

THE PH.D. PROGRAM

The AAEC offers a Ph.D. in Economics jointly with the Department of Economics. Ph.D. students take a common set of core courses in the first three semesters of the program and a common written qualifying examination. Each student must also pass a field-based preliminary examination, write a dissertation, and present a final defense of his/her dissertation. Graduate students pursuing a Ph.D. degree are eligible for graduate teaching assistantships and graduate research assistantships.

Ph.D. Course Requirements

The Graduate School requirements for a Ph.D. degree include a minimum of 90 semester hours of graduate credit beyond the baccalaureate, with at least 27 hours of coursework and 30 hours of Research and Dissertation (AAEC/ECON 7994). A more detailed discussion of Graduate School requirements is found in the Graduate Catalog (<http://www.grads.vt.edu/academics/gcat/index.html>).

For the Ph.D. degree in Economics, there are additional core coursework requirements. These core requirements are summarized in Table 1.

Table 1: Core and Field Courses for the Ph.D. Degree

	Description	Credits
<i>Core Courses</i>		
ECON 5005 and 5006	Microeconomic Theory	6
ECON 5015 and 5016	Macroeconomic Theory	6
AAEC/ECON 5125, 5126, and 5946	Econometrics	9
ECON 5124	Mathematical Economics	3
Sub-total core courses		24
<i>Field Courses</i>		
AAEC Field 1 Course 1		3
AAEC Field 1 Course 2		3
AAEC Field 2 Course 1		3
AAEC Field 2 Course 2		3
AAEC 5114	Applied Microeconomic Theory	3
Elective		3
Sub-total beyond core		18
Total Required		42

In the first year of the program, the core requirements include one semester of mathematical economics, one semester of macroeconomics, and two semesters of microeconomic theory and econometric theory. In the fall of the second year of the program the core requirements include one semester of macroeconomic theory and one semester of microeconometrics.

Beginning in the second year of the program, Ph.D. students are required to complete two field courses in each of their two fields, and two elective courses that support their fields and areas of research specialization. Selections among field courses and electives allow students to tailor their graduate program to particular interests and to interact with faculty working in these areas. However, students normally take AAEC 5114, Applied Microeconomic Theory, as one of their electives as the material provides a useful base for understanding advanced materials covered in AAEC field courses.

The AAEC has recently revised its field course offerings with the arrival of a number of new faculty. AAEC fields and associated course offerings that will be available to students entering the Ph.D. program in the Fall of 2008 are listed in table 2. A list of suggested elective courses is provided, by field, in table 3. The list is not exhaustive and the student's final choice of elective courses should be made in consultation with their advisory committee chair.

Table 2: AAEC Ph.D. Fields of Study and Courses

<i>Field</i>	<i>Courses</i>
Applied Econometrics	Panel Data Econometrics Robust Econometric Methods
Environmental and Resource Economics	Environmental Economics and Policy Environmental Benefit Cost Analysis
Food and Health Economics	Micro Food and Health Economics Macro Food and Health Economics
International Development and Trade	Topics in Applied Development Economics International Trade and Finance
Rural and Regional Development	Regional and Urban Economics Rural Development

Ph.D. students complete many of their required field and elective courses during the second year of their studies. But as some courses are taught in alternate years, it is not unusual for Ph.D. students to take some courses during the third year of their program.

Students with an applied orientation are strongly encouraged to include at least one course in the Econometrics Field in their program of study. Excluding AAEC 5114, at most two courses at the 5000 level can be used to fulfill the Ph.D. field and elective requirements without permission of the Graduate Program Director. In addition to the regularly scheduled courses shown in Tables 2 and 3, a three-credit seminar course is used to offer various special topics in which a group of faculty and students have an interest at a particular time. The AAEC and ECON Graduate Program Directors will sometimes approve these special topic courses (AAEC/ECON 6984) to be counted as part of the field-course requirements. Students who have successfully passed the Ph.D. Qualifying Exam, but have not yet taken and passed their Preliminary Examination are also required to enroll each fall semester in a one-credit research seminar (AAEC 6004) where they present and review research findings with students and faculty. This requirement is waived in semesters when the student is taking four courses (12 credits).

Table 3: Suggested Elective Courses

<i>Field</i>	<i>Courses</i>
Applied Econometrics	Econometric Theory & Practice (ECON 5945) Philosophy of Econometrics (ECON 6635) Adv. Empirical Microeconomics (ECON 6604)
Environmental and Resource Economics	Natural Resource Economics (FOR/AAEC 6454) Resource and Environmental Economics (AAEC 5144)
Food and Health Economics	Public Health Administration (HNFE 5694) Res. Methods for Behavioral Interventions (HNFE 5984) Spatial Statistics (STAT 5544)
International Development and Trade	Development Economics (ECON 6504) Regional and Urban Economics (AAEC 6444)
Rural and Regional Development	Public Economics (ECON 6204) Topics in Applied Development Economics (AAEC 6314)

Students who are admitted to the Ph.D. program without having completed a master's degree at another institution often earn an M.S. at Virginia Tech as part of their Ph.D. program. The credit hours applied to the master's degree can also be counted toward the Ph.D. coursework requirements. A similar rule applies for students who are initially in a master's degree program and are subsequently admitted to the Ph.D. program. In all cases, a separate program of study must be filed with the Graduate School for each degree. Ph.D. students who have filed a preliminary program of study for only a master's degree at the end of their first year must file a final program of study for their Ph.D. degree by their fifth semester of enrollment.

Ph.D. Course Requirement Exceptions

Individual students enter the Ph.D. program with various educational backgrounds. In particular, some students enter directly from a B.A. or B.S. program while others have previously earned an M.A. or M.S. degree. In addition, depending on their background, some students are assigned substantial teaching or research responsibilities during their first year in the Ph.D. program. In recognition of these differences, students may seek exceptions on an individual basis from some parts of the core coursework requirements. In the first-year core, a student may waive out of the Mathematical Economics course by demonstrating competence in equivalent material or by taking a more advanced course. Both the AAEC and Department of Economics Graduate Program Directors must approve such exceptions. Waiving out of Mathematical Economics is recommended only for those students who already have substantial training in calculus, algebra, analysis, and the theory of static optimization.

A student may waive out of any of the remaining core courses (two semesters of microeconomics and macroeconomics and three semesters of econometrics) only by demonstrating completion of equivalent material in a previous program of graduate study. Both the AAEC and Department of Economics Graduate Program Directors must approve such exceptions, which will be granted only to students having outstanding records. With the approval of the AAEC and Department of Economics Graduate Program Directors, a special topics course (AAEC/ECON 5984 or 6984) may be used as one of the courses required for a field. Substitutions within fields also may be permitted to allow qualified individual students to tailor their program toward specialized fields of study or to enhance the overall quality of their graduate education. Such substitutions must be approved by the Graduate Program Director (on the student's program of study submitted to the Graduate School). Exceptions will be based on the specific background and objectives of the student, on recommendations by a student's advisory committee chair, and on outstanding performance of the individual. Even with permitted substitutions, only two field or elective courses at the 5000 level, or its equivalent at another institution, can be included without permission from the Graduate Program Director. As noted, AAEC 5114 does not count towards this restriction. To request that previous graduate coursework at another institution substitute for part of either the Ph.D. core coursework requirements, a student must fill out a "Graduate Credit Transfer Evaluation Form" giving a detailed description of the specified courses. The Graduate Program Director will work with the student to evaluate his/her transfer credits in terms of substitutions for courses offered at Virginia Tech.

Typical Ph.D. Program

An outline of the sequencing of courses in a "typical" Ph.D. program is shown in Table 4. During the third and fourth years, Ph.D. students may take field courses or electives that are only offered in alternate years, but the primary concentration after the second year is on dissertation research. Students who are supported by graduate teaching or research assistantships must register for 12 hours of coursework and/or research and dissertation hours (AAEC/ECON 7994) during each fall and spring semester.

Table 4: Typical Ph.D. Program

First Year	
Fall Semester	Spring Semester
Microeconomics (ECON 5005)	Microeconomics (ECON 5006)
Econometrics (AAEC/ECON 5125)	Econometrics (AAEC 5126)
Mathematical Economics (ECON 5124)	Macroeconomics (ECON 5015)
Research Credit	Research Credit
Second Year	
Fall Semester	Spring Semester
Macroeconomics (ECON 5016)	AAEC Field Course
Microeconometrics (AAEC 5946)	AAEC Field Course or Elective
Applied Microeconomic Theory (AAEC 5114)	Elective
AAEC Field Course	Research Credit
Third Year	
Fall Semester	
AAEC Field Course or Elective	AAEC Field Course/Elective (if needed)
Research Credit	Research Credit
Research Seminar	

The Ph.D. Examinations

In addition to coursework, Ph.D. students are required to pass three examinations: (1) a written qualifying examination, (2) a written and oral preliminary examination, and (3) a final oral dissertation defense.

Written Qualifying Examination

1. Students are required to take the written qualifying examination during the summer following their first two semesters of coursework. Exceptions to the summer rule, while unusual, may be obtained on an individual basis. To be considered for an exception, a student must petition the AAEC Graduate Program Director in writing as early as possible, and not later than four weeks prior to the examination date. Students who fail to take the written qualifying examination without the required permission will be considered to fail, unless there are extraordinary extenuating circumstances.
2. Prior to taking the written qualifying examination, students must have an approved program of study on file at the Graduate School. Exceptions to this rule, while unusual, may be considered if the student petitions the co-chairs of the GPC in writing not later than four weeks prior to the examination date. As noted above, students who have not

previously earned a master's degree may file a program of study just for a master's degree at this time, if they so choose.

3. The qualifying examination will be administered by a written Qualifying Examination Committee comprised of six members, three from each department, two of whom serve as co-chairs. The summer examination will be at least four weeks after the end of spring semester.
4. The Qualifying Examination Committee maintains an outline of topical areas for students to study in preparing for the examination. A file of previous exams is maintained on the web.
5. A student has two attempts to pass the written qualifying examination. Failure to pass the qualifying examination after two attempts will preclude a student continuing in the Ph.D. program. Under extenuating circumstances, the chair of a student's advisory committee may petition the student's Department Head/Chair to allow a third attempt.
6. The determination of whether a student fails or passes the qualifying examination rests with the written Qualifying Examination Committee.
7. Students who do not pass the summer offering of the qualifying examination are required to take the examination at the next sitting. Typically, this reexamination will be scheduled during the following fall semester. Exceptions to this rule may be considered if the student petitions a chair of the GPC not less than four weeks prior to the examination date.
8. If the qualifying examination is given during a period other than summer, any eligible student may take the examination. However, the qualifying examination will not be scheduled at times other than summer only for first attempts.
9. A student cannot advance to the preliminary examination process until the qualifying examination has been passed.

In the last five years, of the students who have used all of their allotted attempts to take the exam, approximately 80 percent have passed.

Preliminary Examination

Each student must pass a preliminary examination consisting of a written and an oral component. The preliminary examination is required by the Graduate School. A student and his/her advisory committee can choose from two approaches to the preliminary examination: either a three-hour written examination followed by an oral examination, or preparation of a dissertation proposal with the oral examination a defense of that proposal. In either case, a student must attempt the preliminary examination before entering a seventh semester of full-time enrollment in the Ph.D. program unless approval for extension is given by the co-chairs of the GPC. The determination of whether a student fails or passes the preliminary examination rests solely with the student's advisory committee.

Under the written examination approach, the examination covers material relevant to the student's declared fields of study. The oral part of the exam will cover all of the student's coursework and material that the student's advisory committee deems relevant for a Ph.D. candidate. The preliminary examination proceeds as follows:

1. The written preliminary examination is designed by the student's advisory committee, which may enlist the help of other faculty in preparing and grading individual questions.
2. A successful attempt at passing the written examination is followed within two months by the oral examination. The oral examination must be scheduled with the Graduate School at least two weeks prior to taking the examination and a card must be obtained for recording the grade on the day of the exam. The results of the oral examination (pass or fail) are recorded with the Graduate School by filing the card upon completion of the oral examination.
3. If a student is unsuccessful on the written examination, it is considered a failure of the preliminary examination and recorded with the Graduate School. A failure on the written examination is recorded by the chair of the student's advisory committee who writes a letter to the student, with copies to the Dean of the Graduate School and the Graduate Program Director, indicating that the student has failed the written portion of the examination, which constitutes failure of the preliminary examination.

Under the dissertation proposal approach, the written component consists of a preliminary investigation of a certain field of research. The proposal should contain evidence that the student has a thorough and broad understanding of the field of investigation, evidence of sufficient innovations within this field of investigation to constitute at least one paper, and an outline of a research agenda beyond the proposed innovations leading to the completion of a dissertation. The proposal should be accompanied by a bibliography of the field of investigation.

The preliminary examination proceeds as follows:

1. The student must submit a draft of the written dissertation research proposal at least six weeks prior to the proposed date of the oral examination to his or her advisor and the designated readers. The student is required to have at least one meeting with his/her advisor and the designated readers regarding the dissertation research proposal prior to the submission of the proposal to the advisory committee as a whole. If necessary the student will have the opportunity to modify his/her proposal to respond to the remarks from the advisor and the designated readers.
2. The student has to submit the final version of the written dissertation research proposal at least two weeks prior to the defense date to all members of his/her advisory committee. The oral examination must be scheduled with the Graduate School at least two weeks prior to taking the examination and a card obtained for recording the grade on the day of the exam. The results of the oral examination (pass or fail) are recorded with the Graduate School by filing the card upon completion of the oral examination.

If a student fails the first attempt of the preliminary examination, the student's Department Head/Chair may grant a second attempt. If a second attempt is granted, the preliminary examination process must be retaken between fifteen weeks and six months after the first attempt. A maximum of two attempts to pass the preliminary examination will be allowed. There will be no opportunity to repeat the preliminary examination process after two attempts.

Final Oral Examination

1. The final oral examination is a defense of the student's dissertation. The Graduate School requires that the final oral exam not be scheduled less than six months after the student has successfully passed the preliminary examination. Before scheduling the final oral examination, the chair of the student's advisory committee and the two dissertation readers must concur that the dissertation is suitable for the final defense.
2. The determination of whether a student fails or passes the final oral defense rests solely with the student's advisory committee.