

## ENERGY (ENRG)

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### **ENRG 4001 Energy Seminar (3 Credit Hours)**

The course will focus on the opportunities and challenges for businesses operating in a low carbon environment. What are the strategies that businesses will pursue and what are the consequences of those strategies? The course will examine California's strategy to reduce carbon output by fifty percent by 2030. How does that strategy affect the state's economy and energy companies such as Pacific Gas and Electric? Students will learn how to develop and apply these business strategies and others within the context of a case study involving Louisiana's attempt to reduce its carbon footprint. The course will feature speakers that are C-suite corporate executives, sustainability experts, and environmental advocacy experts.

### **ENRG 4100 Energy Mkts Econ & Policy (3 Credit Hours)**

The course covers a range of energy-related topics including major challenges and policy issues facing the industry, history of the industry, company profiles and strategies, energy economics, energy regulatory environment, energy markets, energy technology, and the environment and sustainable development. An executive speaker series is an integral component of the course. Students must complete a group paper and presentation as well as an individual paper on energy subject jointly agreed to by the professor and the student. Prerequisites: ECON 1020; sophomore standing or above

**Prerequisite(s):** ECON 1020, 1040, 1020, 1020, 1040, 1040 or 1040.

### **ENRG 4110 Energy Financial Modeling (3 Credit Hours)**

This course makes the connection between learning textbook Finance principles and solving real-world business problems. The course translates textbook Finance into a practical set of tools for solving actual business problems. The course focuses on applications in the Energy industry, with an emphasis on financial modeling of exploration and production (E&P) companies. The course provides students a patterned map for solving common financial models with spreadsheets. Class members will examine each model and the professor will guide each student, step-by-step, through the model and show how it can be solved in MS Excel. Areas covered include financial statement analysis, cash flow analysis, and valuation for E&P companies. The applications are particularly appropriate in equity research and investment banking for energy companies. The course will cover Visual Basic applications. Students must have a good grasp of Excel before taking this class. Prerequisites: FINE 3010, MGSC 3010

**Prerequisite(s):** FINE 3010 and (INFO 3010 or MGSC 3010).

### **ENRG 4200 Energy Fund & Trading (3 Credit Hours)**

This course will cover the fundamentals of energy production, transportation, refining and related marketing and trading activities. Structure of physical and financial markets, risk management practices, and portfolio modeling will be covered. The course will include interactive trading in the university's new state-of-the-art trading facility, which will focus on the futures market of the New York Mercantile Exchange (NYMEX) to test student developed trading strategies, mark-to-market models, options and risk management tactics used in today's fast-paced energy trading environment. Prerequisites: FINE 3010, MGSC 3010; junior standing or above

**Prerequisite(s):** (INFO 3010, 3010, MGSC 3010, ISPM 3010 or 3010) and (FINE 3010, 3010, FINC 3010 or 3010).

### **ENRG 4410 Special Topics (1-3 Credit Hours)**

This course provides an overview of the economic principles used in analyzing energy markets and environmental issues important to this sector. Students in this class will learn to apply fundamental tools of micro and macro-economics to study business and public policy issues involved in oil, natural gas, and electric industries including renewable energy sources. The course will cover the fundamentals of externalities in the energy industries and how to evaluate the impact of various environmental policies. They will evaluate incentives compatible mechanisms and efficient environmental regulation design. Students will study a numbers of industry specific cases and critically analyze typical problems in each industry. Students will apply economic reasoning to unravel popular fallacies and doomsday scenarios such as peak oil, fallacy of common-use resources, technical vs. economic potential of energy technologies, and others. Prerequisites: ECON 1010, ECON 1020; Corequisite: ENRG 4100

**Prerequisite(s):** (ECON 1010, 1010, 1010, 1010, 1030, 1030, 1030 or 1030) and (ECON 1020, 1020, 1020 or 1020) and ENRG 4100\*.

\* May be taken concurrently.

### **ENRG 4610 Enrg Trd: Elec Power Markets (3 Credit Hours)**

This course covers the fundamental concepts necessary to maintain and operate an efficient, wholesale electric power market. Through in-class simulations, students will apply concepts from operations management, economics, risk management, and negotiations to manage physical and financial power portfolios. Lecture topics will include deregulation/industry segmentation, security constrained economic dispatch (including unit commitment and scheduling), locational marginal pricing, resource development (including traditional thermal and renewable resources), and contract negotiation. Instructor-led case studies will review historic successes and failures of deregulated energy firms. Successful completion of this course will provide students with a firm understanding of electric power market operations and portfolio management. Prerequisites: ENRG 4100 or ENRG 4110 or ENRG 4120 or instructor approval

**Prerequisite(s):** ECON 1010 and FINE 3010.

**ENRG 4710 Energy Portfolio Management (3 Credit Hours)**

This course teaches students how to select and analyze companies in the Energy sector and use this knowledge to study and build investment portfolios of energy assets (an Energy sector fund). After taking this course, students should be able to apply to Energy stocks the same key investment concepts and theories that asset management professionals use. Students will learn how professional equity analysts value energy companies; be able to accurately calculate and interpret key quantitative values and evaluate energy assets; apply stock selection criteria to identify investments suitable for an energy sector fund; study and build portfolios using different energy assets and investment styles; and evaluate portfolios against benchmarks and other metrics, including expected return, risk, and other financial measures. Prerequisites: FINE 4110, FINE 4120

**ENRG 4730 Energy Investment Banking (3 Credit Hours)**

Energy Investment Banking is a course that is intended for those students who wish to be introduced to, learn about, and implement the concepts and methodologies of energy investment banking as currently practiced in the investment banking industry. It builds on the core Finance topics covered in Financial Management. The course will cover corporate financial strategy in the context of capital raising alternatives available to actual E&P and Oilfield Services companies that operate in the energy industry. It will also cover key concepts and methods of valuing energy companies, and analyzing, proposing, and completing financing for energy companies. The financing types that students will examine and thoroughly discuss will include initial public offerings, follow-on equity offerings, merger and acquisition engagements, long-term debt issuance, and strategic financial advisory services. Students will be required to develop, present, and discuss financing alternatives for selected companies operating in the energy space. Prerequisites: FINE 3010, MGSC 3010

**Prerequisite(s):** FINE 3010 and (INFO 3010 or MGSC 3010).

**ENRG 4880 Writing Intensive: ENRG 4100 (1 Credit Hour)****ENRG 4890 Service Learning: ENRG 4411 (0-1 Credit Hours)**

**Corequisite(s):** ENRG 4411.

**ENRG 4910 Independent Study (1-3 Credit Hours)****ENRG 5390 Junior Year Abroad (1-20 Credit Hours)****ENRG 6000 Intro to Energy Finance (3 Credit Hours)**

This course provides an introduction to the energy industry and energy finance. A team of faculty members lecture on various topics and supervise field trips to energy facilities in southern Louisiana. The course is taught in conjunction with ENRG 7110 Energy Modeling, and the two courses are coordinated to ensure that students have a good foundation in energy industry fundamentals and financial modeling and analysis. It also includes career development workshops to help students with their preparation for job searches. An Excel/VBA lab is a required component of the course.

**ENRG 7100 Energy Mkts, Inst & Pol (3 Credit Hours)**

This course covers a range of energy-related topics including major challenges and policy issues facing the industry, history and structure of the industry, company profiles and strategies, energy economics, energy markets, energy regulation, energy technology, and sustainable development. Faculty associated with the Tulane Energy Institute will lecture on the history, structure, and economics of the energy sector and its importance in the growth of modern economies. The course also includes a series of presentations by industry participants including energy economists, sell-side analysts, industry regulators, upstream oil and gas operators, midstream and downstream participants, as well as representatives of the myriad companies that provide services to the direct participants.

**ENRG 7110 Energy Modeling (3 Credit Hours)**

This course familiarizes students with the quantitative aspect of energy fundamentals and the use of computer modeling as a tool for analyzing and solving energy-related problems. It introduces company analysis, capital structure, valuation, and portfolio management. The course also acquaints students with the job roles of an equity analyst and the discipline of analyzing and forecasting a company's financials. The goal of the course is to provide students with the skill set necessary to analyze a company, understand its business and performance from both qualitative and quantitative perspectives, value the company, and evaluate that value relative to a peer group. The oil and gas industry, specifically the exploration and production (E&P) subsector is used as a medium to give students tangible experience in company analysis and financial modeling. The course considers the subject matter from both top-down and bottom-up approaches. The course focuses on the E&P sector to introduce students to macro-analysis, industry analysis, peer analysis, and company analysis. Students learn how to analyze the qualitative aspects of analysis in terms of news flow of an industry and the individual companies within it, and the quantitative aspects of an industry, i.e., valuation techniques and relative value analysis. Excel and VBA are the primary computer tools employed in the course. Students are expected to develop proficiency in the use of Excel and VBA.

**Prerequisite(s):** ENRG 6000\*, 6010, 7100 or 4100.

\* May be taken concurrently.

**ENRG 7120 Energy Data Analysis (3 Credit Hours)**

This course emphasizes the analysis of different forms of quantitative data in energy markets, energy production, demand, and supply. The course introduces various interpretive analytic approaches, explores their uses, and guides students in applying them to energy data. The danger of using quantitative methods lies in the lack of fundamental understanding of the justification for the use of a procedure, how to use it correctly, and how to properly interpret results. This course addresses these pitfalls. The course covers the process of extracting meaning from data to support evaluation and decision making by using modern spreadsheet technology such as Microsoft Excel. The class explores data sets from Thomson Reuters and LIM and covers their key technical charting tools, employs statistical thinking to provide understanding of the variation in data, and draws insights into relationships that may exist among underlying factors. The course also covers the basics of cash flow analysis and introduces the elements of financial data interpretation.

**Prerequisite(s):** ENRG 6000 or 7100.

**ENRG 7130 Energy & Environ Economics (3 Credit Hours)**

This course provides an overview of the economic principles used in analyzing energy markets and environmental issues important to this sector. Students in this class will learn to apply fundamental tools of micro and macro-economics to study business and public policy issues involved in the oil, natural gas, and electric industries including renewable energy sources. The course will also cover the fundamentals of externalities in the energy industries and how to evaluate the impact of various environmental policies. They will evaluate incentive compatible mechanism and efficient regulation design. The course goal is to have students critically analyze typical problems in the energy sector. They should be able to apply these skills and economic reasoning to unravel popular fallacies and doomsday scenarios such as peak oil, fallacy of common-use resources, and technical vs. economic potential of energy technologies.

**Prerequisite(s):** ENRG 6000 or 7100.

**ENRG 7200 Energy Fund & Trading (3 Credit Hours)**

This course covers the fundamental and technical information and techniques needed to begin trading in the energy markets. Structure of physical and financial markets, electronic trading tools and techniques, and the associated risk management practices are covered. The course includes interactive trading in the Freeman School's state-of-the-art trading room, which focuses on the futures market of the New York Mercantile Exchange (NYMEX) to test student-developed trading strategies, mark-to-market models, and risk management tactics used in today's fast-paced energy trading environment.

**ENRG 7210 Energy Acctng & Valuation (3 Credit Hours)**

This course covers the fundamentals of the oil and natural gas exploration and production process (E&P or upstream) and the key financial decisions and metrics. The various operational steps and related financial decisions are followed through to their ultimate impact to a public E&P company's external financial statements. Students are able to understand the immediate impact of various decisions on a company's cash and non-cash financial performance which in turn lead to future financial and operational flexibility and success.

**Prerequisite(s):** ENRG 6000 or ACCN 6050.

**ENRG 7220 Energy Accounting & Financing (3 Credit Hours)**

This course covers the fundamentals of the oil and natural gas exploration and production process (E&P or upstream) and the key financial decisions and metrics. The various operational steps and related financial decisions are followed through to their ultimate impact to a public E&P company's external financial statements. Students are able to understand the immediate impact of various decisions on a company's cash and non-cash financial performance which in turn lead to future financial and operational flexibility and success.

**ENRG 7300 Adv Energy Trading & Finance (3 Credit Hours)**

The course covers advanced energy trading techniques, including technical analysis, electronic trading algorithms, and the trading of energy derivatives. In addition, the course considers the use of energy derivatives in the area of energy finance, valuations, planning, credit and risk management, and interactive trading in the school's state-of-the-art trading facility.

**Prerequisite(s):** ENRG 7200.

**ENRG 7310 Adv Energy Trading & Finance (3 Credit Hours)**

The course covers advanced energy trading techniques, including technical analysis, electronic trading algorithms, and the trading of energy derivatives. In addition, the course considers the use of energy derivatives in the area of energy finance, valuations, planning, credit and risk management, and interactive trading in the school's state-of-the-art trading facility.

**ENRG 7500 Energy Risk Management (3 Credit Hours)**

The course balances both the qualitative and the quantitative aspects of the risk in energy markets. The course begins with a broad qualitative look at risk scenarios. For a qualitative perspective, the course draws heavily from Foundations of Energy Risk Management (FERM) and from Managing Energy Risk (MER). For the quantitative aspects such as forwards, MR Models and options, the course relies primarily on Energy and Power Risk Management (EPRM) and Energy Risk (ERVM). Topics covered include the economic impacts of pricing and investment decisions in these industries, privatization of publicly-owned energy assets, regulation of monopolies and antitrust, the transportation and storage of energy commodities, and the economics of renewable energy sources. Major policy trends related to energy production and use, such as deregulation, climate change, and environmental impacts, are critically analyzed. The course focuses on risk management applications from the perspective of an energy company.

**Prerequisite(s):** ENRG 7110.

**ENRG 7610 Trading: Wholesale Elec Mkts (3 Credit Hours)**

This course covers the fundamental concepts necessary to maintain and operate an efficient wholesale electric power market. Through in-class simulations, students will apply concepts from operations management, economics, risk management, and negotiations to manage physical and financial power portfolios. Lecture topics will include deregulation/industry segmentation, security constrained economic dispatch (including unit commitment and scheduling), locational marginal pricing, resource development (including traditional thermal and renewable resources), and contract negotiation. Instructor-led case studies will review historic successes and failures of deregulated energy firms. Successful completion of this course will provide students with a firm understanding of electric power market operations and portfolio management.

**ENRG 7730 Energy Investment Banking (3 Credit Hours)**

Energy Investment Banking is intended for students who wish to be introduced to, to learn about, and to implement the concepts and methodologies of energy investment banking as currently practiced in the investment banking industry. It builds on the core finance topics covered in financial management. Corporate financial strategy will be covered in the context of capital raising alternatives available to actual E&P and oilfield services companies operating in the energy industry. Concepts and methods of valuing energy companies and analyzing, proposing, and completing financing for energy companies will be covered. The financings that will be examined and thoroughly discussed include initial public offerings, follow-on equity offerings, merger and acquisition engagements, long-term debt issuance, and strategic financial advisory services. Students will be required to develop, present, and discuss financing alternatives for selected companies operating in the energy space.

**Prerequisite(s):** ENRG 7110, FINE 6020 or 6050.

**ENRG 7820 Energy Projects II (3 Credit Hours)**

Students work in teams on energy projects sponsored by faculty and energy industry executives. Each team is expected to analyze and research an energy industry issue and to prepare written project reports, presentations, or cases. The final project reports, presentations, and cases are evaluated by the project sponsors. This course is offered during the spring semester.

**Prerequisite(s):** ENRG 6000.

**ENRG 7920 Energy Seminar (3 Credit Hours)**

This course focuses on the role of sustainable development in energy use and its impact on the electric power industry. The first part of the class looks at what the trend of energy use means and how it might transition to a more sustainable pattern of use. The second part of the class provides an in-depth analysis of the power sector and how the demand for renewable power is changing the way the industry operates. Particular attention will be paid to alternative methods of dispatch, pricing, and regulatory strategies in ISO/RTO markets to better integrate renewable power. Students will gain exposure to current power industry developments including: generation and operation planning models, renewable mandates, transmission planning issues, smart grid devices, market rule differences among various power markets, and rate design for demand side programs. Students will research opportunities and challenges for sustainable development in energy use and present case studies in class.

**ENRG 7960 Independent Study (1-3 Credit Hours)**

Independent study: Energy.

**ENRG 8010 Energy Economics and Markets (3 Credit Hours)**

This course discusses global and national markets for oil, natural gas, coal, and renewable energy; examines public policies affecting energy markets including taxation, price regulation and deregulation, and investigates energy efficiency and energy security. Its objective is to help students to develop an understanding of the underlying economics of energy demand, energy supply, energy market structure, energy price mechanisms, and the relationships among energy and politics.

**ENRG 8020 Economics of Energy, Env & Mkt (3 Credit Hours)**

The curriculum is aimed to enable students to systematically grasp basic concepts, basic principles and basic analysis methods of climate economics, environmental economics, and energy economics. Keep abreast of the latest developments and major research directions in the current economics on energy, environment and climate change, new ideas, new methods and new dynamics in various relevant directions; develop the ability to solve practical problems to some extent, and lay a solid foundation for future research and innovation in the field of energy and environmental management.

**ENRG 8030 China Enrg System & Transition (3 Credit Hours)**

This course aims to help students understand the changing trends of the energy sector, the transformation of the energy system and the logic of the evolution of China's energy system by learning basic concepts, theories and methods of energy transition and energy systems. It also aims to provide the "big energy" system thinking and analytical framework for students to understand the trends of China's energy industry in the process of technological change and energy transition.