 Credits.**

Is it true as recent headlines suggest that our fragile planet is on the loom of a grave water crisis, that our rivers are running dry and groundwater aquifers increasingly over-tapped and over-exploited, that wars will be fought between nations over this precious resource (more valuable than oil), and that this is likely to affect the development opportunities for a large share of the world population? Or is this looming crisis over-hyped, a matter of political will and proper pricing, and within the capacity of society to manage? Water is a classic renewable resource, essential to life on this planet. Water sustains the livelihoods of society and makes productive economic activity possible. For such an important resource, it is no wonder that issues surrounding its use (and abuse) can generate cause for so much passionate controversy and concern. This course is a broad survey of the international water issues facing the 21st century. Topics to be covered include, privatization of water service delivery, conflict and cooperation on trans-boundary rivers, the role of large multi-purpose reservoirs (for hydropower, water supply, irrigation), water as a human right, achieving the Millennium Development Goals on water supply and sanitation, the role of water in food security, and climate change. Any discourse today on sustainable development is not complete without a discussion of the important role of water to society. [Click here to see a video introduction for the course.](http://bit.ly/2gKtKSA) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**Prerequisite(s):** Students may not register for this class if they have already received credit for SA.680.854[C]

**SA.680.756. Pol & Ec Of Intl Energy. 4 Credits.****SA.680.759. Facing the Oil Problem: The United States, Canada, OPEC and the World. 4 Credits.**

Every aspect of foreign and domestic policy feels the effect of the oil problem. Solutions will be difficult. The course assesses direct and indirect costs of oil addiction, including global warming. Considers scenarios of supply disruption. Examines who controls oil and how. Explains “peak oil” and the loss of “spare capacity” to cushion price shocks. Looks at heavy oil production from Canada, America’s largest oil supplier. Weighs energy initiatives, alternative energy development and future energy RD&D. Unravels complexities of the oil problem and explores what is to be done about it. (This is a cross-listed course offered by the Energy, Resources and Environment Program that also can fulfill a requirement for the Canadian Studies Program and the Latin American Studies Program.) [Click here to see a video introduction for the course.](http://bit.ly/2b5pydQ) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.760. Climate Change: Science, Economics and Politics. 4 Credits.**

Climate change is anticipated to have catastrophic impacts on the planet and on human civilization over the coming century and beyond. Sea-level rise is expected to have severe consequences on coastal communities; weather extremes such as droughts, heat waves, and hurricanes are expected to intensify; and the combination of these impacts with warming temperatures is expected to influence human activities from agriculture to the development and maintenance of energy systems. Globally, scientists have come to a consensus that greenhouse gas emissions from human activities contribute to present trends in climate. Students will acquire a firm grounding in climate science, mitigation options, economics, and politics that they can leverage at SAIS and throughout their careers. Join us for a lively course on how policymakers and society have addressed this challenge up to now and options into the future, accounting for interactions with the COVID-19 pandemic and beyond. Classroom sessions will involve lectures, seminar discussions, and active learning (e.g., simulations of international climate negotiations). [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.765. The Geopolitics of Energy. 4 Credits.**

Energy and geopolitics are intrinsically linked. Profound shifts in the global energy landscape are having major impacts on international relations. This course will address the risks to global energy security, how countries and regions define their energy challenges, and how these perceptions impact their foreign policies and the international system. The course will look at global energy forecasts, the security considerations attached to different fuels and sources of energy, and the key issues impacting the geopolitics of energy in different regions of the world. [Click here to see a video introduction for the course.](http://bit.ly/29GQSG6) [Click here to see evaluations, syllabi, and faculty bios.](http://bit.ly/1bebp5s)

**SA.680.772. Energy Economics. 4 Credits.**

The objective of this course is to make you familiar with key economic concepts, ground realities, and policies related to the supply and use of energy. There will be a focus on sustainable energy, but the course will not consider environmental implications, which will be part of the Environmental Economics course. We will consider supply issues (renewables and storage, petroleum, coal, natural gas, nuclear), energy demand and efficiency in various sectors, and their interactions with each other and with the rest of the economy. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.774. Policy to Drive Energy Innovation. 4 Credits.**

With the rising challenges of mitigating both energy security and climate change vulnerabilities, the need for facilitating rapid introduction of new energy technologies that are cleaner and more efficient has never been higher. This course will examine the policy framework required to achieve this. It will begin with an overview of the elements needed to drive technology innovation in general, along with the types of policies to spur these elements. The course will then apply this analysis to the specifics of accelerating energy technology innovation, discussing a framework for energy technology policies. Strategies used to drive energy technology innovation in major countries around the world—including both OECD and the more advanced developing countries—will then be examined, beginning with the U.S.. The assessment of the United States will include an examination of its innovation system institutions: their strengths and gaps in driving energy technology innovation, including recent programs to address those gaps, and an analysis of what remains to be done. The course will conclude with an examination of approaches being considered to spur energy technology innovation as part of the climate negotiations. Since this course focuses on policies to achieve energy innovation, it is a good complement to the “Energy Technology Futures” course, which focuses on future technologies and their risks and benefits. [Click here to see a video introduction for the course.](http://bit.ly/2vS1hAZ) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.775. International Energy & Environment Practicum. 4 Credits.**

As both a course and a project, the practicum provides students the opportunity to apply the principles and methods they have learned in their academic courses in a real-world setting. Sponsoring organizations—including NGOs, government agencies, multilateral organizations and private companies—pose real and pressing problems, and students work to develop useful findings for their “client” company. All projects concentrate on international environmental issues, although some may intersect with the other focus areas of the Energy, Resources and Environment Program: energy, technology and health. Students work in teams to (1) agree to detailed terms of reference with the organization; (2) form a work plan for their project; (3) plan and conduct interviews, data collection, travel, etc.; and (4) prepare and present draft and final reports. All students meet every other week in both fall and spring terms. Students register for this course in the fall term, and grades are assigned when projects are completed in the spring. A budget is available for necessary domestic and/or international travel. Limited to 20 students. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.777. Science and Technology and International Affairs. 4 Credits.**

The nexus of scientific and technological (S&T) innovation and public policy influences virtually every issue on the agenda of national and international governments: the economy, public health, education, energy, environment, defense, diplomacy, and more. This course will introduce the complex relationships between science, technology, and public policy in the international sphere. The tools and methods policy analysts and science advisors use to assess issues critical to science, technology, and international affairs will be discussed, with deep dives into specific cases. Students will acquire knowledge that they can implement in practice; for example, how governments solicit expertise, determine funding, and regulate science research and technological industries. The classroom sessions will include the inception of S&T in policy and international affairs, illuminating past and present case studies with role-playing, lively discussion, and exercises. In addition to several skills-enhancing assignments, students will complete a final project on a topic of their own choosing. Topics may include investigations of new innovations and their implications for international affairs or even interactions between specific S&T topics and policy responses to the present pandemic. Join us in this course for exciting lessons and guest lectures featuring real-world experience from prominent practitioners, and an active learning approach that will help you acquire real-world skills. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.781. Renewables: The Challenges of Transitioning from Marginal to Mainstream Source of Energy. 4 Credits.**

This course provides an overview of the renewable energy sector. Students will be exposed to all of the building blocks necessary to take a renewable energy project from concept to reality, spanning regulation/economics, technical, project development and financing aspects. By necessity the topic is multi-disciplinary and also international in its scope. The course will also place renewable energy in the wider energy debate. The professor has invited several guest speakers who are all experts in their field and will expose students to hundreds of years of renewable energy project development, technical and financial experience. The topics to be covered by the speakers will be fully integrated into the syllabus. Each speaker will typically have a 30 minute slot to cover a specific topic (20 minute presentation & 10 minute Q&A). Subject to travel plans, speakers will make themselves available after the lecture to students wishing to engage in more detailed discussions.

**SA.680.783. Agriculture - Global Issues. 4 Credits.**

Examines issues related to global agriculture. Topics covered include: the world food system, the nexus of poverty and hunger, the rurality of poverty, the uniqueness of agriculture relative to other economic sectors, agriculture's role in economic development, resource constraints on future food production, climate change and agriculture, energy and agriculture, technological change in agriculture, public vs. private roles in agricultural and rural development, public policy distortions in global agriculture, globalization and agriculture, and the volatility and trend in agricultural commodity prices. [Click here to see a video introduction for the course.](http://bit.ly/29WdrvO) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.784. Sustainable Cities: Strategies for the Future. 4 Credits.**

This course introduces a wide range of major policy issues pertaining to local, national and global environmental sustainability through case discussions and analyses in a variety of socio-economic and institutional contexts. Students then engage in self-proposed original research of a real-world policy problem through a structured and guided process, resulting in a substantial term paper that informs policy making. The goal is to improve students' understanding of multidisciplinary policy issues in sustainable development and problem-solving skills to identify, critically think, and communicate real-world policy problems. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1beb5s)

**SA.680.786. Nuclear Non-Proliferation Challenges in the 21st Century. 4 Credits.**

Nuclear energy can be used for peaceful purposes or for nuclear weapons. An international non-proliferation regime was established based on the 1968 Nuclear Non Proliferation Treaty (NPT). The Treaty assigned responsibility International Atomic Energy Agency of the United Nations for applying safeguards to nuclear and related materials, nuclear equipment and facilities to ensure that they remain in peaceful use. New challenges arise from resurgent interest by some nations in acquiring nuclear weapons to meet their perceived security needs, and the recent revival of interest in nuclear power as a carbon-free energy source, including from developing countries that have no experience in nuclear technology. In addition, with the end of the Cold War there is a new threat of nuclear terrorism from acts of malice, diversion, sale, and theft of nuclear material and technologies. This course will explore how nuclear weapons work, why some countries are tempted to seek them, and the implications of nuclear weapons for civilian nuclear power and geopolitical stability. Students will gain an understanding of the political and military dynamics of nuclear weapons, ways to slow or halt the spread of such weapons and how to reduce the dangers of nuclear terrorism. Group discussions, simulated exercises, and guest lecturers will introduce additional real-world dimensions into the classroom. [Click here to see a video introduction for the course.](http://bit.ly/2hWONjP) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1beb5s)

**SA.680.787. Climate Change: Implications for Human, National & Global Security. 4 Credits.**

The purpose of this course is to equip students with an understanding of the basic dynamics of the global climate system as well as familiarity with different schools of thought about the implications of climate change for national and global security. The course will summarize the current scientific understanding of the Earth's climate system and will explore the concepts of national and global security through different lenses, in order to surface potential gaps in security studies as well as the "governance" gaps, the challenges emerging from an increasingly interdependent world facing an ever more volatile environment. The first half of the course will present a cross-disciplinary examination of some of the novel challenges that climate change-related disruptions pose for our traditional concepts of national security. In this section, we will take an integrative approach that acknowledges the "global commons" issues that have security-related implications for individual nation-states. Class discussions will explore whether traditional definitions, and existing institutions, are well- or poorly-suited to address the emerging challenges. The second half of the course will consider extant responses to these challenges, beginning with intergovernmental responses, including those by entities as the United Nations Framework Convention on Climate Change, the World Health Organization, the World Bank, and emerging cross-scale institutional innovations to reframe the challenges, and devise transformative solutions that span scientific, societal, political and economic boundaries. [Click here to see a video introduction for the course.](http://bit.ly/2k11fhh) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1beb5s)

**SA.680.788. Public-Private Partnerships: Energy & Environmental Case Studies. 4 Credits.**

The course has been designed to help students understand what public value can be created and what complex public policy problems can be addressed by employing the techniques and structures used in public-private partnerships (PPPs). Public-Private Partnerships are collaborative structures supported by public, private or even non-profit partners who agree to share risks, resources and decisions in building and implementing certain projects. PPPs address issues with financing, operational capacity, inadequate human capital. The parties to a solution may share powerful motivations to create public value by addressing a particular problem but may not agree on how it should be addressed, by whom, at what risk, and for what incentives. The course will focus on a selection of ERE case studies, highlighting how economic PPPs can improve a country's competitiveness. The course will also cover social PPPs, which focus more on assets that lack an adequate revenue source and require subsidies, such as water. An increasing number of countries are seeking a fusion of economic and social PPPs, especially with regard to water, education, and healthcare. The skills needed to effectively develop and integrate economic and social PPPs include negotiation, political management, innovation, and financial structuring. Case studies and readings will be used to illustrate the wide spectrum of situations and challenges associated with PPPs and the types of issues that will benefit from PPPs. Students enrolled in the course will be eligible for PPP research assistant positions and internship opportunities in the public and private sectors. [Click here to see a video introduction for the course.](http://bit.ly/2a1ViuT) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1beb5s)

**Prerequisite(s):** Students may not register for this class if they have already received credit for SA.400.756[C]

**SA.680.789. Urban Transportation. 4 Credits.**

Urban transport is often considered an indicator of the health of a city. If it functions well, people and goods move about easily with positive implications for the local economy, pollution and greenhouse gas emissions are held in check, transportation systems are safe, and the poor have ready access to mobility. On the other hand, if it functions poorly, the transportation system is in gridlock with the poor often having very limited access, the local economy is held in check by the congestion, pollution and greenhouse gas emissions are rampant, and safety concerns abound. This class will address the key components of what is needed in a well-functioning urban transportation system; these include: public transportation, increased vehicle fuel efficiency and pollution control, good land-use management, non-motorized transportation options, discouragement of the use of private vehicles, and management of freight movement. As part of this process, students will write a mid-term paper on the characteristics of a city of their choice that incorporates many of these components. Based upon those papers, student groups will then be assembled and the groups will prepare and present a proposal at the end of the class for recommended changes for a city of their choice that presently does not have a well-functioning urban transportation system. [Click here to see a video introduction for the course.](http://bit.ly/2hWGjb4) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.790. Principles of Energy Economics and Finance. 4 Credits.**

Energy holds a unique position at the nexus of multiple disciplines, including microeconomics, macroeconomics, finance, politics, security, environment, and science and technology. It forms a constant source of anxiety and opportunity to the private sector and policymakers, yet its breadth, complexity, and multi-dimensional nature challenges all participants in the energy space. This course provides a quantitatively rigorous introduction to the principles of energy economics, including the fundamentals of demand and supply, storage, transportation, transmission, and processing. The course also covers the associated financial markets for futures and other derivatives, the linkages between energy and the broader global macroeconomy, the political, environmental, and security externalities and their policy implications, the valuation of energy assets, and finally a survey of some unique characteristics and outlook for various sources of energy, including hydrocarbon, nuclear, biofuel, and renewable sources. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**Prerequisite(s):** SA.680.697[C] AND SA.680.600[C]. [Click here for 680.600 self-enroll instructions.](http://www.sais-jhu.edu/sites/default/files/OBE%20Self-Enroll%20Instructions.pdf) SA.300.701[C] OR SA.300.706[C] OR SA.310.701[C] OR SA.999.701[C]; SA.300.699[C] OR SA.300.700[C] OR SA.310.700[C] OR SA.999.699[C] OR SA.999.700[C]

**SA.680.791. Renewable and Distributed Energy Resources: Trends and Policies. 2 Credits.**

Given the challenges presented by climate change, environmental degradation, and resource scarcity, virtually everybody agrees that “business as usual” in energy production and consumption is no longer tenable. However, for all the compelling reasons to increase the share of energy generated from renewable sources, the development of renewable energy sectors has varied widely across countries. In some economies, more than 30 percent of electricity are now generated from renewable sources, while others have made few attempts to establish domestic renewable energy sectors. This course will examine what’s driving the remarkable growth in some countries while others lag behind. To understand such variation, this course provides an in-depth look at the policies and economics of renewable energy – from large scale wind and solar to distributed generation (DG) resources such as rooftop solar, micro-grids, and storage in the U.S., Europe, and Asia. Weekly, discussion-intensive class meetings examine how specific national and state policies are driving growth in renewable energy sectors, how these policies impact renewable energy projects (large and small scale), how and why these policies have differed across nations and over time, and what factors have contributed to policy failure. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**Prerequisite(s):** SA.680.730[C]

**SA.680.792. The Water, Energy and Food Nexus. 4 Credits.**

The water, energy and food (WEF) nexus is a topic of growing interest in the research and policy communities. Critical physical linkages include the enormous appropriation of water resources for food and energy production, the high energy demand of the water sector for transport and treatment, and the uncertain impacts that climate change will have on all three components. Policy issues include water rights and pricing, energy infrastructure development, and water competition between sectors. This course will survey WEF concepts and principles, introduce tools of analysis, and engage students in case studies of critical WEF issues in the United States and internationally. [Click here to see a video introduction for the course.](http://bit.ly/2hv4kbd) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.793. A Global Natural Gas Market: Revolution or Evolution?. 4 Credits.**

This course offers students a well-rounded introduction into natural gas and teaches them the tools employed by energy companies, consulting firms, financial institutions and governments. The course covers four themes: (a) methods for forecasting gas supply and demand; (b) the regulation that governs natural gas markets and pricing; (c) the economics and politics of large-scale gas projects; and (d) the drivers and strategies of international oil companies (IOCs), national oil companies (NOCs), and utilities. There are no prerequisites for this course. However, students will find the course easier if they have a background in economics (micro, macro), if they understand basic concepts of corporate finance (e.g. discounted cash-flow), and if they can use data-processing software (e.g. Microsoft Excel). [Click here to see a video introduction for the course.](http://bit.ly/2vSnhLI) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.795. Risk, Finance, and the Challenges of Sustainable Infrastructure. 4 Credits.**

Public sector spending on infrastructure in the US is currently in the range of \$150 Billion per year. Recent analyses suggest that the annual investment gap in the US is likely to reach approximately \$50 Billion during this decade. Globally, the International Energy Agency and others have estimated the demand for infrastructure investment is likely to exceed US\$ 1 Trillion annually by 2020. The impacts of climate change are likely to impose additional systemic risks on existing infrastructure and increase the cost of both new and replacement investments. This class will explore the risks and challenges of financing sustainable infrastructure in order to enhance resilience in both developing and industrial countries, highlighting the potential roles of national development banks, pension funds, insurance companies and other institutional investors. Topics will include innovative techniques for valuation and cost-benefit analysis, environmental and social impact assessment, as well as the emerging roles of "Green Banks," infrastructure funds, and public finance in the context of the Post-2015 Sustainable Development Goals (SDGs). Course format will be a mix of seminar discussion and case studies. [Click here to see a video introduction for the course.](http://bit.ly/2jxceSI) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**Prerequisite(s):** SA.380.760[C] OR SA.310.722[C]

**SA.680.796. Comparative Energy and Environmental Governance. 4 Credits.**

How are public policies addressing energy and environmental problems designed and implemented at various levels of governance? Why are certain pressing energy and environmental problems addressed, while others ignored? What drives some nations, but not others, to embrace renewable energy and decrease reliance on fossil fuels? Moving beyond the idea that differences in public opinion are primarily to blame for such variation, this course focuses instead on how the design of the state itself influences energy and environmental governance outcomes. Regime type, electoral systems, party rules, fiscal structures, and institutions that determine regional and municipal policy-making authority have enormous impact on policy design and implementation. In addition, energy and environmental problems span regional and national borders, often mapping poorly onto existing governance institutions and spawning a range of unintended consequences. To systematically examine the link between state institutions and energy and environmental governance, this discussion-intensive seminar applies theories and concepts from literatures on comparative politics to topics in energy and environment, moving gradually from multilateral institutions, through institutions at the national, regional, and municipal levels. The course ends with a class on non-state, market-based governance institutions. To facilitate detailed, comparative analysis and in-class discussion, each week introduces a range of empirical cases drawn primarily from China, Germany, and the United States. [Click here to see a video introduction for the course.](http://bit.ly/29wa0zg) [Click here to see evaluations, syllabi, and faculty bios.](http://bit.ly/1bebp5s)

**SA.680.797. Renewable and Distributed Energy Policy. 4 Credits.**

Given the challenges presented by climate change, environmental degradation, and resource scarcity, virtually everybody agrees that "business as usual" in energy production and consumption is no longer tenable. However, for all the compelling reasons to increase the share of energy generated from renewable sources, the development of renewable energy sectors has varied widely across countries. In some economies, more than 30 percent of electricity are now generated from renewable sources, while others have made few attempts to establish domestic renewable energy sectors. This course will examine what's driving the remarkable growth in some countries while others lag behind. To understand such variation, this course provides an in-depth look at the policies and economics of renewable energy – from large scale wind and solar to distributed generation (DG) resources such as rooftop solar, micro-grids, and storage in the U.S., Europe, and Asia. Weekly, discussion-intensive class meetings examine how specific national and state policies are driving growth in renewable energy sectors, how these policies impact renewable energy projects (large and small scale), how and why these policies have differed across nations and over time, and what factors have contributed to policy failure. [Click here to see a video introduction for the course.](http://bit.ly/2h1Uieh) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**Prerequisite(s):** SA.680.600[C]; Students may not register for this class if they have already received credit for SA.680.791[C]

**SA.680.798. Environmental Policy Analysis. 4 Credits.**

The environment is playing an increasing role in policy decisions, often in competition with economic goals. At the same time, increasing burdens on the environment can limit economic growth due to scarce resources, societal resistance, and impacts. In this course, we explore the empirical and normative factors that shape environmental policy analysis. Multiple factors will be explored in depth, such as politics, economics, risk assessment, energy and natural resource extraction, and impacts to the environment (e.g. pollution, climate, water use, land use). The steps in undertaking environmental policy analysis will be reviewed as well as the tools that can be employed in the analysis. Lectures will facilitate an understanding of the interdisciplinary challenges addressed by political scientists, engineers, and natural scientists on environmental policy. Students will have the choice to employ qualitative or quantitative assessments in their final papers. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.799. Climate Change: Science, Policy and Political Economy. 4 Credits.****SA.680.851. Environmental and Natural Resource Economics. 4 Credits.**

This course will give a broad overview of how economists think about environmental issues and translate it into policy applications. The class will be divided in three parts. Part I will cover ways in which markets fails to efficiently allocate resources in the presence of environmental externalities like pollution, along with policies to correct those failures. Part II will focus on the inefficient allocation of natural resources when property rights are poorly designed. Part III will provide an overview of the role of private actors in environmental sustainability. The objective of this course is to stimulate critical thinking about environmental challenges and solutions. [Click here to see a video introduction for the course.](http://bit.ly/2bc20Uv) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**Prerequisite(s):** SA.300.699[C] OR SA.300.700[C] OR SA.999.699[C] OR SA.999.700[C]

**SA.680.852. Energy Poverty. 4 Credits.**

To this day, more than a billion people do not have electricity at home and almost three billion people rely on traditional biomass for their cooking. This course investigates this problem of energy poverty and how policymakers can overcome it. The course covers all regions of the world but focuses on South Asia and Sub-Saharan Africa, where energy poverty is concentrated. In the lectures, students learn about the socio-economic causes of energy poverty, the impact of the problem, and the political economy of energy access policy. All students conduct an original research project to identify, analyze, and solve an energy access problem in a country of their choosing. [Click here to see a video introduction for the course.](http://bit.ly/2CQqBrs) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.853. Cities: Toward Sustainable Prosperity. 4 Credits.**

Occupying less than 3% of the world's land, cities are home to more than half of the world's seven billion people, generating about three-fourths of global economic output. As we expect three billion new urban dwellers by 2050, cities across the world face major challenges: poverty, inadequate basic services, pollution, congestion, carbon emissions and hazard vulnerability. This course helps students understand the rationale of cities, their internal structure and governing mechanisms, and the connection between urban success and national and global development. It examines how sustainable prosperity can be delivered in cities: how we can increase urban productivity and reduce urban poverty and inequality, enhance quality of life through basic services, housing and infrastructure, protect the urban environment, and reduce risk and vulnerability. It further explores how to improve governance and financing for the success of individual cities and the aggregate urban sector in economies. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.854. The Politics of Water in Developing Economies. 4 Credits.**

This course takes an explicitly comparative perspective to systematically examine how developing economies have managed the domestic politics of water as a resource. From big-state solutions during an era of large-scale infrastructure investment, market-based approaches during the Washington Consensus, to a recent resurgence of state intervention led by China, the role of the state in water management has changed fundamentally over time. Drawing on empirical cases from Asia, Africa, and Latin America, the course investigates how prevailing theories about the role of the state in economic development have influenced state approaches to governing water. Moving beyond technocratic solutions that see water management primarily as an engineering task, the course explores how strategies for water governance are politically contested and reflect the shifting distribution of power among different societal groups. In addition to providing a broad survey of contemporary international water issues, the course offers students practice in comparative policy analysis and develops an analytical toolkit for policy-making in a developing economy context. Students who have taken or take this course, cannot enroll in Winston Yu's course: SA.680.738.01 International Water: Issues and Policies [Click here to see a video introduction for the course.](http://bit.ly/2uJ6KG0) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**Prerequisite(s):** Students may not register for this class if they have already received credit for SA.680.738[C]

**SA.680.855. Life Cycle Assessment. 4 Credits.**

Life cycle assessment (LCA) is a technique that is widely used by businesses, governments, and civil society to quantify environmental impacts of products and processes from cradle-to-grave (or even cradle-to-cradle). Studies employing this technique have uncovered surprising environmental findings, including the trade-offs between plastic and glass bottles, the upstream impacts of gasoline produced from the Canadian Oil Sands, and the hidden impacts of zero emissions vehicles. This course will provide a comprehensive introduction to LCA, an internationally recognized tool that is promoted by organizations such as the United Nations Environmental Program (through the Life Cycle Initiative). The classroom sessions will include in-depth discussions, exercises with and without software, and guest lectures to engage students with real-world LCA practice. The course has been restructured for students to iteratively develop their own real-world LCA on a product of their choice throughout the semester. While other products will be discussed, there will be an emphasis on energy technologies. [Click here to see a video introduction for the course.](http://bit.ly/2D0n6mw) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.856. Quantitative Methods in ERE. 4 Credits.**

[Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.857. ERE Research Seminar. 4 Credits.**

Policy makers, business leaders and other stakeholders in civil society confront many challenges in ensuring a transition to a sustainable energy future. The ERE curriculum provides students with basic and specialized skills and knowledge across a broad spectrum of these challenges. With the introduction of the ERE Research Seminar, students will have the opportunity to conduct more in-depth, focused research on a specific topic under the guidance of an instructor and with inputs from fellow students. Note: successful completion of this course fulfills the capstone oral exam requirement. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.858. Energy and Environmental Policy Analysis. 4 Credits.****SA.680.881. International Wildlife Conservation. 4 Credits.**

Wildlife populations around the globe are under serious threat, impacted by human activity, development, and encroaching industry, much of which is prompted by decisions made by governments and other institutions. Local-level land-use, local, national and international policies, and human trade and development activities heavily influence wildlife populations and the potential for their protection and management. This course provides an overview of the theory and practice of wildlife conservation internationally, with a focus on African wildlife. The objectives of the course are to provide knowledge on policies and practices used to protect and manage wildlife populations, especially as they compete with other development goals. The course will examine: the major issues of concern in global wildlife conservation; the US-based and international agencies working toward wildlife conservation objectives and the way they interact with other "development" groups implementing projects in conservation areas; the impact of major international treaties; and, conservation practices across key regions of the globe. (This is a cross-listed course offered by the Energy, Resources & Environment Program that also can fulfill a requirement for the African Studies or International Development Programs.) [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.884. International Forestry: An Introduction to Major Contemporary Issues. 4 Credits.**

The main focus of this course is to deal with forest issues in an international setting, looking into current state and threats, forest management for wood products, trade, and the important role of forests in the climate debate. However, this course will also look into some of the socio-economic functions of forests in developing tropical countries as well as the regulatory and policy context in which those countries manage their forests and their relations with forest dependant peoples and communities. This will include issues such as land rights, logging titles, forest concessions systems, forest revenue systems benefit sharing mechanisms, and the role of climate change. Each of the session will discuss separate but inter-meshed issues, through review and analysis of concepts, policies etc., as well as illustrative practical examples in a tropical country (mainly Congo Basin countries and Indonesia). [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.885. Water-Energy Nexus. 4 Credits.**

The water-energy-food (WEF) nexus is central to country goals on sustainable development. Demand for all three is increasing, driven by a rising global population, increasing urbanization, changing diets and economic growth. This is also in the context of climate change and challenging institutional and policy environments. Agriculture is the largest consumer of the world's freshwater resources, and more than one-quarter of the energy used globally is expended on food production and supply. Fossil fuel production, still a dominant and growing part of the global energy mix, is highly water intensive, as is biofuel production and the growing practice of shale gas extraction. Energy is needed to deliver and treat water for a broad range of users. These inextricable linkages require an integrated approach (in terms of management, operations, and planning) to ensuring water, food, and energy security. Policy-makers in all three domains will face difficult tradeoffs, balancing economic, environmental, and social concerns. This course will survey WEF concepts and principles, introduce tools of analysis, and engage students in case studies of critical WEF issues within and between nations. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.886. Energy Transitions in the US. 4 Credits.****SA.680.887. Geospatial Dimensions of Energy and Environment (GIS). 4 Credits.****SA.680.888. The Costs of Climate Change: Responding in Developing Countries. 4 Credits.**

With climate change impacts being felt across many parts of the world – particularly in fragile states and those least able to manage the risk – climate change has become a central part of the global sustainable development agenda. The concept of climate-resilient development is bringing core climate science into development strategies and programs, and posing significant questions about how development investments are made and how results are measured. This course will investigate the science of climate change, the impacts for developing countries, and the theoretical foundations of policy responses. It will also delve into the practical opportunities and challenges related to addressing climate change in developing countries and integrating climate change considerations into existing development approaches. The course readings and discussions will draw from a series of practical case studies showcasing efforts to translate theory and policy into concrete program activities. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.889. Global Governance of Energy and Environment. 4 Credits.**

This seminar introduces the institutional governance of international energy and environmental affairs. We will consider several questions of contemporary policy relevance. How have governments designed international institutions to meet energy demands in developing countries? What are the principle challenges for the international community in facilitating global energy transitions? To what extent are global institutions capable of meeting the challenges posed by climate change? How have global institutions evolved since the end of the Cold War to handle environmental issues? And what lessons can policymakers learn in designing or building institutions to govern energy sectors and the natural environment? By the end of the seminar we will have learned about the specific energy and environmental challenges and the international strategies developed to meet those challenges. Topics will include oil markets, climate change, renewable energy, ozone depletion, technology innovation, and financing mechanisms. We will cover the relationships between technology and energy, environment and energy, international relations and energy, domestic politics and fossil fuels, and oil and international relations. Sessions will focus on questions relating material from different parts of the seminar to provide continuity from one week to the next. [Click here to see evaluations, syllabi, and faculty bios](http://bit.ly/1bebp5s)

**SA.680.893. Green New Deals. 4 Credits.**

The notion of Green New Deal is increasingly becoming popular around the world. This course introduces students to this innovative form of policy-making, discussing its main objectives and policy instruments. To do so, the course covers a wide range of topics from global decarbonization trends to global environment protection and biodiversity conservation. It also introduces a host of key concepts that underpin energy, climate and environmental policy analysis, as well as their related economic and social policies. The course pays particular attention to the political economy issues related to Green New Deals, such as the distributional effects of climate policy, the just transition challenge and the important issue of green industrial policy.

**SA.685.858. Energy and Environment Policy Analysis. 4 Credits.**

This course identifies the important linkages between energy and environment. It focuses on how the pollution abatement policies work and examines the use of market-based instruments. Students will analyze policy challenges in resource conservation and waste management, investigate how politics and political economy interfere with energy policy, and evaluate the role of energy policy in climate change mitigation. The use of policy tools to promote clean technology innovation in energy will be reviewed. Students will also assess trade-offs between environmental conservation and economic growth and apply principles of policy analysis to manage global environmental problems in the energy sector.

**SA.685.860. New MASE Course. 4 Credits.****SA.748.112. International Water Politics. 3 Credits.****SA.748.113. Environment and Development in Africa. 3 Credits.**