ENERGY STUDIES (ENRG)

* ENRG 300a, Multidisciplinary Topics in World Energy  Michael Oristaglio
This course studies how the 21st century energy transition away from fossil fuels towards sustainable (sustainable, low-carbon) energy sources is proceeding in key countries and regions around the world such as U.S., Germany, China, India, and Sub-Saharan Africa. The approach is multidisciplinary, encompassing geographical, technological, economic, social and geopolitical incentives and barriers to progress. Enrollment in the Energy Studies MAP is required. SO

* ENRG 320a / ENVE 320a / MENG 320a, Energy, Engines, and Climate  Alessandro Gomez
The course aims to cover the fundamentals of a field that is central to the future of the world. The field is rapidly evolving and, although an effort will be made to keep abreast of the latest developments, the course emphasis is on timeless fundamentals, especially from a physics perspective. Topics under consideration include: key concepts of climate change as a result of global warming, which is the primary motivator of a shift in energy supply and technologies to wean humanity off fossil fuels; carbon-free energy sources, with primary focus on solar, wind and associated needs for energy storage and grid upgrade; traditional fossil-fuel power plants and engines, that are currently involved in 85% of energy conversion worldwide and we can’t “turn on a dime”. Elements of thermodynamics are covered throughout the course as needed, including the definition of various forms of energy, work and heat as energy transfer, the principle of conservation of energy, first law and second law, and rudiments of heat engines. We conclude with some considerations on energy policy and with the "big picture" on how to tackle future energy needs. Designed for juniors and seniors in science and engineering. Prerequisite: MENG 211 or permission from the instructor. QR, SC

* ENRG 400b, Senior Capstone Seminar  Michael Oristaglio
This course serves as the capstone seminar for the Energy Studies Multidisciplinary Academic Program (MAP). Capstone projects in Energy Studies are undertaken in the senior year and can comprise an independent study project or an extension of a summer internship, senior essay or senior project in the major. To register for this course, students must submit a project proposal to the Director of Energy Studies no later than the end of registration period in the term in which the course is to be taken. In addition to individual study, the seminar meets regularly during the term. Prerequisite: Enrollment in, and expected completion of, the course requirements for Energy Studies.