ECONOMICS

The department offers coursework for the degrees of bachelor of science with three different majors: agricultural business, business economics, and economics. A minor in agricultural business and a minor in economics are also possible. In addition, the department participates in four interdepartmental programs: international agriculture and global resources systems offered by the College of Agriculture and Life Sciences, and international studies and women’s studies offered by the College of Liberal Arts and Sciences. For further discussion of programs in agricultural business, see the statement below under College of Agriculture and Life Sciences. For programs in business economics, see the statement below under College of Business. For programs in economics, see the statement below under College of Liberal Arts and Sciences. Visit our web site at www.econ.iastate.edu.

Graduates of the Department of Economics learn skills that distinguish them from other graduates. Economics teaches the abilities to think and reason clearly, to address complex issues using tools and decision-making models of economics, mathematics, and statistics, as well as concepts from the biological, physical, and social sciences. The study of Economics also helps students develop understanding of the interaction of technology, human activity, and the environment, learn to apply economic and business concepts associated with making “optimal” choices among economic alternatives, and communicate them, using a variety of means, to other professionals, collective organizations, governments, and the general public.

Economics provides a foundation for for graduate work in law, economics, and business. It also provides students the tools of critical analysis and human relations skills that are essential for being an informed citizen and getting and keeping meaningful employment.

1. College of Agriculture and Life Sciences
   1.1. Major - Agricultural Business

The major in agricultural business prepares students for advanced studies and for careers in agricultural finance, management in agricultural supply and marketing industries, commodity merchandising and research, business research and management, farm and ranch operations, commercial farm management and appraisal, agricultural sales and marketing, agricultural reporting and public relations, agricultural extension, international activities, and government service. A major in agricultural business with a minor in economics is not permitted; however, a double major in agricultural business and economics is permitted.

Students majoring in agricultural business often choose elective coursework leading to minors in the College of Business or in the College of Agriculture and Life Sciences, or emphasizing specific areas within agricultural business such as finance, management, commodity analysis, research, agricultural sales and marketing, environmental economics, farm and ranch operations, international economics, agricultural extension, or government service.

The major in agricultural business requires a minimum of 120 credits and a GPA of 2.00 or higher. Only 65 credits (which may include up to 16 technical credits) from a two-year institution may apply to the degree. At least 18 credits must be earned from courses taught by the Department of Economics at ISU, with at most 9 P-NP credits of free electives. The major in agricultural business requires:

**International Perspective:** 3 cr. from approved course list (http://tinyurl.com/bzbmv9).  
**U.S. Diversity:** 3 cr. from approved course list (http://tinyurl.com/atq6kpj).  
**Communication/Library:** 13 cr.

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<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 150</td>
<td>Critical Thinking and Communication</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 250</td>
<td>Written, Oral, Visual, and Electronic Composition</td>
<td>3</td>
</tr>
<tr>
<td>One of the following</td>
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<td>3</td>
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<tr>
<td>ENGL 302</td>
<td>Business Communication</td>
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<tr>
<td>ENGL 309</td>
<td>Proposal and Report Writing</td>
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</tr>
<tr>
<td>ENGL 314</td>
<td>Technical Communication</td>
<td></td>
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<tr>
<td>One of the following</td>
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<tr>
<td>SP CM 212</td>
<td>Fundamentals of Public Speaking</td>
<td></td>
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<tr>
<td>AGEDS 311</td>
<td>Presentation and Sales Strategies for Agricultural Audiences</td>
<td></td>
</tr>
<tr>
<td>LIB 160</td>
<td>Information Literacy</td>
<td>1</td>
</tr>
</tbody>
</table>

Communication Proficiency Requirement: A grade of C or better in ENGL 250, a C or better in either ENGL 150 or (ENGL 302 or ENGL 309 or ENGL 314), and a C or better in the speech fundamentals course (SP CM 212 or AGEDS 311).

Total Credits: 13

**Humanities and Social Sciences:** 6 cr.

<table>
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<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 102</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
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<tr>
<td>Three credits from approved course list (<a href="http://www.agstudent.iastate.edu/humanities.htm">www.agstudent.iastate.edu/humanities.htm</a>)</td>
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**Ethics:** 3 cr. from approved course list (www.agstudent.iastate.edu/ethics.htm)

**Life Sciences:** 6 cr.

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<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOL 101</td>
<td>Introductory Biology</td>
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</tr>
<tr>
<td>BIOL 211</td>
<td>Principles of Biology I</td>
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</tbody>
</table>

Three credits from approved course list (www.agstudent.iastate.edu/life_science.htm).  

Total Credits: 6

**Mathematics:** 13-14 cr.

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<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>One of the following</td>
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<td>4</td>
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</tbody>
</table>
MATH 160    Survey of Calculus
MATH 165    Calculus I
One of the following 3-4
ECON 207    Applied Economic Optimization
MATH 166    Calculus II
STAT 226    Introduction to Business Statistics I
STAT 326    Introduction to Business Statistics II

Physical Sciences: 5 cr.
CHEM 163    College Chemistry
& 163L      and Laboratory in College Chemistry
Or
PHYS 111    General Physics

Agricultural, Food, or Natural Resources Sciences: 6 cr. from approved course list (http://tinyurl.com/lcs25jb).
General Economics: 9-10 cr.
ECON 101    Principles of Microeconomics
ECON 301    Intermediate Microeconomics 3-4
One of the following 3
ECON 302    Intermediate Macroeconomics
ECON 353    Money, Banking, and Financial Institutions
ECON 492    Graduating Senior Survey R

Business and Agricultural Business: 29 cr.
ACCT 284    Financial Accounting
FIN 301     Principles of Finance
Six credits from ACCT 285 or any 300-489 ACCT, FIN, MKT, MGMT,
MIS, or SCM courses.
ECON 110    Orientation in Agricultural Business
ECON 235    Introduction to Agricultural Markets
ECON 292    Career Seminar
Nine credits of ECON 230-289, 300-389, 400-489 courses.
Three credits of 400-489 level ECON courses. 3

Electives: 22-24 cr.
Agricultural business majors seeking a double major in economics
must take a minimum of 42 credits in economics. These include all of
the economics courses required for the economics major. To double
major in economics, agricultural business majors must also earn an
average grade of C or higher in ECON 101 Principles of Microeconomics,
ECON 102 Principles of Macroeconomics, and ECON 302 Intermediate
Macroeconomics with no grade lower than a C-.

2. College of Business
2.1. Major - Business Economics
The major in business economics provides a high-quality education
with a balanced emphasis in both business and economics. Graduates
from the business economics major possess a unique mix of analytical
and applied business skills well-suited for employment in upper level
management and public service positions. Graduates also have solid
preparation for graduate studies in law, economics, and in Master of
Business Administration (MBA) programs. A double major in business
economics and agricultural business is not permitted; a double major
in business economics and economics is not permitted. A major in
business economics with a minor in economics is not permitted. For
the undergraduate curriculum in business economics, see College of
Business Economic Major or visit the College of Business web
site at http://www.business.iastate.edu/.

3. College of Liberal Arts and Sciences
3.1. Major - Economics
The major in economics prepares students for advanced studies,
professional degrees such as law and business administration, and
for careers in finance, business and economic research, management,
insurance, brokerage, real estate, labor relations, international
development, and government service. Candidates for the bachelor of
science degree with a major in economics must fulfill requirements
established by the College of Liberal Arts and Sciences. (For details of
undergraduate curricula in liberal arts and sciences, see College of Liberal
Arts and Sciences, Curriculum.)

Students majoring in economics are required to take the following
courses within the General Education Area of Natural Sciences and
Mathematical Disciplines:

Choose one of the following: 7-8
MATH 165    Calculus I
& MATH 166   and Calculus II
MATH 165    Calculus I
& ECON 207   and Applied Economic Optimization *
MATH 160    Survey of Calculus
& ECON 207   and Applied Economic Optimization (*)

*Students who plan to take postgraduate work in economics should
take MATH 165 and MATH 166.

Choose one of the following: 6
STAT 226    Introduction to Business Statistics I
& STAT 326   and Introduction to Business Statistics II
STAT 341    Introduction to the Theory of Probability and
& STAT 342   Statistics I
              and Introduction to the Theory of Probability and
              Statistics II

Students must complete the following courses in economics:
ECON 101    Principles of Microeconomics
ECON 102    Principles of Macroeconomics
A minimum of 18 credits of economics coursework must be earned at Iowa State University. Economics majors must maintain a C average in ECON 101 Principles of Microeconomics, ECON 102 Principles of Macroeconomics, ECON 301 Intermediate Microeconomics, and ECON 302 Intermediate Macroeconomics with no grade lower than a C-.

Communication Proficiency Requirement: The LAS College requires a grade of C or better in ENGL 250. In addition the major in Economics requires a grade of C or better in ENGL 302 or ENGL 314.

Optimal progress for an economics major would be to complete the principles sequence:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 101</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>and one of the following sequences in the freshman year:</td>
<td></td>
<td>7-8</td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
<td></td>
</tr>
<tr>
<td>or MATH 166</td>
<td>Calculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 165</td>
<td>Calculus I</td>
<td></td>
</tr>
<tr>
<td>or ECON 207</td>
<td>Applied Economic Optimization</td>
<td></td>
</tr>
<tr>
<td>MATH 160</td>
<td>Survey of Calculus</td>
<td></td>
</tr>
<tr>
<td>or ECON 207</td>
<td>Applied Economic Optimization</td>
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</tbody>
</table>

The freshman-year sequences should be followed in the sophomore year by the intermediate theory sequence:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 301</td>
<td>Intermediate Microeconomics</td>
<td>3</td>
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<tr>
<td>&amp; ECON 302</td>
<td>and Intermediate Macroeconomics</td>
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</tr>
</tbody>
</table>

STAT 226 Introduction to Business Statistics I and STAT 326 Introduction to Business Statistics II are recommended in the sophomore year.

**4. Learner Outcome Goals**

The Department of Economics at Iowa State University has general goals for its B.S. graduates. These goals are for students to be able to solve problems and think critically, engage in economic reasoning, demonstrate leadership skills, communicate effectively, make ethical decisions, understand the environmental impacts of human activities, meet the challenges of living and working in a culturally diverse and global community, develop a capacity for innovativeness and creativity, and value the importance of life-long learning. Regarding each of these general goals, there are more specific additional goals, namely:

1. **Problem Solving/Critical Thinking:**
   a. Distinguish factual statements from opinions or value judgments.
   b. Summarize, analyze, and interpret research data and policy issues.
   c. Distinguish causal relationships from correlations.
   d. Determine the accuracy of statements.
   e. Understand the usefulness of abstractions and models.
   f. Identify assumptions and detect bias.
   g. Critically evaluate their arguments and those of others.
   h. Distinguish relevant information from irrelevant information.
   i. Establish priorities.
   j. Apply a holistic approach to solving complex, issue-laden, problems.

2. **Economic Reasoning:**
   a. Distinguish positive ('what is') from normative ('what should be') economics.
   b. Determine the opportunity cost of alternatives.
   c. Apply the concepts of comparative advantage, specialization, and exchange to analyze resource allocation issues.
   d. Identify the conditions under which markets allocate resources efficiently or markets fail.
   e. Apply marginal economic analysis to solve problems.
   f. Conduct comparative static analyses.
   g. Pose and test hypotheses.
   h. Use scientific methods to identify optimal choices among economic alternatives.
   i. Identify decision-makers, objectives, choice variables, incentives, and constraints.
   j. Understand how conclusions depend on assumptions.

3. **Leadership:**
   a. Organize, facilitate, and participate effectively in a group, team, or organization.
   b. Define a problem or opportunity, implement an action planning process, work toward a goal and justify actions taken.

4. **Professional, Interpersonal and Cross-cultural Communications:**
   a. Communicate economic and business concepts to professionals, organizations, governments, and the general public.
   b. Obtain information by accessing electronic or traditional media, listening, or by observation.
   c. Read, listen, observe and reflect.
   d. Speak and write clearly and persuasively.
e. Prepare and present effective visual, oral, written, and electronic presentations.

5. Ethics:
   a. Define and assess their ethical perspectives, sense of moral responsibility, and values.
   b. Identify and critically evaluate contemporary ethical and moral issues in professional and private life.

6. Environmental Awareness:
   a. Explain the physical and biological interactions within ecosystems.
   b. Explain how human activities impact the environment and how societies are affected by environmental change.

7. International/Multi-Cultural Awareness:
   U.S. Diversity – Students should achieve two of the following outcomes:
   a. Articulate how their personal life experiences and choices fit within the context of the larger mosaic of U.S. society, indicating how they have confronted and critically analyzed their perceptions and assumptions about diversity-related issues.
   b. Analyze and evaluate the contributions of various underrepresented social groups in shaping the history and culture of the U.S.
   c. Analyze individual and institutional forms of discrimination based on factors such as race, ethnicity, gender, religion, sexual orientation, class, etc.
   d. Analyze how cultural diversity and cooperation among social groups affect U.S. society.

   International Perspectives – Students should achieve two of the following outcomes:
   a. Analyze the accuracy and relevancy of their own worldviews and anticipate how people from other nations may perceive that worldview.
   b. Describe and analyze how cultures and societies around the world are formed, are sustained, and evolve.
   c. Analyze and evaluate the influence of global issues in their own lives.
   d. Describe the values and perspectives of cultures other than their own and discuss how the influence individuals’ perceptions of global issues or events.
   e. Communicate competently in a second language.

8. Entrepreneurship:
   a. Demonstrate innovativeness and creativity regardless of context.
   b. Identify and pursue opportunities that produce value.
   c. Be persistent in shepherding necessary resources and managing associated risk to facilitate change.

9. Life-long Learning:
   a. Articulate how continued learning after graduation will enrich their lives.
   b. Identify and participate in new areas for learning beyond the classroom and after graduation.

1. College of Agriculture and Life Sciences
   1.1. Minor - Agricultural Business

Courses to be included in the minimum of 15 credits include the following:

   ECON 101 Principles of Microeconomics 3
   ECON 230 Farm Business Management 3
   ECON 235 Introduction to Agricultural Markets 3
   ECON 301 Intermediate Microeconomics 3-4

   Three credits of ECON 300-389, 400-489 courses.

2. College of Liberal Arts and Sciences
   2.1 Minor - Economics

Courses to be included in the minimum of 15 credits are:

   ECON 101 Principles of Microeconomics 3
   ECON 102 Principles of Macroeconomics 3
   ECON 301 Intermediate Microeconomics 3-4

Six credits of ECON 230-289, 300-389, 400-489 courses.

Economics, B.S.

<table>
<thead>
<tr>
<th>Freshman</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
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<tr>
<td>ECON 101</td>
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<td>ECON 102</td>
<td>3</td>
<td></td>
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<tr>
<td>ENGL 150</td>
<td>3</td>
<td>ECON 207</td>
<td>3</td>
<td></td>
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<tr>
<td>LIB 160</td>
<td>3</td>
<td>ENGL 250</td>
<td>3</td>
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<tr>
<td>MATH 160</td>
<td>3</td>
<td>STAT 326</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Arts and Humanities</td>
<td>3</td>
<td>Arts and Humanities</td>
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<tr>
<td>Natural Science</td>
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<td>Natural Science</td>
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\[ \text{Total: 17 Credits} \]

\[ \text{Total: 15 Credits} \]

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<th>Sophomore</th>
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<th>Credits</th>
<th>Spring</th>
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<tbody>
<tr>
<td>ECON 301</td>
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<td>ECON 302</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENGL 250</td>
<td>3</td>
<td>STAT 326</td>
<td>3</td>
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<tr>
<td>STAT 226</td>
<td>3</td>
<td>Elective or Foreign Language</td>
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<tr>
<td>LAS 201 or Elective</td>
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<td>Social Science</td>
<td>3</td>
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<tr>
<td>Elective or Foreign Language</td>
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<td>Natural Science</td>
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\[ \text{Total: 15 Credits} \]

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<th>Junior</th>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
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<tr>
<td>ECON 371</td>
<td>4</td>
<td>ECON 400-489</td>
<td>3</td>
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</table>
Students in all ISU majors must complete a three-credit course in both U.S. diversity and in International Perspectives. The two courses may simultaneously meet the following graduation requirements: Social Science, Arts/Humanities, ECON 400-489, or Econ courses from approved list. Please discuss with our advisor.

LAS majors require a minimum of 120 credits, including a minimum of 45 credits at the 300/400 level. Three of the required 45 credits at the 300+ level must be earned in a general education group outside the group of your major. Econ majors must meet or complete the LAS foreign language requirement. In addition, Econ majors must earn a minimum of 18 credits from courses taught by the Department of Economics at ISU.

Students do not need to have an undergraduate major in economics or agricultural economics in order to qualify for graduate work in the department. However, students must have completed undergraduate coursework in macroeconomics, microeconomics, statistics, calculus, and matrix algebra. Some background in Math courses emphasizing logic and proofs is preferred, particularly for the Ph.D.

**Graduate Study**

The department offers work toward the degrees master of science and doctor of philosophy with majors in economics and agricultural economics. The department also offers minors to students with majors in other departments. Visit our web site at [www.econ.iastate.edu](http://www.econ.iastate.edu).

Students do not need to have an undergraduate major in economics or agricultural economics in order to qualify for graduate work in the department. However, students must have completed undergraduate coursework in macroeconomics, microeconomics, statistics, calculus, and matrix algebra. Some background in Math courses emphasizing logic and proofs is preferred, particularly for the Ph.D.

Candidates for the degree master of science (thesis option) are required to complete satisfactorily 30 credits of acceptable graduate work, including preparation of a thesis.

Candidates for the degree master of science (non-thesis option) may fulfill requirements by satisfactorily completing 32 credits of coursework, including preparation of a creative component.

Programs of study for the doctorate are organized by each student in consultation with the major professor and the individual's committee. Subject to staffing constraints, the department offers coursework to support the following fields of concentration: applied econometrics, agricultural economics, financial economics, industrial organization, international economics, human resources, macroeconomics, and environmental and resource economics. Each student must complete advanced courses in microeconomic and macroeconomic theory, quantitative methods and econometrics, and two fields from the list above. Students must demonstrate competence in theory by passing qualifying examinations. Students must also participate in workshops.

**Courses primarily for undergraduates:**

**ECON 101: Principles of Microeconomics**

(3-0) Cr. 3. F.S.SS.

**ECON 101H: Principles of Microeconomics: Honors**

(3-0) Cr. 3.
Prereq: Honors program students only

**ECON 101L: Laboratory in Principles of Microeconomics**

(0-2) Cr. 1. F.
Prereq: Concurrent enrollment in the appropriate section of ECON 101
Discussion of material typically covered in Econ 101. Application of economic principles to real world problems. Economic principles and basic business management concepts applied to decision-making in agribusiness operations.
ECON 102: Principles of Macroeconomics
(3-0) Cr. 3. F.S.S.
Prereq: ECON 101 recommended

ECON 102H: Principles of Macroeconomics: Honors
(3-0) Cr. 3.
Prereq: ECON 101 recommended; admission to the Honors program.

ECON 110: Orientation in Agricultural Business
(1-0) Cr. 1. F.
Orientation course for freshman and new transfer students in agricultural business.

ECON 207: Applied Economic Optimization
(2-2) Cr. 3. F.S.
Prereq: MATH 151, MATH 160, MATH 165 or equivalent
Application of linear algebra, calculus and unconstrained and constrained optimization techniques to economic problems. Learning outcomes include the ability to (i) identify the objective, decision variables and constraints in economic decision problems, (ii) represent elements of an economic problem in simple mathematical models, (iii) identify and apply mathematical tools that can be used to solve the problems, (iv) identify the strengths and limitations of the solution method, and (v) interpret the economic meaning and implications of the solution.

ECON 230: Farm Business Management
(2-2) Cr. 3. F.S.
Prereq: ECON 101; ACCT 284
Business and economic principles applied to decision making and problem solving in the management of a farm business. Cash flow, partial, enterprise, and whole farm budgeting. Information systems for farm accounting, analysis, and control. Obtaining and managing land, capital, and labor resources. Alternatives for farm business organization and risk management.

ECON 234: Small Business Management
(3-0) Cr. 3.
Prereq: ECON 101
An introduction to small business management, entrepreneurship, and economics utilizing a series of case studies. Exploration of issues related to starting or acquiring a new business and development of knowledge and skills for successful management of a small business, with an emphasis on agricultural business.

ECON 235: Introduction to Agricultural Markets
(3-0) Cr. 3. F.S.
Prereq: ECON 101
Basic concepts and economics principles related to markets for agricultural inputs and products. Overview of current marketing problems faced by farms and agribusinesses, farm and retail price behavior, structure of markets, food marketing channels, food quality and food safety, and the role of agriculture in the general economy. The implications of consumer preferences at the farm level. Introduction to hedging, futures, and other risk management tools.

ECON 292: Career Seminar
(1-0) Cr. 1.
Prereq: Classification in economics or agricultural business
Career opportunities in the various industries and government institutions. Required training and skills needed to perform successfully in different types of careers. Factors important in finding and obtaining employment either before or after graduation including personal resumes, interviewing, and letter writing. Only one of ECON 292, 292A, and 292B can be used toward graduation.

ECON 292A: Career Seminar: Agricultural Business
(1-0) Cr. 1.
Prereq: Classification in economics or agricultural business
Career opportunities in the various industries and government institutions. Required training and skills needed to perform successfully in different types of careers. Factors important in finding and obtaining employment either before or after graduation including personal resumes, interviewing, and letter writing. Only one of ECON 292, 292A, and 292B can be used toward graduation.

ECON 292B: Career Seminar: Economics and Business Economics
(1-0) Cr. 1.
Prereq: Classification in economics or agricultural business
Career opportunities in the various industries and government institutions. Required training and skills needed to perform successfully in different types of careers. Factors important in finding and obtaining employment either before or after graduation including personal resumes, interviewing, and letter writing. Only one of ECON 292, 292A, and 292B can be used toward graduation.
ECON 297: Internship  
Cr. 2. Repeatable, maximum of 4 credits.  
Prereq: Permission of instructor and classification in agricultural business or economics  
Students complete a research report, based on their internship or approved work experience, that examines chosen topics in management, marketing or finance. Offered on a satisfactory-fail basis only.

ECON 298: Cooperative Education  
Cr. R. Repeatable.  
Prereq: Permission of the department cooperative education coordinator; sophomore classification  
Required of all cooperative education students. Students must register for this course prior to commencing each work period.

ECON 301: Intermediate Microeconomics  
(3-0) Cr. 3-4. F.S.S.S.  
Prereq: ECON 101; ECON 207 or MATH 166  
Theory of consumer and business behavior; optimal consumption choices and demand; theory of firm behavior; costs, production, and supply; competitive and imperfectly competitive markets; theory of demand for and supply of factors of production; general equilibrium analysis. Recitation required for 4 credits.

ECON 301H: Intermediate Microeconomics: Honors  
(3-0) Cr. 3-4.  
Prereq: ECON 101; ECON 207 or MATH 166  
Theory of consumer and business behavior; optimal consumption choices and demand; theory of firm behavior; costs, production, and supply; competitive and imperfectly competitive markets; theory of demand for and supply of factors of production; general equilibrium analysis. Recitation required for 4 credits.

ECON 302: Intermediate Macroeconomics  
(3-0) Cr. 3. F.S.  
Prereq: ECON 101, ECON 102; MATH 160 or MATH 165  
Theory of income, employment, interest rates, and the price level; fiscal and monetary policy; budget and trade deficits; money and capital inflows, interest rates, and inflation.

ECON 302H: Intermediate Macroeconomics: Honors  
(3-0) Cr. 3.  
Prereq: ECON 101, ECON 102; MATH 160 or MATH 165  
Theory of income, employment, interest rates, and the price level; fiscal and monetary policy; budget and trade deficits; money and capital inflows, interest rates, and inflation.

ECON 313: Economics of Sports  
(3-0) Cr. 3.  
Prereq: ECON 101  
Application of economics to issues in sports, including franchising; rival leagues and barriers to entry; cooperative, competitive, and collusive behavior; player productivity and compensation; contracts, unions, and discrimination; antitrust, taxation, and subsidies. Economic concepts include supply and demand, labor economics, pricing, public finance, production, game theory, and industrial organization.

ECON 320: Labor Economics  
(3-0) Cr. 3.  
Prereq: ECON 101  
Economic analysis of contemporary domestic and international labor market issues including labor supply and demand, unemployment, and employment in the U.S. and elsewhere; investments in and returns to education, training, health, immigration and migration; income inequality; labor productivity; out-sourcing and global competitiveness; work incentives; compensation including benefits; and labor policies such as minimum wages, over-time pay, discrimination, unions, and immigration. Examples drawn from the U.S. and other developed countries with reference to developing countries where relevant. Meets International Perspectives Requirement.

ECON 321: Economics of Discrimination  
(Cross-listed with W S). (3-0) Cr. 3.  
Prereq: ECON 101  
Economic theories of discrimination. Analysis of the economic problems of women and minorities in such areas as earnings, occupations, and unemployment. Public policy concerning discrimination. Poverty measurement and antipoverty programs in the U.S. Meets U.S. Diversity Requirement

ECON 330: Advanced Farm Business Management  
(3-0) Cr. 3.  
Prereq: ECON 230  
Effective use of strategic planning, decision methods, and computer assistance for solving farm problems. Applications of economic and management theory to analyze farm business decisions using efficiency measures to assess current resource use and direct the farm business analysis, planning, and tax process.
ECON 332: Cooperatives
(3-0) Cr. 3.
Prereq: ECON 101
Survey of cooperative business structure, including historical developments in the United States, principles of cooperation, state and federal authorization for cooperative activity, economic motivations and foundations, governance, marketing and pricing strategies, and financing, capitalization and taxation considerations. Students will learn how the cooperative model is applied in a variety of markets.

ECON 334: Entrepreneurship in Agriculture
(3-0) Cr. 3. F.S.
Prereq: ECON 101
Introduction to the process of entrepreneurship within the agricultural and food sectors. Emphasis on opportunity recognition and assessment, resource acquisition and feasibility analysis for both private and social enterprises. Students will develop a comprehensive feasibility study for a new business or non-profit organization.

ECON 335: The Economics of Global Agricultural Food and Bio-energy
(Cross-listed with GLOBE). (3-0) Cr. 3.
Prereq: ECON 101
Applied economic analysis of the determinants of world agricultural production, marketing, and use in feed, food, fiber, biofuel, and other applications, and global food processing and consumption. Analysis of market case studies and various data on global agricultural production and transformation, land and resource use, demography, economic activity, nutrition and health trends.
Meets International Perspectives Requirement.

ECON 336: Agricultural Selling
(3-0) Cr. 3.
Prereq: ECON 101
Principles of selling with application to agricultural and food related businesses. Attitudes, value systems, and behavioral patterns that relate to agricultural sales. Electronic marketing, selling strategies, preparing for sales calls, making sales presentations, handling objections, and closing sales. Analysis of the buying or purchasing process. Evaluation of agri-selling as a possible career choice.

ECON 337: Agricultural Marketing
(2-2) Cr. 3.
Prereq: ECON 101 required, ECON 235 recommended
Understanding of agricultural commodity markets for grain, livestock and dairy with emphasis on marketing decisions and risk management for farmers and processors. Lab will provide hands-on applications of marketing and management tools via market simulations.

ECON 344: Public Finance
(3-0) Cr. 3.
Prereq: ECON 101

ECON 353: Money, Banking, and Financial Institutions
(3-0) Cr. 3. F.S.
Prereq: ECON 101, ECON 102
Theoretical and applied analysis of money, banking, and financial markets; interest rates and portfolio choice; the banking industry in transition; the money supply process; the Federal Reserve System and the conduct of monetary policy; macro implications of monetary policy; international finance.

ECON 355: International Trade and Finance
(3-0) Cr. 3.
Prereq: ECON 101, ECON 102
Explanations of causes of international trade and the impact of trade on welfare and employment patterns. Analysis of government policies towards trade, such as tariffs, quotas, and free trade areas. Theory of balance of payments and exchange rate determination, and the role of government policies. Examination of alternative international monetary arrangements.
Meets International Perspectives Requirement.

ECON 362: Applied Ethics in Agriculture
(Cross-listed with SOC). (3-0) Cr. 3.
Prereq: ECON 101 or SOC 134, junior or senior status in the College of Agriculture
Identify major ethical issues and dilemmas in the conduct of agricultural and agribusiness management and decision making. Discuss and debate proper ethical behavior in these issues and situations and the relationship between business and personal ethical behavior.

ECON 364: Rural Property Appraisal
(3-0) Cr. 3.
Prereq: ECON 101
Use of income capitalization, sales comparison and cost appraisal concepts in appraising agricultural resources. Application of underlying economic/business/management principles, especially present value, as they relate to farmland appraisal. Determination and estimation of economic impacts of special consideration and property use factors. Evaluate feasibility and profitability of investment in rural property.
ECON 371: Introductory Econometrics
(4-0) Cr. 4. F.S.
Prereq: ECON 301, ECON 302 OR ECON 353, STAT 326
Introduction to the models and methods used to estimate relationships and test hypotheses pertaining to economic variables. Among the topics covered in the course are: Single and multiple regression analysis; functional forms; omitted variable analysis; multicollinearity; heteroskedasticity; autocorrelation; simultaneous equations; and dynamic models.

ECON 376: Rural, Urban and Regional Economics
(Cross-listed with CRP). (3-0) Cr. 3.
Prereq: ECON 101
Firm location with respect to regional resources, transport, scale economies, externalities, and policies. Measures of local comparative advantage and specialization. Spatial markets. Population location considering jobs, wages, commuting, and local amenities. Business, residential, and farm land use and value. Migration. Other topics may include market failure, regulation, the product cycle, theories of rural and urban development, developmental policy, firm recruiting, local public goods and public finance, schools, poverty, segregation, and crime.

ECON 378: Retirement Planning and Employee Benefits
(Cross-listed with GERON, HD FS). (3-0) Cr. 3.
Prereq: 3 credits in Principles of Economics and 3 credits in Human Development and Family Studies
Economic well-being in the context of demographic change, the present and future of Social Security, family retirement needs analysis, investment strategies and characteristics of retirement plans, helping others to work towards financial security, family economic issues for retired persons. Overview of employee and retirement benefits. Meets U.S. Diversity Requirement

ECON 380: Energy, Environmental and Resource Economics
(Cross-listed with ENV S). (3-0) Cr. 3.
Prereq: ECON 101
Natural resource availability, use, conservation, and government policy, with emphasis on energy issues. Environmental quality and pollution control policies.

ECON 385: Economic Development
(Cross-listed with GLOBE). (3-0) Cr. 3.
Prereq: ECON 101, ECON 102
Current problems of developing countries, theories of economic development, agriculture, and economic development, measurement and prediction of economic performance of developing countries, alternative policies and reforms required for satisfying basic needs of Third World countries, interrelationships between industrialized countries and the developing countries, including foreign aid. Meets International Perspectives Requirement.

ECON 387: Economies of China and India
(3-0) Cr. 3.
Prereq: ECON 101
The economic development of China and India within the larger historical, political, and socioeconomic contexts. The characteristics of the development paths of major industries. The drivers of and impediments for future economic development. The two economies’ connections with the world economy. Meets International Perspectives Requirement.

ECON 398: Cooperative Education
Cr. R.
Prereq: Permission of the department cooperative education coordinator; junior classification
Required of all cooperative education students. Students must register for this course prior to commencing each work period.

ECON 401: Topics in Microeconomics
(3-0) Cr. 3.
Prereq: ECON 301, STAT 226
Advanced treatment of selected topics from one or more of the following areas: household production models, factor markets, game theory and imperfect competition, general equilibrium, intertemporal choice, asset markets, income distribution, externalities and public goods, etc.

ECON 402: Topics in Macroeconomics
(3-0) Cr. 3.
Prereq: ECON 301, ECON 302, STAT 226
Advanced treatment of selected topics from one or more of the following areas: business cycle theory, growth theory, fiscal and monetary policy, coordination issues, open economy macroeconomics, and financial economics.

ECON 416: Industrial Organization
(3-0) Cr. 3.
Prereq: ECON 301
Study of the structure of firms and markets and of their interaction, with emphasis on imperfectly competitive markets. Behavior of firms in strategic settings and insights of basic game-theoretic models. Welfare implications of alternative market organizations, consequences of market power, and scope for government regulation and antitrust/competition policies. Topics include monopoly and price discrimination, oligopoly models, product quality, product differentiation, vertical integration, information and advertising, patents, R&D and innovation, and regulation.
ECON 418: Introduction to Game Theory
(3-0) Cr. 3.
Prereq: ECON 301
Systematic introduction to game theory and its uses in economics. Develops the basic framework, models and tools necessary to analyze games of strategy, including: Strategic and extensive-form representations of games; best response functions and Nash equilibrium, mixed strategies backward induction and subgame-perfect equilibrium, imperfect and incomplete information, Bayesian and sequential equilibria. Examples and applications taken from economics, business, political science, law and biology.

ECON 431: Managerial Economics
(3-0) Cr. 3.
Prereq: ECON 301
Theory of the firm; organizational incentives and efficiency; moral hazard; role of information and decision making under uncertainty; ownership and control; business investment.

ECON 437: Commodity Marketing and Risk Management
(3-0) Cr. 3.
Prereq: ECON 235, ECON 301, STAT 326

ECON 455: International Trade
(3-0) Cr. 3.
Prereq: ECON 301
Rigorous treatment of theories of international trade and international factor movements. Examination of the impact of trade and labor migration on domestic and world welfare and on the distribution of income. Theoretical analysis of government policies towards trade and factor movements, including quotas, tariffs, free trade areas and immigration restrictions. Discussion of contemporary issues and controversies concerning globalization, including multinational firms and labor migration. Meets International Perspectives Requirement.

ECON 457: International Finance
(3-0) Cr. 3.
Prereq: ECON 302
National income accounting and balance of payments; foreign exchange rates and exchange rate markets; money, interest rates, and exchange rate determination; prices, exchange rates, and output in the short run; international monetary arrangements; fixed versus flexible exchange rates; optimal currency areas; international capital flows; currency and financial crises in emerging markets. Meets International Perspectives Requirement.

ECON 458: Economic Systems for Electric Power Planning
(Cross-listed with E E). (3-0) Cr. 3.
Prereq: E E 303 or ECON 301

ECON 460: Agricultural, Food, and Trade Policy
(Dual-listed with ECON 560). (3-0) Cr. 3.
Prereq: ECON 301 or ECON 501
Description and analysis of economic problems of U.S. agriculture. Explanation and economic analysis of government policies and programs to develop agriculture, conserve agricultural resources, address consumer food concerns, stabilize farm prices, and raise farm incomes. The influence of macropolicy, world economy, international trade, and bioenergy on U.S. agriculture.

ECON 466: Agricultural Finance
(3-0) Cr. 3.
Prereq: ECON 301, STAT 226, FIN 301 and ECON 353 (recommended)
Financial analysis of agricultural businesses; liquidity, capital structure, and growth and risk of agricultural firms; capital budgeting methods; analysis of land investments, leasing, and costs of credit; financial intermediation and major financial institutions for agriculture; borrower-lender relationships, and asset-liability management techniques by financial intermediaries; public policies affecting agricultural credit markets.

ECON 480: Intermediate Environmental and Resource Economics
(Dual-listed with ECON 580). (3-0) Cr. 3.
Prereq: ECON 301 or ECON 501
ECON 490: Independent Study  
Cr. 1-5. Repeatable, maximum of 6 credits.  
Prereq: Junior or senior classification, 14 credits in economics  
Offered on a satisfactory-fail basis only. No more than 9 credits of Econ 490 may be used toward graduation.

ECON 490E: Independent Study: Entrepreneurship  
Cr. 1-5. Repeatable, maximum of 6 credits.  
Prereq: Junior or senior classification, 14 credits in economics  
Offered on a satisfactory-fail basis only. No more than 9 credits of Econ 490 may be used toward graduation.

ECON 490H: Independent Study: Honors  
Cr. 1-5. Repeatable, maximum of 6 credits.  
Prereq: Junior or senior classification, 14 credits in economics  
Offered on a satisfactory-fail basis only. No more than 9 credits of Econ 490 may be used toward graduation.

ECON 492: Graduating Senior Survey  
Cr. R.  
Prereq: Graduating senior  
Final preparations for graduation. The final stages of job searching, interviewing, letter writing, and resume preparation. Outcomes assessment information from graduating seniors including opinion surveys, instructor/advisor/course evaluations, exit interviews, student accomplishment surveys, job placement surveys, and comprehensive skills examinations. Departmental recognition of graduating seniors. Life as an alumnus - expectations and obligations. Convocation and commencement information. Offered on a satisfactory-fail basis only.

ECON 495: Economics Domestic Travel Course  
Cr. 1-3.  
Prereq: Sophomore status. Permission of instructor  
Tour and study of domestic businesses, markets, and economic institutions located outside Iowa to expose students to the diversity of activities within the U.S. economy. Pre-trip sessions arranged. Locations and duration of tours will vary.

ECON 496: Economics International Travel Course  
Cr. 1-3. Repeatable.  
Prereq: Sophomore status; permission of instructor.  
Tour and study of international agricultural and/or nonagricultural economies, markets, and institutions. Locations and duration of tours will vary. Limited enrollment.  
Meets International Perspectives Requirement.

ECON 498: Cooperative Education  
Cr. R.  
Prereq: Permission of the department cooperative education coordinator; senior classification  
Required of all cooperative education students. Students must register for this course prior to commencing each work period.  
Courses primarily for graduate students, open to qualified undergraduates:

ECON 500: Quantitative Methods in Economic Analysis I  
(4-0) Cr. 4. F.  
Prereq: ECON 301, 1 year of calculus, STAT 401, and permission of Director of Graduate Education  
Economic applications of selected mathematical and statistical concepts: linear models and matrix algebra; differential calculus and optimization; integral calculus and economic dynamics; probability distributions, estimation, and hypothesis testing in the analysis of economic data.

ECON 501: Microeconomics  
(4-0) Cr. 4. F.  
Prereq: ECON 301, credit or enrollment in ECON 500 or equivalent background in calculus and statistics  
The theory of the consumer, theory of the firm, perfect and imperfect competition, welfare economics, and selected topics in general equilibrium and uncertainty.

ECON 502: Macroeconomics  
(4-0) Cr. 4. F.  
Prereq: ECON 302, credit or enrollment in ECON 500 or equivalent background in calculus and statistics  
Models of aggregate supply and demand, theories of consumption and investment, money supply and demand, inflation, rational expectations, stabilization policy, financial markets, and international finance.

ECON 509: Applied Numerical Methods in Economics  
(3-0) Cr. 3.  
Prereq: ECON 500, ECON 501; or ECON 600, ECON 601  
Use of numerical techniques to solve economic problems. Numerical differentiation and integration numeric solutions of systems of equations, static and dynamic optimization problems including unconstrained optimization, maximum likelihood methods, general nonlinear programming methods, dynamic programming and optimal control, numerical methods for solving functional equations.
ECON 510: Experimental Economics
(3-0) Cr. 3.
Prereq: ECON 501 or ECON 601
Introduction to experimental economics and major subject areas addressed by laboratory and field experiments. Exploration of experimental methods by concentrating on series of experiments. Applications include individual decision-making, behavioral game theory, markets, behavioral labor, public and development economics, social network, and neuroeconomics. Research project.

ECON 520: Labor Supply and Human Capital Formation
(3-0) Cr. 3.
Prereq: ECON 501 or ECON 601
Labor supply decisions and empirical analysis for agricultural operators and other self-employed and wage-earning households; multiple job holding; resource allocation in productive households; human capital formation by households, firms, and public institutions, which includes schooling, on-the-job training, migration, health, research, raising of children, and implications for household income and welfare; applications to problems in rural areas of developing and developed countries.

ECON 521: Labor Markets
(3-0) Cr. 3.
Prereq: ECON 501 or ECON 601
Analysis of labor demand and market determination of wages and employment; analysis of distortions in labor markets due to non-competitive forces, legislation, and discrimination; wage inequality, compensation and work incentives; compensating differentials; microeconomic analysis of unemployment and job search.

ECON 532: Managerial Economics for the Global Organization
(3-0) Cr. 3.
Prereq: ECON 101 and enrollment in MBA or BAS program; not for economics majors
Applications of microeconomic theory and decision analysis for firms operating in U.S. and internationally. Topics include demand & supply, consumer choice theory, production and cost theory, short run and long run business decisions, input cost and human capital differences across countries, empirical estimation of demand and supply, pricing, exchange rates, government and business, market structures and strategy.

ECON 537: Commodity Markets: Analysis and Strategy
(3-0) Cr. 3.
Prereq: ECON 501 or ECON 532 or ECON 601, ECON 571 or STAT 326

ECON 545: Public Economics
(3-0) Cr. 3.
Prereq: ECON 501 or ECON 601
Optimal taxation; excess burden; partial and general equilibrium analysis of tax incidence; social insurance; effects of taxation on labor supply and savings; economics of the health sector.

ECON 560: Agricultural, Food, and Trade Policy
(Dual-listed with ECON 460). (3-0) Cr. 3.
Prereq: ECON 301 or ECON 501
Description and analysis of economic problems of U.S. agriculture. Explanation and economic analysis of government policies and programs to develop agriculture, conserve agricultural resources, address consumer food concerns, stabilize farm prices, and raise farm incomes. The influence of macropolicy, world economy, international trade, and bioenergy on U.S. agriculture.

ECON 571: Intermediate Econometrics
(3-0) Cr. 3. S.
Prereq: ECON 500
Single and multiple equation regression models; dummy explanatory variables; serial correlation; heteroskedasticity; distributed lags; qualitative dependent variables; simultaneity. Use of econometric models for tests of economic theories and forecasting.

ECON 576: Spatial Economics
(3-0) Cr. 3.
Prereq: ECON 501 or ECON 601
Analysis of location choice by firms, employees, and households emphasizing the role of spatial variations in agglomeration economies, economies of scale, distance, transport, endowments, amenities, and local government. Models of land use, urban form, spatial competition, central place theory, and migration. Techniques of discrete choice analysis, statistical analysis of categorical data, urban system modeling, and interregional computable general equilibrium.

ECON 580: Intermediate Environmental and Resource Economics
(Dual-listed with ECON 480). (3-0) Cr. 3.
Prereq: ECON 301 or ECON 501
ECON 581: Advanced Environmental Economics
(3-0) Cr. 3.
Prereq: ECON 501 or ECON 601

ECON 590: Special Topics
Cr. 1-5. Repeatable.
Offered on a satisfactory-fail basis only.

ECON 599: Creative Component
Cr. 1-5.
Offered on a satisfactory-fail basis only.

Courses for graduate students:

ECON 600: Quantitative Methods in Economic Analysis II
(4-1) Cr. 4. F.
Prereq: ECON 500
Unconstrained and equality- and inequality-constrained optimization; the Kuhn-Tucker formulation; abstract spaces; dynamic programming; dynamical systems.

ECON 601: Microeconomic Analysis I
(4-1) Cr. 4. F.
Prereq: ECON 301, previous or concurrent enrollment in 600 and permission of Director of Graduate Education
Economic theory and methodology; theory of consumer behavior, theory of the competitive firm, supply and factor demand; duality relations in consumer and producer theory, welfare change measures; partial equilibrium analysis, perfect competition, monopoly; choice under uncertainty, the expected utility model, risk aversion; insurance, portfolio and production decisions under risk.

ECON 602: Macroeconomic Analysis
(4-1) Cr. 4. S.
Prereq: ECON 301, ECON 302, previous or concurrent enrollment in 600 and permission of Director of Graduate Education
Neoclassical aggregate growth models; the overlapping generations model; endogenous growth models; equilibrium business cycle theories; equilibrium job search and matching; models of money, fiscal and monetary policy; income and wealth distribution.

ECON 603: Microeconomic Analysis II
(4-1) Cr. 4. S.
Prereq: ECON 601, ECON 602 and permission of Director of Graduate Education
General equilibrium analysis, efficiency, and welfare; market failures, externalities, and the theory of the second best; introduction to game theory; adverse selection, signaling, screening and moral hazard.

ECON 604: Advanced Macroeconomic Analysis
(4-1) Cr. 4. F.
Prereq: ECON 601, ECON 602 and permission of Director of Graduate Education
Topics will be selected from: new Keynesian approaches to business cycle theory; endogenously generated business cycles; models of credit and financial intermediation; mechanism design and time inconsistency issues; political economy models; heterogeneous-agent models with strategic interaction; path dependence, network effects, and lock-in; economies as evolving self-organizing systems.

ECON 606: Advanced Topics in Macroeconomics
(3-0) Cr. 3.
Prereq: ECON 603, and credit or current enrollment in ECON 604
Selected topics in macroeconomic theory of current significance to the profession.

ECON 615: Theoretical Industrial Organization
(3-0) Cr. 3.
Prereq: ECON 603
Theoretical analysis of traditional topics in industrial organization. Review of game theory. Monopoly and oligopoly theory, price discrimination, product differentiation, research and development, diffusion of innovation, network externalities, and asymmetric information.

ECON 618: Game Theory
(3-0) Cr. 3.
Prereq: ECON 603, or ECON 501 and permission of instructor
Theoretical analysis and applications of strategic games, extensive form games, and cooperative games. Nash equilibrium, correlated equilibrium, Bayesian games, subgame perfect equilibrium, the core, evolutionary equilibrium, repeated games with finite automata, and common knowledge.
ECON 641: Agricultural Economics I
(3-0) Cr. 3.
Prereq: ECON 603
Demand and supply for agricultural products, market equilibrium models, implications of government policies on the agricultural sector, evaluation of research and development policies in agriculture, and biofuel and energy policy analysis. Commodity promotion programs, food safety and consumers’ valuation of product attributes.

ECON 642: Agricultural Economics II
(3-0) Cr. 3.
Prereq: ECON 603
Advanced treatment of topics and models in agricultural economics with emphasis on stochastic models. Topics will include analysis of risk in decision making by consumers, firms and farms; analysis of risk management strategies for farmers; the economics of commodity storage; analysis of the impact of biofuels on commodity prices; and models of agricultural inputs and outputs.

ECON 653: Financial Economics
(3-0) Cr. 3.
Prereq: ECON 603, ECON 672. Recommended: ECON 674, STAT 551

ECON 655: International Trade
(3-0) Cr. 3.
Prereq: ECON 603
Theories of international trade; welfare and distributional aspects of trade and commercial policies. Optimal trade policies in the presence of domestic distortions; strategic trade policy; international trade and economic growth.

ECON 657: International Finance
(3-0) Cr. 3.
Prereq: ECON 602
The intertemporal approach to current account determination; non-traded goods and the real exchange rate; fiscal policy in the open economy; monetary approach to balance of payments and exchange rate determination; sticky price models of the open economy; exchange-rate based stabilizations; capital inflows; financial and balance of payments crises; international business cycles.

ECON 671: Econometrics I
(4-1) Cr. 4. F.
Prereq: ECON 501 and STAT 447 or STAT 542
Probability and distribution theory for univariate and multivariate normal random variables, introduction to the theory of estimators for linear models, hypothesis testing and inference, introduction to large sample properties of estimators; derivation of common estimators and their properties for the classical and general multiple regression models, hypothesis testing, forecasting, implications of specification errors - missing data, left-out regressors, measurement error, stochastic regressors.

ECON 672: Econometrics II
(4-1) Cr. 4. S.
Prereq: ECON 671
Identification, estimation, and evaluation of systems of simultaneous equations; qualitative choice and limited dependent variable models; introduction to time series methods and applications, including alternative variance specifications.

ECON 673: Microeconometrics
(3-0) Cr. 3.
Prereq: ECON 672, ECON 601
Econometric treatment of models arising in microeconometric applications. Methods are primarily concerned with the analysis of cross-section data. Topics may include: systems of demand equations in panel data settings, random utility models of discrete choices, production possibilities frontier estimation, and discrete/continuous models of participation and consumption.

ECON 674: Macroeconometrics
(3-0) Cr. 3.
Prereq: ECON 672, ECON 602
Time-series econometric techniques and their application to macroeconomics and financial markets. Techniques may include GARCH and ARCH-M models, unit-root tests, nonlinear adjustment models, structural VARs, and cointegration tests.

ECON 680: Advanced Resource Economics
(3-0) Cr. 3.
Prereq: ECON 603
Dynamic allocation of scarce, exhaustible, and renewable natural resources, including minerals and energy, soil, water, forests, and fish. Social versus private decisions. Market and nonmarket considerations. Technological change. Regulation. Dynamics and uncertainty.

ECON 690: Advanced Topics
Cr. 1-5. Repeatable.
Offered on a satisfactory-fail basis only.
ECON 691: Third-Year Paper
Cr. 3.
Under the direction of the major professor, Ph.D. students write a formal research paper as an introduction to the dissertation research process. Offered on a satisfactory-fail basis only.

ECON 693: Workshops
Cr. 3.
Workshop in economics. Offered on a satisfactory-fail basis only.

ECON 699: Research for Thesis or Dissertation
Cr. arr. Repeatable.
Offered on a satisfactory-fail basis only.