AAEC’S OPTIONS

AAEC offers a high-quality MS program in Agricultural and Applied Economics and a five-year BS/MS program for exceptional students.

Normand Adams
Graduate Program Coordinator
(540) 231-0913
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RESEARCH AREAS

- General Economics
- Econometrics & Quantitative Methods
- Trade & Development
- Environmental & Resource Economics
- Food Systems & Health Economics

Program Highlights

- Flexibility in determining Plan of Study
- Seminars with breadth of research topics
- Labs & conferences to help students develop presentation skills & gain new perspectives on research
- Graduate co-op provides working experience

Addressing 21st Century Concerns

- Helping alleviate rural poverty and hunger through policy analysis
- Protecting natural resources through evaluation of energy uses
- Creating strategies to better manage businesses across complex global food and health systems
- Evaluating the social and environmental consequences of technologies and policies

Theoretical Framework

- Adopting the notation and framework used by Song et al. (2011)
- The value of the crop production under management system i given the option of transitioning to system j: 

\[ V^i(x_i(t), x_d(t)) = \max \{ x_i(t) dt + e^{-\gamma t_i} EV^j(x_i(t + dt), x_d(t + dt)), V^j(x_i(t), x_d(t)) - I_j \} \]
Structure:

<table>
<thead>
<tr>
<th>Thesis Option</th>
<th>Non-thesis Option</th>
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<tbody>
<tr>
<td>• 26 hours of coursework + 6 research and thesis hours = 32 semester hours minimum</td>
<td>• 30 semester hours, 23 at 5000 level or above</td>
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<tr>
<td>• Financial assistance available via Research or Teaching Assistant Positions</td>
<td>• Final oral or written examination</td>
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<td>• Thesis defense</td>
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More Options...

• Humboldt University Exchange - Exchange program with the International Agriculture Program of Humboldt University Berlin. Students spend 9-12 weeks in Europe at the end of their first spring semester at Virginia Tech.
• Combined BS/MS program - Undergraduates who are admitted to the program can double-count up to 12 hours of graduate credit to be applied toward an MS degree and their BS degree.

Application Process...

1) All students must submit an application to the Virginia Tech Graduate School by January 5th - students interested in the joint BS/MS program must submit an by March 1 of their junior year.

2) Applications consist of academic transcripts from accredited institutions, reference letters, application forms, GRE scores, and TOEFL scores for international students.

3) Admission is based on review of applicants' undergraduate GPA, GRE scores (and TOEFL scores if applicable), personal statement, reference letters, and fit with the program.
AAEC Master's program

ALUMNI NOW

- Ph.D. students
- Economic Development Specialists
- Senior Analysts
- Economists with EPA
- Managers at Monsanto

*Additional forms and information here.

Jonathon Giuffria, Residential Account Manager, ICF

Kathryn Russ, Associate Professor, UC Davis
### Required Courses

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AAEC 5025</td>
<td>Applied Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>AAEC/STAT 5804</td>
<td>Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>AAEC 5024, AAEC 5026, ECON 5015</td>
<td>Choose 2: Math Progr., Applied Microeconomics, Macroeconomics</td>
<td>6</td>
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</tbody>
</table>

**Applied Economics Courses:**
- Choose 2 from among AAEC 5134, 5144, 5154, 5244, ECON 5964 (Experimental Economics) and FOR 5984 (AAEC 5024 may substitute for one of the applied economics courses if AAEC 5026 and ECON 5015 are taken)

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<tr>
<th>Course Number</th>
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</tr>
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<tbody>
<tr>
<td>AAEC 5004</td>
<td>Seminar in Professional Ethics and Expectations</td>
<td>1</td>
</tr>
<tr>
<td>AAEC 6004</td>
<td>Seminar in Professional Engagement and Communication</td>
<td>1</td>
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</tbody>
</table>

**Total Core Required** 20

### Additional Coursework

Students complete the remaining 6 credits of their master's program with electives in classes at the 4000 level and higher. Classes could be in economics, agricultural and applied economics, forestry, statistics, mathematics, or other disciplines.
Typical Master's Degree Program - Thesis Option

**FIRST YEAR FALL SEMESTER**
Applied Microeconomics (AAEC 5025)
Mathematical Programming (AAEC 5024) or Applied Economics
Applied Economics or Elective Seminar (AAEC 5004)

**FIRST YEAR SPRING SEMESTER**
Applied Microeconomics (AAEC 5026) or Macroeconomics (ECON 5015)
Applied Economics or Elective Econometrics (AAEC/STAT 5804)
Seminar (AAEC 6004)

**SECOND YEAR FALL SEMESTER**
Applied Economics or Elective Thesis Research

**SECOND YEAR SPRING SEMESTER**
Thesis Research
Course Descriptions

AAEC 5004 - Seminar
Formal presentation and discussion of current problems, programs, and research studies in agricultural economics. Presentations and discussions. Repeatable for credit. 1,II
Credit Hour(s): 1, Lecture Hour(s): 1

AAEC 5024 - Mathematical Programming for Economist
Employing economic principles to optimally achieve the goals of firms as a "whole." Linear, non-linear, and integer programming are employed to model firm decision making. I
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): AAEC 3004 (UG) OR AAEC 3004 OR ECON 3104 (UG) OR ECON 3104

AAEC 5025 - Applied Microeconomic
Basic economic theory of food and fiber production, food and fiber consumption, agricultural markets, and social welfare as influenced by the agricultural sector. Major emphasis placed on application of theory to current agricultural and resource problems. I,II
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): (MATH 1526 (UG) OR MATH 1526, ECON 3004 (UG) OR ECON 3004) OR (ECON 3104 (UG) OR ECON 3104)

AAEC 5026 - Applied Microeconomics
Basic economic theory of food and fiber production, food and fiber consumption, agricultural markets, and social welfare as influenced by the agricultural sector. Major emphasis placed on application of theory to current agricultural and resource problems. I,II
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): (MATH 1526 (UG) OR MATH 1526, ECON 3004 (UG) OR ECON 3004, ECON 3104 (UG) OR ECON 3104)
Course Descriptions Cont'd

AAEC 5104 - Research Project Plan
Planning and executing a research project with emphasis on problem identification, formulation of hypothesis, choice of appropriate empirical technique and data sources. II Credit Hour(s): 1, Lecture Hour(s): 1

AAEC 5114 - Applied Microeconomic Theory
Theoretical and empirical issues in developing and implementing microeconomic models. Topics include duality, risk, household production, selecting functional forms, aggregation, and numerical partial and general equilibrium models. Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 5006, (AAEC 5126 OR ECON 5126)

AAEC 5125 (ECON 5125) - Empirical Research Methods in Economics
Extensive treatment of new techniques for economic modeling. 5125: Probability and statistical inference, linear regression and related dynamic models, specification, estimation, misspecification, respecification, identification. 5126: Simultaneous equations, dynamic systems, time series, limited dependent variable models. Permission of the Director of the Graduate Studies required. II Credit Hour(s): 3, Lecture Hour(s): 3

AAEC 5126 (ECON 5126) - Empirical Research Methods in Economics
Extensive treatment of new techniques for economic modeling. 5125: Probability and statistical inference, linear regression and related dynamic models, specification, estimation, misspecification, respecification, identification. 5126: Simultaneous equations, dynamic systems, time series, limited dependent variable models. Permission of the Director of Graduate Studies required. I Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): AAEC 5125 (UG) OR AAEC 5125
Course Descriptions Cont'd

AAEC 5134 - Agricultural Marketing
Concepts of technical and economic efficiency as they are related to the flow of agricultural products from farm to consumer. Major topics include: market equilibrium over time, space and form; price discovery under different market structures, and price risk management with futures and options. II
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 3104 (UG) OR ECON 3104

AAEC 5144 - Resource and Environmental Economics
Economic theory and methods are applied to analysis of the uses of natural resources, environmental problems and public investment planning. The contribution of economic analysis to public policy formulation is stressed. II
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 3104 (UG) OR ECON 3104 OR AAEC 3004 (UG) OR AAEC 3004

AAEC 5154 - International Agricultural Development and Trade
This course focuses on the role of agriculture in economic development and the effects of alternative trade policies and practices in less developed nations. Topics include agriculture in theories of development, population growth, migration, the economic organization of the peasant-household firm, technological change, institutional change, effects of trade restrictions, exchange rates, trade preferences, regional economic groupings, food aid, trade negotiations, agricultural sector marketing, and project analysis. II
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 3104 (UG) OR ECON 3104
Course Descriptions Cont'd

AAEC 5174 - International Agricultural Development and Trade
Agriculture in world economic development, agricultural modernization strategies, and the effects of trade policies and agreements on agriculture. Dimensions of world food, population, income, and natural resource issues; technological and institutional change; trade, capital flows, and foreign aid. Pre. Understanding of introductory microeconomic and macroeconomic theory. Graduate standing required.
Credit Hour(s): 3, Lecture Hour(s): 3
Instruction Type(s): Lecture, Online Lecture

AAEC 5244 - Rural Development
Theory and methods related to economic development of rural America. Considers the roles of agriculture, resources, human capital, and federal, state and local governments in development processes. Outlines the constraints created by resource scarcity, location and government policy. Quantitative methods in resource development, regional development and impact analysis are introduced. II
Credit Hour(s): 3, Lecture Hour(s): 3

AAEC 5804G - Fundamentals of Econometrics
Introduction to economic applications of mathematical and statistical techniques: regression, estimators, hypothesis testing, lagged variables, discrete variables, violations of assumptions, simultaneous equations, instrumental variables, panel data methods. Graduate standing required.
Credit Hour(s): 3, Lecture Hour(s): 3

AAEC 5814G - Adv Food & Health Economics
Microeconomics of food, nutrition, and health. Overview of nutrition, nutrition recommendations, and implications for economic based decisions. Individual and household food consumption and health production models. Farm to consumer market linkage models with nutrition and health implications. Effectiveness of food and nutrition interventions and policies. Cost-benefit and cost- effectiveness analysis of health interventions. Pre: Graduate standing.
Credit Hour(s): 3, Lecture Hour(s): 3
Course Descriptions Cont'd

AAEC 5894 - Final Examination
Credit Hour(s): 3, Lecture Hour(s): 3

AAEC 5904 - Project and Report
Credit Hour(s): 1 TO 19, Lecture Hour(s): 1 TO 19

AAEC 5946 (ECON 5946) - Econometric Theory and Practice
An intensive coverage of the most important techniques of econometric estimation and hypothesis testing, addressing the use of both cross-section and time series data. A core sequence in the MA program in both locations. Prerequisite to the research-thesis seminar in Northern Virginia. I,II
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 2115 (UG) OR ECON 2115 OR ECON 2116 (UG) OR ECON 2116 OR ECON 2005 (UG) OR ECON 2005 OR ECON 2006 (UG) OR ECON 2006 OR ECON 2125 (UG) OR ECON 2125 OR ECON 2126 (UG) OR ECON 2126 OR ECON 2025H (UG) OR ECON 2025H OR ECON 2026H (UG) OR ECON 2026H

AAEC 5954 - Study Abroad
Credit Hour(s): 1 TO 19, Lecture Hour(s): 1 TO 19

AAEC 5974 - Independent Study
Credit Hour(s): 1 TO 19, Lecture Hour(s): 1 TO 19

AAEC 5984 - Special Study
Credit Hour(s): 1 TO 19, Lecture Hour(s): 1 TO 19

AAEC 5994 - Research and Thesis
Credit Hour(s): 1 TO 19, Lecture Hour(s): 1 TO 19
Course Descriptions Cont'd

AAEC 6004 - Seminar
Formal presentation and discussion of current problems, programs, and research studies in agricultural economics including projects employing advanced theoretical and quantitative techniques. Presentations and discussions. Repeatable for credit, up to 3 (M.S.) or 4 (Ph.D.) times. I,II,III,IV
Credit Hour(s): 1, Lecture Hour(s): 1

AAEC 6214 - Food and Health Microeconomics
Microeconomics of food and health. Overview of nutrition recommendations and implications for economic decisions. Individual and household food consumption and health production models. Farm to consumer market linkage models with nutrition and health implications.
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): AAEC 5126, ECON 5006, ECON 5016, ECON 5124

AAEC 6224 - Food & Health Macro Economics
Introduction to policy and intervention design and evaluation, including review of basic nutrition, contract theory and applications, intervention outcome metrics, nonmarket evaluation, empirical cost effectiveness analysis and treatment effect estimations.
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 5006, (ECON 5126 OR AAEC 5126)

AAEC 6304 - International Trade and Finance
Core models in international trade and finance; current topics in international economics. Ricardian, Hecksher-Ohlin-Samuelson, Dynamic imperfect competition trade theories; Political economy of trade; Trade policy, Factor mobility, Uncertainty, and Intra-industry trade. Mundell-Fleming, Monetary, Real- and Imperfect competition- Micro-foundations theories of international macroeconomics; exchange rate determination; and capital markets. Extensions to monetary and fiscal policy, economic growth, and external debt analysis.
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 5005, ECON 5015
Course Descriptions Cont'd

AAEC 6314 - Topics Applied Dev Econ
Economic theories and empirical methods for measuring poverty, inequality, and vulnerability, and for targeting social programs. Topics include theory of the farm household and empirical methods to measure effects of public policies, interactions between the environment and development policy, methods for measuring technical change and its impacts, effect of social networks on technology adoption, and the role of microfinance in economic development.
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 5006, ECON 5126

AAEC 6444 - Regional and Urban Economics
An advanced study of the theory and application of regional and urban economics, with particular focus on the spatial aspects of economic activity. Topics include: nature of regional and urban areas, models of regional economies, location choice of firms and consumers, local public finance, housing, transportation, and labor markets. II
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): ECON 5005 (UG) OR ECON 5005, (ECON 5126 (UG) OR ECON 5126 OR AAEC 5126 (UG) OR AAEC 5126)

AAEC 6524 - Env Theory & Policy Analysis
Advanced coverage of the theory of environmental economics and policy. Topics covered in the course include: theory of externalities and public goods, theory behind policy instruments, issues with non-point source and transboundary pollution, and the role of the political economy for environmental problems.
Credit Hour(s): 4, Lecture Hour(s): 3
Prerequisite(s): ECON 5006
Course Descriptions Cont'd

AAEC 6554 - Panel Data Econometrics
Introduction to major panel data techniques and modeling ideas currently employed (e.g., dynamic panel, panel for discrete choice model, treatment effect and program evaluations etc.), including both statistical theory derivations and practical applications
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): (AAEC 5124 OR ECON 5124), AAEC 5126

AAEC 6564 (STAT 6564) (ECON 6564) - Bayesian Economics Analysis
Bayesian estimation of economic models, with focus on Gibbs sampling, hierarchical modeling, data augmentation, and model search. Strong emphasis on programming and computational implementation.
Credit Hour(s): 3, Lecture Hour(s): 3
Prerequisite(s): AAEC 5126 OR ECON 5126 OR STAT 5304 OR STAT 5444

AAEC 6984 - Special Study
Credit Hour(s): 1 TO 19, Lecture Hour(s): 1 TO 19

AAEC 7994 - Research and Dissertation
Credit Hour(s): 1 TO 19, Lecture Hour(s):