ISYE/PUBP 67xx Energy Technology and Policy
Prerequisites: : Graduate standing, a strong undergraduate preparation in science or engineering, and modeling and statistics at the level of ISyE 6739 or PUBP 6114.

This course is co-taught by faculty from the School of Industrial and Systems Engineering and the School of Public Policy, and integrates engineering and policy analysis.

Technology Content: The course addresses the quantitative physical relationships between energy, power, fuel consumption, generation and end-use efficiency, greenhouse gas and other emissions, and the physical principles of energy resource availability and energy use applications. The economic, technology, and environmental implications of energy decisions are evaluated with quantitative energy and environmental assessment.

Policy Content: This course examines the close coupling of policy formulations with attributes of markets and technology systems. Principles of policy analysis and theory will be introduced and illustrated throughout the course, including stakeholder assessment, market failure and externalities, and regulatory and fiscal paradigms. Methods of policy and program evaluation will be illustrated in the context of energy policies, including cost-benefit analysis and alternative cost-effectiveness tests.

Topics Addressed. The course focuses on innovative and sustainable energy options including energy efficiency, alternative transportation fuels and vehicle technology; high performance buildings and advanced lighting; the smart grid; solar and wind energy; fossil fuels and carbon sequestration; and nuclear energy policy and technology.

Possible texts:
Policy: *Energy and American Society – Thirteen Myths*. B. K. Sovacool and M. A. Brown (eds.), 2007. ISBN-13; 978-1-4020-5563-8.
Technology: *Physics of Societal Issues*, D. Hafemeister, Springer 2007.

Course outline:

Energy Overview: Overview of energy: history of energy use; relation of energy and the economy, energy metrics.

Petroleum: Geopolitics of petroleum, assessment of petroleum resources, and automotive fuel efficiency policy.

Nuclear Energy: Principals of nuclear energy; history and status of nuclear power; technological basis and international policy for nuclear non-proliferation.

Coal and Carbon: Coal and greenhouse gases; technology approaches to carbon sequestration, clean coal and the policies used to promote them.

Renewable Energy Resources: Overview of renewable resources; status of renewable power technologies; tax incentives and other policies employed to overcome barriers to deployment. Cost benefit analysis and lifecycle assessment of renewable energy technologies.

State and Federal Energy Policies: Review of recent federal energy policy and the Georgia State Energy Plan.

Energy Efficiency: Buildings, Land Use, & Combined Heat and Power: High performance buildings, advanced lighting and other technologies. Policy: social marketing, codes and standards. Smart growth. Evaluation of carbon emissions of individuals, institutions, metropolitan areas, and businesses.

The Electric Grid. Siting issues associated with electric infrastructure investment. Chronology of air quality regulations in response to changing public policy paradigms. Current trends in the restructuring and regulation of the electricity industry.

Transportation Energy Technologies and Policies: Plug-in Hybrid Electric Vehicles. Characterization of bioenergy resource constraints, and the potential for technological innovation in the trade-off of food, feed, fiber and fuel.

Climate Change: Climate Change Science, Technologies to Address Climate Change, and Climate Policy: UNFCCC, Kyoto Protocol and Carbon Trading.