SA.685 (SUSTAINABLE ENERGY - ONLINE)

Courses

SA.685.600. MASE Economics Basics.
This Basics of Economics course is a self-paced, self-study course designed to get MASE students up to speed with the basics of economic theory. The goal is for students to develop the economic literacy necessary to thrive in the economic courses in the MASE curriculum and to become informed and critical consumers of economically oriented news from outlets like The Financial Times, The Economist, and The Wall Street Journal. The course will be divided in two parts. We will start by looking at Microeconomic theory (the study of how individuals and institutions make choices when facing scarce resources) and finish with Macroeconomic theory (the study of how economies as a whole function).

SA.685.710. Economics of Sustainable Energy. 4 Credits.
This course introduces the economics of sustainable energy. Using a variety of graphical and analytical tools, the course introduces basic concepts and tools in the economic analysis of sustainable energy. Besides covering the basics of energy and environmental economics, the course pays particular attention to the economics of sustainable energy sources. Economics of renewable energy, energy efficiency, and nuclear power are also considered. Topics covered also include economics of positive and negative externalities, carbon pricing and markets, and other sustainable energy policies. Students learn through lectures, readings, and a number of individual and group assignments for hands-on experience.

SA.685.715. Sustainable Energy and Climate Change. 4 Credits.
This course aims to connect sustainable energy to the challenge of climate change. The energy sector is the most important source of greenhouse gases, and decarbonizing energy is necessary for effective climate mitigation. The course reviews the problem of climate change in the energy sector and opportunities for sustainable energy. The course covers not only the power sector, but also industrial energy and heating. In the class, students gain a broad overview of the challenge of low-carbon energy, potential technical solutions, and policy options for pursuing them.

SA.685.720. Global Governance of Sustainable Energy. 4 Credits.
Environmental problems such as climate change are global in nature —and solving them requires global governance through international cooperation, including in the energy sector. In this course, students learn about the global governance of sustainable energy. Focusing on wind, solar, nuclear power, energy access, and grid systems, the course explores the challenges of expanding access to sustainable energy, introduces the most important global institutions that govern sustainable energy, and offers students an opportunity to conduct policy analysis. Besides formal international organizations, the course explores how non-state, transnational actors contribute to global governance in this policy area.

SA.685.725. Sustainable Energy and Economic Development. 4 Credits.
Energy is a necessity for economic development. Without abundant and affordable energy, economies cannot power their agriculture, industry, and services. In this course, students learn about the problem of energy for economic development, with a particular emphasis on the opportunities of sustainable energy. The course introduces key trade-offs between economic development and environmental protection in energy planning. The course emphasizes the opportunities and challenges of sustainable energy with comparative analysis of experiences in key emerging economies from Brazil to China and India.

SA.685.730. Sustainable Energy Finance. 4 Credits.
In this course, students learn the basics of sustainable energy finance. The course introduces the problem of financing sustainable energy and how it has evolved over time. The student learns about typical financial arrangements in energy, with a particular emphasis on sustainable sources of energy. Students also gain direct exposure to basic financial tools used by project developers, financiers, and policymakers. Climate finance and green finance feature prominently in the class.

SA.685.797. Distributed and Renewable Energy. 4 Credits.
This course serves as an in-depth survey of distributed and renewable energy sources. Due to rapid technological advances, sustainable energy sources such as solar and wind power are increasingly competitive with fossil fuels and nuclear power. What is more, interest in distributed energy generation including rooftop solar, mini-grids, and home systems offers new opportunities for resilience and rural electrification in remote areas. These energy sources face a number of specific techno-economic, regulatory, and political challenges. Students gain detailed knowledge of distributed and renewable energy, their potential, and challenges to expanding them.

SA.685.858. Energy and Environmental 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.685.870. Systems Analysis for Sustainable Energy. 4 Credits.
Energy systems consist of hardware, such as pipelines and power plants, and software, such as societal practices and institutions. This course introduces students to systems thinking in the field of sustainable energy. Students learn how to detect, understand, and analyze complex cause-effect relationships in the global energy system. The course covers topics such as life cycle assessment, socio-technical systems, the water-energy nexus, and integrated assessment.?

SA.685.900. MASE Capstone Residency I. 1 Credit.
The MASE degree culminates in a capstone research project, which students will begin during the Capstone Residency I course in Washington, DC. The capstone research project focuses on a broad, common theme but allows students to choose a focus that reflects their interests and future career plans. The goal is to solve an important problem of practical importance in the field of sustainable energy. During Capstone Residency I, students are introduced to the capstone project, brainstorm potential ideas, write a project proposal, and develop a timeline for completion. Students are guided by a faculty advisor as they engage in collaborative efforts to develop and refine their ideas. Students will also hear from expert guest lecturers on a variety of energy-related topics.

SA.685.901. MASE Capstone Residency II. 1 Credit.
The MASE capstone experience culminates with the Capstone Residency II course, which takes place in Washington, DC at the end of the MASE program, immediately preceding graduation. Students will come to Washington, DC to present their capstone projects to faculty and peers and engage in rigorous Q&A sessions. Students will receive detailed feedback from faculty on their capstone projects.

SA.685.902. MASE Capstone. 4 Credits.
The Capstone Course is a continuation of the work begun during the Capstone Residency I course. The Capstone Course takes place during the final semester of the program. Students will further develop their research skills and build upon their knowledge of Sustainable Energy as they prepare a written report, slide deck, and executive summary on their chosen capstone topic. Opportunities for faculty review and peer review will be provided.