

niques of analysis and design applicable to current system documentation and the development of general systems solutions are presented. Topics include process and data flows, I/O designs, and systems modeling. Problem solving and communication skills employed in the transition from analysis to design are stressed. Prerequisite: CS 230. Offered Fall semester alternate years (Fall 2006). Three credits.

### **CS 352 Networked and Large Database Systems**

This course primarily discusses topics associated with networked and large database systems. Issues such as concurrency control, error recovery, distributed systems, and data warehousing are discussed. The Oracle database is studied in considerable detail. Prerequisite: CS 350. Three credits.

### **CS 355 Software Engineering**

Since good programming involves the systematic mastery of complexity, one can consider programming to be an engineering discipline (if we use the term engineering in a wider sense than used when referring to traditional fields of engineering). This course will develop a methodology for program construction which will allow software of high quality to be constructed, where high quality software is defined as software which is reliable and reasonably easy to understand, modify, and maintain. Prerequisite: CS 230. Offered Fall semester alternate years (Fall 2005). Three credits.

### **CS 357 Computing Science Project I**

Using principles and techniques developed in CS 351 or CS 355, a capstone senior project is begun in this course. This includes items such as choosing a project, researching the requirements and technologies needed, and producing a requirements document. A team approach may be used at the discretion of the instructor. Some projects may be actual projects for local companies. Prerequisites or concurrent: CS 351 or CS 355. Offered Fall semester. One credit.

### **CS 358 Computing Science Project II**

Using principles and techniques developed in CS 351 or CS 355, the capstone senior project begun in CS 357 is now implemented. A team approach to software development may be used at the discretion of the instructor. Some projects may be actual projects for local companies. Prerequisite: CS 357. Offered Spring semester. Two credits.

### **CS 450 Independent Study in Computing and Information Science**

An independent study may be possible by arrangement with an individual faculty member. Course may be repeated with a different topic. Variable credit.

### **CS 465 Management Information Systems**

This course explains how information is used in organizations, the role of information technology professionals, and how information systems are used to an advantage in business settings. Students will gain an appreciation of the importance of information accuracy and integrity, an appreciation of how information technology contributes to an organization, and an understanding of the issues and challenges involved in the development, implementation and maintenance of information systems. The course will also address social and ethical issues related to information system design and use. Cross-listed as BA 465 and GCBA 665. Offered every semester. Three credits.

### **CS 550 Cooperative Education—Computing and Information Science Internship**

An internship involves practical work experience, typically with a local business. Course may be repeated. Variable credit. May be done for no credit.

# Economics

## Alex G. McKenna School of Business, Economics, and Government

*Gary Quinlivan, Dean, McKenna School and Program Chairperson  
Andrew R. Herr; Peter M. Hutchinson; James Teague*

*Adjunct Faculty: David Dahlman, Frank Gamrat; Füsün Gonül*

The curriculum of the Economics Department is designed to provide a comprehensive education in both theoretical and applied economics. The economics program seeks to provide a strong academic foundation for understanding the complexities of economic activity and decision making within both the private and public sectors and for understanding the relationship between the economy and society as a whole. It seeks to enable students to apply rigorous analysis to economic issues and problems through the use of market oriented theoretical models, quantitative techniques, and economic reasoning.

The study of economics, as part of the liberal arts and sciences approach to learning, helps students understand one of the most fundamental facets of human life in civil society — economic activity — and helps prepare them to effectively address the socioeconomic challenges and opportunities of contemporary public life. In addition to general economic theory and analysis, the special strengths of the Department include finance (private, public, and international), international trade, game theory, environmental economics, and experimental economics. In conjunction with the Center for Economic and Policy Education, the Department also seeks to provide exceptional educational experiences in the study of contemporary public policy and major issues in public life.

Through these approaches and by working closely with its students, the goal of the Department's economics major is to help students achieve a strong academic background for successful graduate studies or professional employment. The Department of Economics awards both the Bachelor of Arts and Bachelor of Science degrees. The B.S. degree is designed for students intending to pursue graduate studies in economics, finance, or M.B.A programs with more demanding quantitative requirements. The B.A. is designed for students planning for immediate employment in business, government, or the nonprofit sector, as well as preparation for law school or other professional oriented graduate studies. For students interested in gaining a disciplined understanding of economics, courses in the department may be taken to satisfy the social science requirement of the College core.

The major's capstone requirement is a senior thesis that incorporates original research efforts. The thesis is written in conjunction with EC 480 and is taken during the senior or junior year.

### **Departmental Activities**

Students are encouraged to join the staff of Center for Political and Economic Thought, which sponsors various lecture series, conferences, and publications; the Economics Club; and Mock Trial Team. The Economics Department is the Delta Sigma branch of Omicron Delta Epsilon, which is the national honor society for outstanding economics students.

### **Requirements for B.A. degree in Economics (43 credits):**

**(See Core Curriculum requirements.)**

BA 350	Statistics I	3
EC 101	Principles of Economics: Micro	3
EC 102	Principles of Economics: Macro	3
EC 201	Microeconomic Theory	3
EC 202	Macroeconomic Theory	3
EC 331	Public Finance	3

EC 351	International Trade & Development	3
EC 353	International Finance	3
EC 360	Econometrics	3
EC 380	Game Theory	3
EC 390	Experimental Economics	3
EC 480	Senior Thesis	3
MA 109/111	Calculus I	4
PS 100	Principles of American Politics	3

This program satisfies the mathematics and the social science core. After completing this major and the college core, you will have 34 credits for electives.

**Requirements for B.S. degree in Economics (53 credits):**  
(See Core Curriculum requirements.)

BA 350	Statistics I	3
or		
MA 208	Probability and Statistics	3
EC 101	Principles of Economics: Micro	3
EC 102	Principles of Economics: Macro	3
EC 201	Microeconomic Theory	3
EC 202	Macroeconomic Theory	3
EC 331	Public Finance	3
EC 351	International Trade & Development	3
EC 353	International Finance	3
EC 360	Econometrics	3
EC 380	Game Theory	3
EC 390	Experimental Economics	3
EC 401	Advanced Microeconomic Theory	3
EC 402	Advanced Macroeconomic Theory	3
EC 480	Senior Thesis	3
MA 109/111	Calculus I	4
MA 110/112	Calculus II	4
PS 100	Principles of American Politics	3

Candidates for the B.S. degree who plan to pursue graduate work in economics, finance, or related disciplines are strongly encouraged to complete, at minimum, Calculus III, Differential Equations, and Linear Algebra. Consult with a member of the departmental faculty for further assistance in planning course work. After completing this major and the college core, the economics major will have 24 credits for electives.

**Typical Freshman Year Schedule**

		Fall	Spring
EC 101 and EC 102	Principles of Economics	3	
PS 100	Principles of American Politics	3	3
EL 102	Foreign Language and Rhetoric	3	3
RS 119	Exploring Religious Meaning	3	
	or may be taken in the Spring		
	Mathematics	3-4	3-4
	College core	0-6	0-6

All students will take one three (3) credit course designated as a Freshman Seminar which will satisfy a Core Curriculum requirement.

**Requirements for the Minor in Economics (18 credits):**

EC 101	Principles of Economics: Micro	3
EC 102	Principles of Economics: Macro	3
EC 201	Microeconomic Theory	3
EC 202	Macroeconomic Theory	3
BA 350	Business Statistics I	3
Plus one elective (3 credits) from the following offerings:		
EC 331	Public Finance	3

EC 351	International Trade and Development	3
EC 353	International Finance	3
EC 360	Econometrics	3
EC 380	Game Theory	3
EC 390	Experimental Economics	3
EC 401	Advanced Microeconomic Theory	3
EC 402	Advanced Macroeconomic Theory	3

**Double major in Mathematics and Economics**

For those students who will pursue upon graduation an advanced degree (masters or Ph.D. level) in finance or economics.

**Requirements for B.S. degree in Mathematics and Economics (85 credits in majors):**

(See Core Curriculum requirements.)

BA 350	Statistics or	3
MA 208	Probability and Statistics	3
PS 100	Principles of American Politics	3
EC 101	Principles of Economics: Micro	3
EC 102	Principles of Economics: Macro	3
EC 201	Microeconomic Theory	3
EC 331	Public Finance	3
EC 360	Econometrics	3
EC 351	International Trade & Development	3
EC 380	Game Theory	3
EC 390	Experimental Economics	3
EC 401	Advanced Microeconomic Theory	3
EC 402	Advanced Macroeconomic Theory	3
EC 480	Senior Thesis	3
MA 111	Calculus I	4
MA 112	Calculus II	4
MA 113	Calculus III	4
MA 114	Ordinary & Partial Differential Equations	4
MA 115	Linear Algebra	3
MA 203	Complex Variables	3
MA 204	Topology	3
MA 206	Real Analysis I	4
PH 111	General Physics I	3
PH 112	General Physics I Lab	1
PH 113	General Physics II	3
PH 114	General Physics II Lab	1
PH 370	Mathematical Physics is strongly suggested	3

This program satisfies the mathematics, natural science, and the social science requirements of the college core curriculum for the B.S. After completing this major and the college core, you will have 6 credits for electives.

**EC 101 Principles of Economics, Micro**

The course introduces the student to economic reasoning, terminology and fundamental concepts. Emphasis is placed on individual economic units such as the household and the firm; how they affect and are affected by the various market structures existing in American capitalism. Three credits.

**EC 102 Principles of Economics, Macro**

An analysis of the functioning of the entire economy, in particular the forces that influence the level of production, unemployment, and prices. Also included are the nature and role of governmental intervention in changing these variables. Three credits.

**EC 201 Microeconomic Theory**

The course provides rigorous analysis of consumer and producer behavior, market structure in both the product and resource markets, and general equilibrium theory. The course emphasizes the theoretical foundations and techniques of Neoclassical microeconomics. Prerequisite: EC 101. Offered Fall semester. Three credits.

**EC 202 Macroeconomic Theory**

An examination and analysis of aggregate economic relationships in

the context of competing Keynesian and Classical paradigms. The course emphasizes differences in the choice of appropriate stabilization policy on the part of government, as well as the theoretical structures of macroeconomic models. A brief introduction to economic growth theory is included. Prerequisite: EC 102. Offered Spring semester. Three credits.

### **EC 331 Public Finance**

This course discusses the role of government in the allocation of resources, criteria for public expenditures, incidence and the economic effects of taxation, sources of demand for public goods, and the impact of government on the private sector. Prerequisite: EC 201. Offered in the spring of odd-numbered years. Three credits.

### **EC 351 International Trade and Development**

The course emphasizes the theory behind the international exchange of goods and services among nations of the world. Topics include the Heckscher-Ohlin Theorem, offer curves, the influence of market impediments, the pros and cons of free trade, etc. Prerequisite: EC 201 and MA 109 or MA 111. Offered Fall of odd-numbered years. Three credits.

### **EC 353 International Finance**

The course covers the following topics: recent developments in international financial markets, foreign exchange markets, derivative security markets, and international asset portfolios and financial risk management. Prerequisite: EC 102. Offered Fall of even-numbered years. Three credits.

### **EC 360 Econometrics**

This course is designed as a continuation of BA 350. It is an introduction to regression and correlation analysis, multiple regression, their uses and related problems such as multicollinearity, serial correlation and heteroskedasticity. The course is balanced between theoretical development and applications. Prerequisite: MA 109 or MA 111 and BA 350 or MA 208. Offered Spring semester. Three credits.

### **EC 380 Game Theory**

The primary goal of this course is to study the scope and methods of game theory, focusing on applications arising within the discipline of economics. Game theory attempts to describe the strategic interaction of agents (e.g., consumers, firms, or the government) in situations where there are competing interests and/or the outcomes depend on the actions chosen by the various agents. The course is designed to expose students to the concepts studied by game theorists as well as the set of analytical skills used in game theory. Prerequisites: EC 201, MA 110 or MA 112. Offered Fall of even-numbered years. Three credits.

### **EC 390 Experimental Economics**

This course focuses on laboratory experimentation as a research tool in applied economics, particularly in the areas of industrial organization, political economy, and game theory. The course offers both an overview of general principles used in designing, conducting, and evaluating behavior in economic experiments and a review of current research in the field of experimental economics. The areas of study include market behavior in alternative institutional settings, allocation decisions in settings with externalities, and individual choice with uncertainty. Prerequisites: EC 201 and MA 109 or MA 111. Offered Fall of odd-numbered years. Three credits.

### **EC 401 Advanced Microeconomic Theory**

This course offers the student an in-depth, mathematical analysis and extension of subject matter covered in EC 201 (Microeconomic Theory). Topics covered include: multivariate economic applications (i.e. firm and consumer theory) of optimization theory with and with-

out constraints utilizing linear algebra. Some time is devoted to the Kuhn-Tucker Conditions and consumer behavior under conditions of uncertainty. Prerequisites: EC 201, MA 110 or MA 112. Offered Spring of even-numbered years. Three credits.

### **EC 402 Advanced Macroeconomic Theory**

This course examines open economy macroeconomic models, models with rational expectations, dynamic modeling, and stochastic macroeconomic models. Prerequisites: EC 202, MA 110 or MA 112. Offered Spring of odd-numbered years. Three credits.

### **EC 480 Senior Thesis**

The purpose of this seminar is to produce a scholarly piece of research and writing. Prerequisites: EC 201, EC 202, MA 109 or MA 111, and enrollment in EC 390. Offered Fall of odd-numbered years. Three credits.

### **EC 500 Independent Study**

May be repeated. Variable credit.

### **EC 550 Internship**

May be repeated. See Dean of McKenna School. Variable credit.