REQUIRED COURSES

Perspectives in Energy Business
Overview of the energy industry from the systems perspectives, with discussion of the operating diversity among different energy companies. Explores the relationships among all major energy sectors — oil, gas, coal, nuclear, electricity, and renewables — and their value chains.

Residency Seminar I
A face-to-face non-credit laboratory course required for graduation. Satisfies program orientation requirements and facilitates student engagement with the energy industry.

Residency Seminar II
A face-to-face credit laboratory course required for graduation that is focused on industry engagement and development of leadership skills.

Leading and Managing Energy Organizations
A survey of the principles and best practices for managing and leading people and organizations, with special emphasis on organizational situations and workforce challenges that are unique to the energy industry.

Analytical Tools for Energy Business Management
A modular study of management tools and resources pertinent to the energy industry, including problem-framing and analysis, project management, decision analysis, energy information systems, and basic data analysis methods applied to commercially-available energy data. Includes computer exercises.

Energy Accounting and Financial Reporting
Study of financial information used by energy companies. Primarily focused on upstream/midstream oil and gas operations, topics include successful-efforts and full-cost accounting, impairments, asset retirement obligations, production costs, joint interest operations, revenue streams, unitization, supplemental disclosures, conveyances, completion decisions, and basic energy economics. Addresses other energy sectors and international activities as time permits.

Financial Management in the Energy Enterprise
Fundamental principles of finance and microeconomics for energy operations, including supply and demand, opportunity cost, marginal and average cost, revenue and profit, and maximum/minimum relative to cost. Includes aspects of corporate finance from the energy perspective such as capital budgeting, asset management, financial decision-making and risk, and energy project financing mechanisms.
**Energy Policy & Sustainability**
Survey of initiatives, laws, treaties, and agency derivatives used by government entities to promote development of, and commercial investment in, specific energy resources, technologies, or markets. Addresses the macroeconomic issues and technical viability of competing energy sources, and presents the concept of sustainability from the corporate, environmental, and social perspectives.

**Legal and Regulatory Environment of the Energy Industry**
Survey of laws, legislation, and regulations governing development, production, and disposition of energy resources and related business transactions, and the federal and state agencies that have regulatory responsibility. Includes a discussion of economic, environmental, resource conservation, and market theories that underlie the establishment of energy laws and regulations.

**The Business of Renewable Energy and Alternative Fuels**
Principles and practices of doing business in the renewable energy and alternative fuels sectors. Investigates the feasibility and economics of competing energy sources and technologies and considers their contribution to a total systems approach to energy business. Includes concepts of innovation, relevant business models, the use of government incentives, and related topics.

**Management of the Energy Supply Chain**
An in-depth study of the supply and value chain for the energy industry from a theoretical and systems perspective, with a discussion of supply chain management as it relates to oil, natural gas, and power.

**Energy Economics**
Study and application of energy market economics from both a theoretical and applied perspectives. Covers the role of primary energy resources in global markets, as well as differences in market structures between and among various energy resources.

**ELECTIVES**

**Current Topics in the Upstream-Midstream-Downstream Operations**
A survey of current topics, industry initiatives, new ventures, and government programs that are impacting the operations of oil, gas, and other companies, and by extension, the development of energy resources and the evolution of the energy industry. Topics will vary with student and instructor interest.

**Critical Issues for the Energy Industry**
A modular study of major issues facing the energy industry, including: (1) impact of technology and innovation on the evolution of the industry, (2) health, safety, and environmental stewardship, and (3) corporate social responsibility (CSR) and ethics. Topics rotate depending on demand.

**Energy Markets and Commodities Trading**
A technical presentation of the processes and economics of moving energy resources, products, and supplies from point of production to marketplace. Includes specific information about how energy markets are established and how end products are priced and traded. Addresses all major resource/product groups, but uses natural gas as a template.

**Energy Outlook 20xx**
Comparative investigation of worldwide energy supply and demand over the next two to three decades in light of economic, political, technological, environmental, and societal constraints. Addresses various estimates of existing and future resources, supplies, demand, and usage, in both the domestic and international arenas. Includes historical perspectives of the energy industry.
US Oil and Gas Law
Survey of the legal environment of the domestic oil and gas industry and its operations. Covers property and contract law pertinent to conducting business in the US upstream and midstream segments of the oil and gas industry. Topics include pooling/unitization/conservation agreements, drilling contracts and permits, conveyance issues, and mineral estates.

Energy Transactions in the International Arena
Survey of the legal environment of international petroleum business. Covers property and contract law in the international arena, agreements governing international energy commerce and business transactions, and US laws regulating international business activity. Topics include foreign legal systems, national oil corporations, international operating agreements, concessions, foreign direct investment, and dispute resolution.

Economic Evaluation of Energy Assets
Study of petroleum project economic analysis and decision-making, including cash flow, risk analysis, reserves calculations, property valuation, asset management, and risk. Topics include time value of money, profitability measures, engineering analysis and prediction of cash flow for oil, gas, and other properties, tax and depreciation effects, international contracts, inflation, and uncertainty analysis.

Global Energy Decisions
A seminar course about the history, politics, and operations of state-run energy companies (national oil companies) and how firms that are not government-owned (such as US oil and gas organizations) make business decisions to invest in countries where political uncertainty may be high. Compares operating characteristics of oil-producer countries such as Saudi Arabia, Iran, Kuwait, Mexico, Brazil, Venezuela, Norway, and Nigeria. Also includes discussion about upstream and downstream competition in various global and regional markets (e.g., coal, power, transportation).

Directed Research in Energy Business
A guided seminar designed to teach research skills, critical thinking and synthesis of multiple sources of information, and writing skills that are useful to energy business. May also serve as a capstone research project.

Seminar in Energy Business
Topical study of current issues in energy business. Topics rotate depending on student and instructor interest.

ON-DEMAND ELECTIVES OFFERED AS PART OF THE SEMINAR SERIES

International Energy Markets
The course is a study and application of energy market economics, covering differences in market structures between and among various energy resources and globally. The focus is on the economics of the various energy markets from both a theoretical and applied perspective. The role of primary energy resources in our global markets is quite important. However, these markets are not well understood.

The Electric Utility Industry & Demand Side Management
The study of the electric utility industry, with specific focus on power demand management, conservation, and energy efficiency. Topics may include technological advances such as smart grids.

Energy in US History Since 1859
The course examines economic, environmental and foreign policy dimensions of energy in America since 1859. A recurring theme is disconnections between tangible energy market problems and federal policies adopted in response, e.g., price controls, tariffs, quotas and perceived imperatives to secure foreign supply. Cyclical phenomena such as commodity prices, panics, bubbles and peak oil forecasts are a particular focus. Tension between conservationism and anti-capitalism, and the recent emergence of climate change as a security issue will be studied.

The Refining and Petrochemicals Business
A survey of the business aspects of the refining and petrochemicals sectors of the energy industry.

Comparative Management Strategy in Energy Corporations
Comparative study of business and management strategies used by contemporary energy companies.

Energy Risk Modeling
Study of energy risk combined with practice in the quantitative and computational tools and techniques used in modeling various energy industry risk scenarios. Topics may include refinery blending problems, comparison of petroleum exploration projects, forecasting oil and gas prices, project financing issues, electricity demand, and related concerns. Requires intermediate-to-advanced level expertise in Excel spreadsheet modeling and strong background in probability and statistics.

Energy Logistics and Transportation Management
Survey of the operational aspects of moving energy assets, including equipment, products, and people, from one point to another. Includes investigation of conceptual models and optimization techniques, as well as the regulatory environment of energy distribution. Topics include domestic and international transportation of energy equipment, marine transportation of petroleum products, liquids and gas pipelines, contracting and procurement, workforce issues, safety, and ethics.

Energy Infrastructure and Asset Management
Survey of the theory and practice of managing physical assets and infrastructure to improve operational efficiency and financial performance in energy corporations. Topics include infrastructure as a strategic investment, financing and managing large-scale infrastructure development projects, physical security of assets, the evolution to digital operations, public-private partnerships, assembling and managing portfolios of energy assets (refineries, power plants, process plans, pipeline systems, etc.), operational efficiency strategies and metrics, safety, and risk management/mitigation.

International Energy Finance
Study and application of energy finance in the international context, covering foreign exchange rates and markets, project finance, and the theory and practice of real options. The course focuses on problem solving and employs cases addressing a full range energy sector activity, including the petroleum and power.

Energy Analytics & the Digital Energy Enterprise
Study of the evolving discipline and practice of Big Data analytics in the energy industry, including discussion of contemporary business analytics principles and models employed in energy organizations and the move to increased use of digital and other automated technologies in corporate operations. Examples and cases from the oil, gas, and power sectors are presented.