

Economics and Business

Program Description

The economy is becoming increasingly global and dependent on advanced technology. In such a world, private companies and public organizations need leaders and managers who understand economics and business, as well as science and technology.

Programs in the Division of Economics and Business are designed to bridge the gap that often exists between economists and managers, on the one hand, and engineers and scientists, on the other. All Mines undergraduate students are introduced to economic principles in a required course, and many pursue additional course work in minor programs or elective courses. The courses introduce undergraduate students to economic and business principles so that they will understand the economic and business environments, both national and global, in which they will work and live.

In keeping with the mission of the Colorado School of Mines, the Division of Economics and Business offers a Bachelor of Science in Economics. Most economics degrees at other universities are awarded as a Bachelor of Arts, with a strong liberal arts component. Our degree is grounded in mathematics, engineering and the sciences. We graduate technologically literate economists with quantitative economics and business skills that give them a competitive advantage in today's economy.

Economics majors have a range of career options following their undergraduate studies. Some pursue graduate degrees in economics, business, or law. Others begin careers as managers, economic advisors, and financial officers in business or government, often in organizations that deal with engineering, applied science, and advanced technology.

Program Educational Objectives (Bachelor of Science in Economics)

In addition to contributing toward achieving the educational objectives described in the CSM Graduate Profile and the ABET Accreditation Criteria, the educational objectives of the undergraduate program in economics and business are:

1. To provide students with a strong foundation in economic theory and analytical techniques, taking advantage of the mathematical and quantitative abilities of CSM undergraduate students; and
2. To prepare students for the work force, especially in organizations in CSM's areas of traditional strength (engineering, applied science, mathematics and computer science), and for graduate school, especially in economics, business, and law.

Curriculum

All economics majors take forty-five percent of their courses in math, science, and engineering, including the same core required of all CSM undergraduates. Students take another forty percent of their courses in economics and business. The remaining fifteen percent of the course work can come from any field. Many students complete minor programs in a technical field, such as computer science, engineering, geology or environmental science. A number of students pursue double majors.

To complete the economics major, students must take 45 hours of 300 and 400 level economics and business courses. Of these, 18 hours

must be at the 400 level. At least 30 of the required 45 hours must be taken in residence in the home department. For students participating in an approved foreign study program, up to 19 hours of the 30 hours in residence requirement may be taken abroad.

Degree Requirements in Economics

Freshman

Fall		lec	lab	sem.hrs
DIST SCI	Distributed Science*	4.0		4.0
MATH111	CALCULUS FOR SCIENTISTS AND ENGINEERS I	4.0		4.0
CHGN121	PRINCIPLES OF CHEMISTRY I	3.0	3.0	4.0
CSM101	FRESHMAN SUCCESS SEMINAR	0.5		0.5
EDNS151	DESIGN I			3.0
PAGN	PHYSICAL ACTIVITY COURSE			0.5
Elective				
				16.0

Spring		lec	lab	sem.hrs
PHGN100	PHYSICS I - MECHANICS	4.5		4.5
MATH112	CALCULUS FOR SCIENTISTS AND ENGINEERS II	4.0		4.0
CSCI101	INTRODUCTION TO COMPUTER SCIENCE	3.0		3.0
HASS100	NATURE AND HUMAN VALUES			4.0
PAGN	PHYSICAL ACTIVITY COURSE			0.5
Elective				
				16.0

Sophomore

Fall		lec	lab	sem.hrs
EBGN201	PRINCIPLES OF ECONOMICS	3.0		3.0
MATH213	CALCULUS FOR SCIENTISTS AND ENGINEERS III	4.0		4.0
HASS200	GLOBAL STUDIES			3.0
FREE	Free Elective	3.0		3.0
PAGN	PHYSICAL ACTIVITY COURSE			0.5
Elective				
				13.5

Spring		lec	lab	sem.hrs
EBGN301	INTERMEDIATE MICROECONOMICS	3.0		3.0
MATH201	PROBABILITY AND STATISTICS FOR ENGINEERS	3.0		3.0
MATH225	DIFFERENTIAL EQUATIONS	3.0		3.0
FREE	Free Elective			3.0
EBGN	EBGN Elective I**	3.0		3.0
PAGN	PHYSICAL ACTIVITY COURSE			0.5
Elective				
				15.5

Junior

Fall		lec	lab	sem.hrs
EBGN302	INTERMEDIATE MACROECONOMICS	3.0		3.0
EBGN425	BUSINESS ANALYTICS			3.0

EBGN	EBGN Elective II**	3.0		3.0
ELECTIVE	HUMANITIES & SOCIAL SCIENCE (H&SS) Mid-Level Restricted Elective	3.0		3.0
FREE	Free Elective	3.0		3.0
				15.0
Spring		lec	lab	sem.hrs
EBGN303	ECONOMETRICS	3.0		3.0
EBGN321	ENGINEERING ECONOMICS	3.0		3.0
EBGN409	MATHEMATICAL ECONOMICS*** or EBGN Elective III**	3.0		3.0
ELECTIVE	HUMANITIES & SOCIAL SCIENCE (H&SS) Mid-Level Restricted Elective	3.0		3.0
FREE	Free Elective	3.0		3.0
				15.0
Summer		lec	lab	sem.hrs
EBGN403	FIELD SESSION	3.0		3.0
				3.0
Senior				
Fall		lec	lab	sem.hrs
EBGN401	ADVANCED TOPICS IN ECONOMICS	3.0		3.0
EBGN455	LINEAR PROGRAMMING*** or EBGN Elective III**	3.0		3.0
ELECTIVE	HUMANITIES & SOCIAL SCIENCE (H&SS) 400-Level Restricted Elective	3.0		3.0
EBGN	EBGN Elective IV**	3.0		3.0
FREE	Free Elective	3.0		3.0
				15.0
Spring		lec	lab	sem.hrs
EBGN	EBGN Elective V**	3.0		3.0
EBGN	EBGN Elective VI**	3.0		3.0
EBGN	EBGN Elective VII**	3.0		3.0
FREE	Free Electives	3.0		3.0
FREE	Free Electives	3.0		3.0
				15.0

Total Semester Hrs: 124.0

* Students in all degree options (majors) are required to complete a minimum of three out of five courses from the list of Distributed Science Requirements. For Economics Majors, students must take CSC1101 and MATH201 and one of the following: CBEN110, GEGN101, PHGN200, CHGN122, or CHGN125.

** At least 2 EBGN elective courses must be at the 400-level or above.

*** Students must take either EBGN409 or EBGN455.

Major GPA

During the 2016-2017 Academic Year, the Undergraduate Council considered the policy concerning required major GPAs and which courses are included in each degree's GPA. While the GPA policy has not been officially updated, in order to provide transparency, council

members agreed that publishing the courses included in each degree's GPA is beneficial to students.

The following list details the courses that are included in the GPA for this degree:

- EBGN100 through EBGN599 inclusive

The Mines guidelines for Minor/ASI (catalog.mines.edu/undergraduate/undergraduateinformation/minorasi/) can be found in the Undergraduate Information (catalog.mines.edu/undergraduate/undergraduateinformation/) section of the Mines Catalog (catalog.mines.edu/undergraduate/).

Minor Program in Economics

The minor in Economics requires that students complete 6 courses from the Division of Economics and Business, for a total of 18.0 credit hours. Minors are required to take Principles of Economics (EBGN201) and either Intermediate Microeconomics (EBGN301) or Intermediate Macroeconomics (EBGN302). Students must complete 4 additional EBGN courses. Up to 9 of the 18 hours required for the Economics minor may be used for other degree requirements including Humanities & Social Science (H&SS) electives. At least 9.0 of the hours required for the Economics minor must not be used for any part of the degree other than Free Electives.

Program Requirements:

EBGN201	PRINCIPLES OF ECONOMICS	3.0
EBGN301	INTERMEDIATE MICROECONOMICS	3.0
or EBGN302	INTERMEDIATE MACROECONOMICS	
EBGNXXX	Economics Electives	12.0
Total Semester Hrs		18.0

Minor in Business and Entrepreneurship

The Minor in Business and Entrepreneurship provides the opportunity for students to gain skills and knowledge in business and entrepreneurship. The minor requires that students complete 6 business courses for a total of 18.0 credit hours. Requirements as follows:

Required		
EBGN201	PRINCIPLES OF ECONOMICS	3.0
EBGN321	ENGINEERING ECONOMICS	3.0
Select 4 of the following:		
EBGN304	PERSONAL FINANCE	3.0
EBGN345	PRINCIPLES OF CORPORATE FINANCE	3.0
EBGN346	INTRODUCTION TO INVESTMENTS	3.0
EBGN360	INTRODUCTION TO ENTREPRENEURSHIP	3.0
EBGN425	BUSINESS ANALYTICS	3.0
EBGN460	BUSINESS MODEL DEVELOPMENT	3.0
EBGN485	BUSINESS STRATEGY	3.0

At least 9.0 of the hours required for the Business and Entrepreneurship minor must not be used for any part of the degree other than Free Electives.

Area of Special Interest in Economics

The area of special interest in Economics requires that students complete Principles of Economics (EBGN201) and 3 other EBGN courses for a total of 12 credit hours. Except for Principles of Economics (EBGN201),

EBGN courses taken to complete the ASI in Economics must not be used for any part of the degree other than Free Electives.

EBGN201	PRINCIPLES OF ECONOMICS	3.0
EBGNXXX	Economics Electives	9.0
Total Semester Hrs		12.0

Area of Special Interest in Entrepreneurship

The objective of the Area of Special Interest in Entrepreneurship is to supplement an engineering or applied science education with tools and processes to recognize and evaluate entrepreneurial opportunities.

These tools include financial forecasting, business models and the interrelationships of business functions including accounting, marketing, finance, human resources and operations. The processes include developing feasibility studies and business plans.

The area of Special Interest in Entrepreneurship requires that students complete Principles of Economics (EBGN201), Introduction to Entrepreneurship (EBGN360), Business Model Development (EBGN460), and one additional business course for a total of 12 credit hours.

EBGN201	PRINCIPLES OF ECONOMICS	3.0
EBGN360	INTRODUCTION TO ENTREPRENEURSHIP	3.0
EBGN460	BUSINESS MODEL DEVELOPMENT	3.0
Select 1 of the following:		
EBGN304	PERSONAL FINANCE	3.0
EBGN321	ENGINEERING ECONOMICS	3.0
EBGN345	PRINCIPLES OF CORPORATE FINANCE	3.0
EBGN346	INTRODUCTION TO INVESTMENTS	3.0
EBGN425	BUSINESS ANALYTICS	3.0
EBGN485	BUSINESS STRATEGY	3.0

Courses

EBGN198. SPECIAL TOPICS IN ECONOMICS AND BUSINESS. 1-6 Semester Hr.

(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

EBGN199. INDEPENDENT STUDY. 0.5-6 Semester Hr.

(I, II) Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Prerequisite: ?Independent Study? form must be completed and submitted to the Registrar. Variable credit; 1 to 6 credit hours. Repeatable for credit.

EBGN201. PRINCIPLES OF ECONOMICS. 3.0 Semester Hrs.

(I,II,S) Introduction to microeconomics and macroeconomics. This course focuses on applying the economic way of thinking and basic tools of economic analysis. Economic effects of public policies. Analysis of markets for goods, services and resources. Tools of cost-benefit analysis. Measures of overall economic activity. Determinants of economic growth. Monetary and fiscal policy. Prerequisites: None. 3 hours lecture; 3 semester hours.

EBGN298. SPECIAL TOPICS IN ECONOMICS AND BUSINESS. 1-6 Semester Hr.

(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

EBGN299. INDEPENDENT STUDY. 1-6 Semester Hr.

(I, II) Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Prerequisite: ?Independent Study? form must be completed and submitted to the Registrar. Variable credit; 1 to 6 credit hours. Repeatable for credit.

EBGN301. INTERMEDIATE MICROECONOMICS. 3.0 Semester Hrs.

Equivalent with EBGN411,
This course introduces the theoretical and analytical foundations of microeconomics and applies these models to the decisions and interactions of consumers, producers and governments. Develops and applies models of consumer choice and production with a focus on general equilibrium results for competitive markets. Examines the effects of market power and market failures on prices, allocation of resources and social welfare. Prerequisite: EBGN201 and MATH213.

EBGN302. INTERMEDIATE MACROECONOMICS. 3.0 Semester Hrs.

Equivalent with EBGN412,
Intermediate macroeconomics provides a foundation for analyzing both short-run and long-run economic performance across countries and over time. The course discusses macroeconomic data analysis (including national income and balance of payments accounting), economic fluctuations and the potentially stabilizing roles of monetary, fiscal and exchange rates policies, the role of expectations and intertemporal considerations, and the determinants of long-run growth. The effects of external and internal shocks (such as oil price shocks, resource booms and busts) are analyzed. Prerequisite: EBGN201 and MATH213.

EBGN303. ECONOMETRICS. 3.0 Semester Hrs.

Equivalent with EBGN390,
Introduction to econometrics, including ordinary least-squares and single- equation models; two-stage least-squares and multiple-equation models; specification error, serial correlation, heteroskedasticity, and other problems; distributive-lag models and other extensions, hypothesis testing and forecasting applications. Prerequisite: EBGN201 and MATH201.

EBGN304. PERSONAL FINANCE. 3.0 Semester Hrs.

The management of household and personal finances. Overview of financial concepts with special emphasis on their application to issues faced by individuals and households: budget management, taxes, savings, housing and other major acquisitions, borrowing, insurance, investments, meeting retirement goals, and estate planning. Survey of principles and techniques for the management of a household's assets and liabilities. Study of financial institutions and their relationship to households, along with a discussion of financial instruments commonly held by individuals and families.

EBGN305. FINANCIAL ACCOUNTING. 3.0 Semester Hrs.

Survey and evaluation of balance sheets and income and expense statements, origin and purpose. Evaluation of depreciation, depletion, and reserve methods for tax and internal management purposes. Cash flow analysis in relation to planning and -decision making. Inventory methods and cost controls related to dynamics of production and processing. Prerequisite: EBGN201.

EBGN306. MANAGERIAL ACCOUNTING. 3.0 Semester Hrs.

Introduction to cost concepts and principles of management accounting including cost accounting. The course focuses on activities that create value for customers and owners of a company and demonstrates how to generate cost-accounting information to be used in management decision making. Prerequisite: EBGN201, EBGN305.

EBGN310. ENVIRONMENTAL AND RESOURCE ECONOMICS. 3.0 Semester Hrs.

(I) (WI) Application of microeconomic theory to topics in environmental and resource economics. Topics include analysis of pollution control, benefit/cost analysis in decision-making and the associated problems of measuring benefits and costs, non-renewable resource extraction, measures of resource scarcity, renewable resource management, environmental justice, sustainability, and the analysis of environmental regulations and resource policies. Prerequisite: EBGN201. 3 hours lecture; 3 semester hours.

EBGN315. THE ECONOMICS OF STRATEGY. 3.0 Semester Hrs.

An introduction to game theory and industrial organization (IO) principles at a practical and applied level. Topics include economies of scale and scope, the economics of the make-versus-buy decision, market structure and entry, dynamic pricing rivalry, strategic positioning, and the economics of organizational design. Prerequisite: EBGN201.

EBGN320. ECONOMICS AND TECHNOLOGY. 3.0 Semester Hrs.

(II) The theoretical, empirical and policy aspects of the economics of technology and technological change. Topics include the economics of research and development, inventions and patenting, the Internet, e-commerce, and incentives for efficient implementation of technology. Prerequisite: EBGN201. 3 hours lecture; 3 semester hours.

EBGN321. ENGINEERING ECONOMICS. 3.0 Semester Hrs.

Equivalent with CHEN421,

Time value of money concepts of present worth, future worth, annual worth, rate of return and break-even analysis applied to after-tax economic analysis of mineral, petroleum and general investments. Related topics on proper handling of (1) inflation and escalation, (2) leverage (borrowed money), (3) risk adjustment of analysis using expected value concepts, (4) mutually exclusive alternative analysis and service producing alternatives. Prerequisite: EBGN201.

EBGN330. ENERGY ECONOMICS. 3.0 Semester Hrs.

Equivalent with ENGY330,

Study of economic theories of optimal resource extraction, market power, market failure, regulation, deregulation, technological change and resource scarcity. Economic tools used to analyze OPEC, energy mergers, natural gas price controls and deregulation, electric utility restructuring, energy taxes, environmental impacts of energy use, government R&D programs, and other energy topics. Prerequisite: EBGN201.

EBGN340. ENERGY AND ENVIRONMENTAL POLICY. 3.0 Semester Hrs.

This course considers the intersection of energy and environmental policy from an economic perspective. Policy issues addressed include climate change, renewable resources, externalities of energy use, transportation, and economic development and sustainability. Prerequisites: EBGN201. 3 hours lecture; 3 semester hours.

EBGN345. PRINCIPLES OF CORPORATE FINANCE. 3.0 Semester Hrs.

(II) Introduction to corporate finance, financial management, and financial markets. Time value of money and discounted cash flow valuation, risk and returns, interest rates, bond and stock valuation, capital budgeting and financing decisions. Introduction to financial engineering and financial risk management, derivatives, and hedging with derivatives. Prerequisite: EBGN201. 3 hours lecture; 3 semester hours.

EBGN346. INTRODUCTION TO INVESTMENTS. 3.0 Semester Hrs.

This course is an introduction to the principles of investment in competitive financial markets. The course will provide an overview to: 1) the structure of capital markets, 2) theories and practice of portfolio construction and management, 3) asset pricing theories used to analyze securities, 4) equity and debt securities, and 4) derivative instruments. 3 hours lecture; 3 semester hours. Prerequisite: EBGN201.

EBGN360. INTRODUCTION TO ENTREPRENEURSHIP. 3.0 Semester Hrs.

This course introduces students to the entrepreneurial process, focusing on the concepts, practices, and tools of the entrepreneurial world. This will be accomplished through a combination of readings, cases, speakers, and projects designed to convey the unique environment of entrepreneurship and new ventures. The mastery of concepts covered in this course will lead to an initial evaluation of new venture ideas. In this course students will interact with entrepreneurs, participate in class discussion, and be active participants in the teaching/learning process. 3 hours lecture; 3 semester hours.

EBGN398. SPECIAL TOPICS IN ECONOMICS AND BUSINESS. 1-6 Semester Hr.

(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

EBGN399. INDEPENDENT STUDY. 1-6 Semester Hr.

(I, II) Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Prerequisite: ?Independent Study? form must be completed and submitted to the Registrar. Variable credit; 1 to 6 credit hours. Repeatable for credit.

EBGN401. ADVANCED TOPICS IN ECONOMICS. 3.0 Semester Hrs.

(I) Application of economic theory to microeconomic and macroeconomic problems. This course will involve both theoretical and empirical modeling. Specific topics will vary by semester depending on faculty and student interest. Topics may include general equilibrium modeling, computational economics, game theory, the economics of information, intertemporal allocations, economic growth, microfoundations of macroeconomic models and policy simulation. Prerequisites: EBGN301, EBGN302 and EBGN303. 3 hours lecture; 3 semester hours.

EBGN403. FIELD SESSION. 3.0 Semester Hrs.

Equivalent with EBGN402,

An applied course for students majoring in economics. The field session may consist of either participation in a computer simulation or an independent research project under the supervision of a faculty member. In the computer simulation, students work as part of the senior executive team of a company and are responsible for developing and executing a strategy for their company with on-going decisions on everything from new product development, to marketing, to finance and accounting. Prerequisite: EBGN301, EBGN302, EBGN303.

EBGN409. MATHEMATICAL ECONOMICS. 3.0 Semester Hrs.

Application of mathematical tools to economic problems. Coverage of mathematics needed to read published economic literature and to do graduate study in economics. Topics from differential and integral calculus, matrix algebra, differential equations, and dynamic programming. Applications are taken from mineral, energy, and environmental issues, requiring both analytical and computer solutions using programs such as GAMS and MATHEMATICA. Prerequisite: MATH213, EBG301, EBG302.

EBGN425. BUSINESS ANALYTICS. 3.0 Semester Hrs.

With the increasing availability of large volumes of raw business data, the process of converting it into meaningful insights has become critical for organizations to stay competitive. Driven by massive volumes of business data, business analytics has become instrumental in unveiling such managerial practices which guide the decision making process in companies at every operational stage. This course includes various descriptive, predictive and prescriptive business analytics strategies. It provides fundamental skills using quantitative tools to organize, process, and critically interpret business data, as well as key concepts in quantitative decision making to model and solve real-world problems. Prerequisite: EBG201, MATH112.

EBGN430. ADVANCED ENERGY ECONOMICS. 3.0 Semester Hrs.

(I) (WI) Application of economic models to understand markets for oil, gas, coal, electricity, and renewable energy resources. Models, modeling techniques and applications include market structure, energy efficiency, demand-side management, energy policy and regulation. The emphasis in the course is on the development of appropriate models and their application to current issues in energy markets. Prerequisites: EBG301, EBG330. 3 hours lecture; 3 semester hours.

EBGN434. PROPERTY RIGHTS AND NATURAL RESOURCES. 3.0 Semester Hrs.

When choosing how to allocate our scarce resources, institutions serve as constraints at any given time. Over time, these institutions form and evolve when it appears profitable to do so. This course focuses on the North American story of resource use and draws on economics, law, and history to understand those processes and their implications. The course will provide a framework to understand why certain institutions were adopted and how they now shape our economic decisions today. Prerequisite: EBG201.

EBGN437. REGIONAL ECONOMICS. 3.0 Semester Hrs.

(II) (WI) Analysis of the spatial dimension of economies and economic decisions. Interregional capital and labor mobility. Location decisions of firms and households. Agglomeration economies. Models of regional economic growth. Measuring and forecasting economic impact and regional growth. Local and regional economic development policy. Urban and regional spatial structure. Emphasis on application of tools and techniques of regional analysis. Prerequisite: EBG301 or EBG302. 3 hours lecture; 3 semester hours.

EBGN441. INTERNATIONAL ECONOMICS. 3.0 Semester Hrs.

Theories and determinants of international trade, including static and dynamic comparative advantage and the gains from trade. The history of arguments for and against free trade. The political economy of trade policy in both developing and developed countries. Prerequisite: EBG301.

EBGN443. PUBLIC ECONOMICS. 3.0 Semester Hrs.

This course covers public-sector economics, including the fundamental institutions and relationships between the government and private decision makers. It covers the fundamental general equilibrium welfare theorems and their interaction with government policy instruments that affect efficiency and distribution. Normative topics include an intensive study of the causes and consequences of, and policy prescriptions for, market failure due to public goods, or other problems associated with externalities and income distribution. Positive analysis focuses on policy formation in the context of political economy and public choice theories. Prerequisite: EBG301.

EBGN455. LINEAR PROGRAMMING. 3.0 Semester Hrs.

This course addresses the formulation of linear programming models, examines linear programs in two dimensions, covers standard form and other basics essential to understanding the Simplex method, the Simplex method itself, duality theory, complementary slackness conditions, and sensitivity analysis. As time permits, multi-objective programming, an introduction to linear integer programming, and the interior point method are introduced. Applications of linear programming models discussed in this course include, but are not limited to, the areas of manufacturing, finance, energy, mining, transportation and logistics, and the military. Prerequisite: MATH332 or MATH348 or EBG409.

EBGN459. SUPPLY CHAIN MANAGEMENT. 3.0 Semester Hrs.

As a quantitative managerial course, the course will explore how firms can better organize their operations so that they more effectively align their supply with the demand for their products and services. Supply Chain Management (SCM) is concerned with the efficient integration of suppliers, factories, warehouses and retail-stores (or other forms of distribution channels) so that products are provided to customers in the right quantity and at the right time. Topics include managing economies of scale for functional products, managing market-mediation costs for innovative products, make-to order versus make-to-stock systems, quick response strategies, risk pooling strategies, supply-chain contracts and revenue management. Additional "special topics" will also be introduced, such as reverse logistics issues in the supply-chain or contemporary operational and financial hedging strategies. Prerequisite: None.

EBGN460. BUSINESS MODEL DEVELOPMENT. 3.0 Semester Hrs.

(II) This course leads students through the process of developing and validating a business model for an innovative product or service by a start-up or an established organization. The creation of a business model can be challenging, frustrating, fascinating and fulfilling. Building on skills learned in EBG360, students explore ways to sustain and scale a promising new product or service in any context: commercial/for-profit, social/non-profit or government. It is an iterative process that involves uncovering beneficiary needs and leads to an in-depth understanding of how value is delivered, differentiated and captured. Students work in teams since new ventures are started by teams with complementary skills and a shared purpose. This is a demanding, hands-on course that integrates knowledge from entrepreneurship, business, economics and engineering classes. Students are expected to initiate and drive an intense beneficiary discovery process that involves reaching out to beneficiaries and engaging them outside class. Prerequisite: EBG360. 3 hours lecture; 3 semester hours.

EBGN461. STOCHASTIC MODELS IN MANAGEMENT SCIENCE. 3.0 Semester Hrs.

As a quantitative managerial course, the course is an introduction to the use of probability models for analyzing risks and economic decisions and doing performance analysis for dynamic systems. The difficulties of making decisions under uncertainty are familiar to everyone. We will learn models that help us quantitatively analyze uncertainty and how to use related software packages for managerial decision-making and to do optimization under uncertainty. Illustrative examples will be drawn from many fields including marketing, finance, production, logistics and distribution, energy and mining. The main focus of the course is to see methodologies that help to quantify the dynamic relationships of sequences of "random" events that evolve over time.

EBGN470. ENVIRONMENTAL ECONOMICS. 3.0 Semester Hrs.

(II) (WI) This course considers the role of markets as they relate to the environment. Topics discussed include environmental policy and economic incentives, market and non-market approaches to pollution regulation, property rights and the environment, the use of benefit/cost analysis in environmental policy decisions, and methods for measuring environmental and nonmarket values. Prerequisite: EBG301. 3 hours lecture; 3 semester hours.

EBGN474. INVENTING, PATENTING AND LICENSING. 3.0 Semester Hrs.

(S) (WI) This course provides an introduction to the legal framework of inventing and patenting and addresses practical issues facing inventors. The course examines patent law, inventing and patenting in the corporate environment, patent infringement and litigation, licensing, and the economic impact of patents. Methods and resources for market evaluation, searching prior art, documentation and disclosure of invention, and preparing patent applications are presented. Prerequisite: None. 3 hours lecture; 3 semester hours.

EBGN485. BUSINESS STRATEGY. 3.0 Semester Hrs.

Business strategy is focused on formulating and implementing the major goals of the firm in relation to changing competitive environmental conditions, firm resources, and individuals' motives and values. This course is about the issues and challenges of running a firm in a competitive environment from the perspective of a senior manager. The challenge for senior managers goes well beyond applying an appropriate formula to a problem because to date there are not any universal formulas for successful companies. Rather, senior managers must be able to identify that a problem exists and then to bring resolution, despite partial information. This course requires identifying, analyzing, and solving firm problems with original thinking and execution. A key instructional objective of this course is to help you develop a rigorous approach for addressing complex business problems. Prerequisite: EBG321 or EBG345 or EBG346.

EBGN495. ECONOMIC FORECASTING. 3.0 Semester Hrs.

An introduction to the methods employed in business and econometric forecasting. Topics include time series modeling, Box-Jenkins models, vector autoregression, cointegration, exponential smoothing and seasonal adjustments. Covers data collection methods, graphing, model building, model interpretation, and presentation of results. Topics include demand and sales forecasting, the use of anticipations data, leading indicators and scenario analysis, business cycle forecasting, GNP, stock market prices and commodity market prices. Includes discussion of links between economic forecasting and government policy. Prerequisite: EBG301, EBG302, EBG303.

EBGN498. SPECIAL TOPICS IN ECONOMICS AND BUSINESS. 0.5-6 Semester Hr.

(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

EBGN499. INDEPENDENT STUDY. 1-6 Semester Hr.

(I, II) Individual research or special problem projects supervised by a faculty member, also, when a student and instructor agree on a subject matter, content, and credit hours. Prerequisite: ?Independent Study? form must be completed and submitted to the Registrar. Variable credit; 1 to 6 credit hours. Repeatable for credit.

Professor

Roderick G. Eggert , Viola Vestal Coulter Professor, Deputy Director, Critical Materials Institute

Associate Professors

Jared C. Carbone

Michael B. Heeley

Assistant professors

Tulay Flamand

Ben Gilbert

Ian Lange

Peter Maniloff

Steven M. Smith

Teaching Professor

Scott Houser

Teaching Associate Professors

Becky Lafrancois

Andrew Pederson

Sid Saleh

Professor of Practice

David Culbreth

Professors Emeriti

Carol A. Dahl

John E. Tilton

Graham Davis

Franklin J. Stermole

Michael R. Walls