

# EMA - Energy Management

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## Energy Management: EMA

### Lower-Division Courses

### Upper-Division Courses

### Graduate Courses

#### EMA 180, 280. Seminar in Energy Management.

Meet with leading energy experts from industry and academia to discuss recent developments in technology, policy, law, and business. Conference course. For each hour of credit earned, the equivalent of one hour a week for one semester. May be repeated for credit. Prerequisite: Graduate standing.

#### EMA 182, 282, 382. Topics in Economics.

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing; additional prerequisites vary with the topic.

**Topic 1: Environmental Economics.** Explore economic theory and public policy as they apply to environmental problems. Includes the role of market failure in explaining the existence of pollution, alternative strategies for pollution control and environmental management, and global environmental issues.

**Topic 2: Managerial Economics.** Explore energy fundamentals through a detailed examination of the history, structure and functioning of the modern energy industry. Includes models of supply, demand, and transportation; market structure; game theoretic strategies and risk management; environmental issues; and policy and regulation.

**Topic 9: Advanced Economics.**

#### EMA 184, 284, 384. Topics in Finance.

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

**Topic 1: Energy Markets and Risk Management.** Study how firms manage their financial risk exposures and how they use derivative securities.

**Topic 2: Valuation.** Explore financial modeling, derivatives in corporate finance, business valuation, and value-based management.

**Topic 3: Investments.** Analyze the investment decision-making process, including asset allocation, security analysis, risk and expected return measurement, asset-pricing models, and international investment.

**Topic 4: Advanced Corporate Finance.** Investigate advanced corporate financial management in the global marketplace, including valuation concepts, optimal capital structure, risk management, corporate control and restructuring, and mergers and acquisitions.

**Topic 5: Private Equity Mergers and Acquisitions.** Examine the application of advanced corporate finance concepts in the private equity markets and mergers and acquisitions.

**Topic 6: Energy and Environmental Markets.** Explore the business and public policy issues that these changes have raised in energy markets, and in the environmental markets to which they are closely tied using tools from economics and finance. Includes the development the political economy of deregulation, the environmental impacts and policies related to energy production and use, market power and

antitrust in energy and environmental markets, and the transportation and storage of energy commodities.

#### Topic 7: Environmental, Social, and Governance Investments.

Explore a conceptual and theoretical foundation for corporate ESG (Environmental, Social and Governance) policies and actions and investors' preferences regarding such policies and actions including how such policies and actions affect firm performance and investor reactions.

**Topic 8: Corporate Finance.** Explore principles of finance, with application to all aspects of the energy firm; particular attention to cost of capital, investment decisions, management of assets, and procurement of funds.

**Topic 9: Advanced Finance.**

#### EMA 186, 286, 386. Topics in Accounting.

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

**Topic 1: Financial Accounting.** Explore transaction analysis, financial statement preparation, and analysis of financial statements.

**Topic 2: Cost Accounting.** Analyze manufacturing costs, and explore the development of cost estimates and preparation of relevant information for management decision making.

**Topic 3: Tax Accounting.** Introduction to the role of taxes in contemporary society and their impact on individuals and business entities, with an emphasis on federal income taxation.

**Topic 4: Environmental Accounting.** Explore the pursuit of the goal of sustainability. Investigate how corporate and government leaders must manage companies and economies in terms of balancing and optimizing the triple bottom line of social, environmental, and economic impacts.

**Topic 5: Oil and Gas Accounting.** Introduction to oil and gas accounting for upstream operations related to exploration and development of oil and gas. Includes accounting principles and procedures for exploration, acquisition, drilling, development and production costs in different phases when searching for producing oil and gas.

**Topic 6: Energy Accounting.** Introduction to accounting for the energy industry. Includes accounting principles and procedures for exploration, acquisition, construction, development and production costs in different phases for a producer of electricity or oil and gas.

**Topic 7: Intermediate Accounting.**

**Topic 9: Advanced Accounting.**

#### EMA 188, 288, 388. Topics in Management.

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

**Topic 1: Negotiations.** Explore the theories, processes, and practical techniques of negotiation to successfully negotiate and resolve disputes in a variety of situations including interpersonal, group, and international settings. Examine influence and conflict resolution strategies; identify interests, issues, and positions of the parties involved; analyze co-negotiators, their negotiation styles, and the negotiation situations; and manage the dynamics associated with most negotiations.

**Topic 2: Entrepreneurship.** Identify innovations and market opportunities. Explore how to write a business plan, obtain funding, and launch a new company.

**Topic 3: Creating and Managing Human Capital.** Investigate issues related to making human resource decisions in a more effective manner. Explore a strategic perspective, with particular emphasis on the links between human resource decisions and a firm's competitive position.

**Topic 4: Strategy.** Analyze business situations from the point of view of the practicing general manager. Address key tasks involved in general management, including strategic decisions that ensure the long-term health of the entire firm or a major division.

**Topic 9: Advanced Strategy.**

### **EMA 190, 290, 390. Topics in Quantitative Analysis.**

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate Standing.

**Topic 1: Decision Analysis.** Study decision-making under risk and with multiple criteria. Focus on strategic decisions and operational decisions using decision trees, simulation and other quantitative tools.

**Topic 2: Supply Chain.** Investigate the operations or production functions, and the skills required for analyzing and solving related problems.

**Topic 3: Project Management.** Explore project management through a proven framework for leading and directing projects and teams to deliver project results within constraints such as schedule, budget, and available resources.

**Topic 4: Getting Product to Market and Trading.** Provide students a basic understanding of the various aspects of the energy supply chain covering the crude oil, natural gas and electric power supply chains with a focus on how energy products are transported from where they are produced to their ultimate markets.

**Topic 5: Optimization.** Frame, formulate, and apply quantitative optimization and descriptive models to management decisions, using spreadsheets and other software.

**Topic 6: Information Technology.** Explore the in-depth treatment of business data processing concerns such as database management, telecommunications, and the development of commercial systems.

**Topic 7: Analytics.** Investigate methods used to model and analyze data. Explore regression models and time-series models and their application in the area of energy.

**Topic 8: Operations and Supply Chain.** Investigate the operations or production functions, and the skills required for analyzing and solving related problems. Explore the use of developed predictive dynamic models in operations planning and operations decision making.

**Topic 9: Advanced Analytics.**

### **EMA 192, 292, 392. Topics in Marketing.**

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

**Topic 1: Energy Consumer Behavior.** Examine the acquisition and consumption of goods, services, time, and ideas by individuals and groups in the energy industry, including normative and descriptive theories.

**Topic 2: Consumer Analysis.** Introduction to the data and tools used to analyze the business environment and enable marketing decision making. Use real-world data and problems to evaluate strategic market opportunities and assess the impact of marketing decisions in the marketplace.

### **EMA 194, 294, 394. Topics in Law.**

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

**Topic 1: Law and Agreements.** Explore contracts and transfers by oil and gas lessees such as assignments, farmouts, operating agreements, purchase and sale agreements, and master service agreements. Consider the oil and gas development on federal, state,

and American Indian lands as well as environmental regulation of the petroleum industry.

**Topic 2: Real Estate Law and Contracts.** Explore the legal framework of commercial real estate finance and development, including basic real estate law concepts, legal aspects of financing techniques and instruments, subdivision land-use controls, and the environmental regulation of real estate development.

**Topic 3: Domestic Petroleum Transactions.** Explore the practical aspects of the U.S. oil and gas legal regime, focusing on the relationship between energy companies and regulatory authorities. Investigate bankruptcy, energy finance, and land use control, as well as purchase of domestic oil and gas assets by foreigners.

**Topic 4: International Petroleum Transactions.** Explore international petroleum transactions in the context of a single industry. Includes the various participants and transactions that take place at each stage of the industry, from acquisition of development rights through exploration and production to transportation and marketing.

**Topic 5: Environmental Law.** Introduction to environmental thinking in the context of scarce publicly and privately owned natural resources. Explore the public trust doctrine, relevance of the Tenth Amendment to environmental protection, the National Endowment Policy Act, the Endangered Species Act, and the Fish and Wildlife Coordination Act.

**Topic 6: Law and Policy.** An introduction to the legal and regulatory regimes governing the energy industry, as well as the important economic and political concerns that underlie the regulation of the production and sale of energy.

**Topic 9: Advanced Law.**

### **EMA 196, 296, 396. Topics in Engineering and Science.**

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

**Topic 1: Oil and Gas Capstone.** Reinforce the interdisciplinary nature of developing petroleum assets. Includes the key stages of project development, such as: acquisition, exploration, development, production, abandonment, and exit.

**Topic 2: Electricity Capstone.** Reinforce the interdisciplinary nature of developing electricity generation assets. Explore the key stages of project development, including site selection, life-cycle analysis, due diligence, permitting, contracting, and financing.

**Topic 3: Energy Technology and Policy.** Explore the understanding of the broad context of energy production and consumption in the U.S. and the world. Discuss past energy trends and fundamentals of energy and power, including fossil fuels and renewable energy sources and technologies. Explore different energy resources, environmental impacts, and societal uses of energy. Evaluate future energy technology options.

**Topic 4: Electricity Systems.** Explore the locational marginal pricing (or nodal) model of organized or centralized day-ahead and real-time electricity markets. Investigate the solution of power flow, formulate optimal dispatch as an optimization problem, consider offer-based economic dispatch, transmission and unit commitment issues. Discuss pricing rules and incentives in markets, particularly in the context of transmission limits. Examine energy and transmission price risk hedging, network models, and capacity adequacy.

**Topic 5: Petroleum Systems.** Introduction to the petroleum system, including source rocks and reservoirs, maturation and migration of hydrocarbons, traps and seals, rock properties, basin, play and prospect risking and assessment and tools for subsurface analysis (wells and seismic) for nontechnical personnel. Examine prospecting strategies and leasing.

**Topic 6: Petroleum Engineering.** Introduction to drilling, reservoir engineering, surface facilities and processing, pipelines, and project abandonment for nontechnical personnel.

**Topic 7: Energy Networks.** Introduction to analysis, design and management of complex integrated systems typically in midstream oil and gas processes and electric grids.

**Topic 8: Advanced Electricity Systems.**

**Topic 9: Advanced Petroleum Systems.**

**Topic 10: Technology and Policy.** Investigate the broad context of energy production and consumption in the U.S. and the world. Discuss past energy trends and fundamentals of energy and power, including fossil fuels and renewable energy sources and technologies. Explore different energy resources, environmental impacts, and societal uses of energy, and evaluate future energy technology options.

**Topic 11: Financial Strategies for Energy Firms.** Perform an integrated analysis of the interaction between the investment and operating policies of a corporation and its financial strategies, with special emphasis on firms in the energy industry.

### **EMA 197, 297, 397. Advanced Energy Management.**

Focus on the economics, strategy, business valuation, technology, science, policy and finance specific to the energy industry. For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit. Prerequisite: Graduate standing and consent of instructor.

## **Professional Courses**