Agricultural and Resource Economics Graduate Program
Degree Requirements

Revised October 16, 2003
Approved by Graduate Council on October 17, 2003

Doctor of Philosophy Program
The Ph.D. program at Davis provides rigorous training in a supportive academic environment. Students and faculty interact with the goal of advancing knowledge on important problems in agricultural economics, natural resources and environmental economics, development economics and related areas. Study in these specialized areas builds on strong foundations in economic theory and quantitative methods. To complete the program, students:

- take core requirements in microeconomic theory, quantitative methods, mathematical programming, applied microeconomic theory and research methodology;
- complete three preliminary examinations
- complete two elective fields of three courses each, and three additional Ph.D. elective courses
- complete a research essay and dissertation prospectus;
- pass a comprehensive oral qualifying examination;
- submit a dissertation approved by three advisors.

While rigorous, the program is also streamlined and flexible. The scheduling of courses and requirements are such that all coursework can be completed in two years by students entering with an M.S.-level background. Additional course work, in year three, is encouraged but is optional. Often those who enter with a B.S. as well as those who have had less economics previously, at their option, take the required courses over two years and the field courses during their third year. Completing the coursework over three years, rather than two, is referred to as “splitting the core.”

Required Ph.D. Courses
1. Microeconomic Theory Satisfied by successful completion of a written exam, administered jointly with the Economics Department, covering material from the following courses:
   - ARE/ECN 200A (5) I Microeconomic Theory
   - ARE/ECN 200B (5) II Microeconomic Theory
   - ARE/ECN 200C (5) III Microeconomic Theory
2. Econometric Methods and Statistics  
Satisfied by passing a written examination covering material from the following courses:

- STA 133 (4) I Mathematical Statistics for Economists
- ARE/ECN 240A (4) II Econometric Methods
- ARE/ECN 240B (4) III Econometric Methods

3. Applied Microeconomic Theory  
The applied micro theory sequence complements the microeconomic theory sequence and is taken concurrently. The goal is to show how the theory is used to solve applied problems in agriculture, resources and development. Particular emphasis is placed on the general philosophy of economic modeling, welfare economics, and empirical models of industrial organization. Satisfied by passing a written examination covering material from the following courses:

- ARE 202A (3) I Applied Microeconomics I: Introduction to Research Methods; Consumer and Producer Behavior
- ARE 202B (3) II Applied Microeconomics II: Welfare Analysis and Imperfect Competition
- ARE 202C (3) III Applied Microeconomics III: Mathematical Programming; Dynamic Optimization

Preliminary Examinations
Students in the Ph.D. program are required to pass three preliminary examinations, one in Microeconomic Theory, one in Econometrics, and one in Applied Microeconomics, at the earliest opportunity following completion of the course work pertaining to the exams. (Students who depart from this schedule without approval from the Graduate Administrative Committee may be viewed as not making normal academic progress.) Passing these exams is necessary to continue in the program. Students have a total of six tries in the three exams, with a maximum of three tries in one subject. Click here for information on the procedures for completing the preliminary examination requirement.

Elective Fields
Two fields are chosen and completed, in most students' second year. As these two fields cover six courses, students take another three courses. These can be a sequence in another field, or a selection among courses across several fields, or courses such as Macroeconomics, Econ 200D and 200E. Students must complete a total of nine Ph.D. level courses that are not included in the core requirements. Completing at least three courses with a grade of B- or better satisfies each field. That is, there are no exams over the fields.

One field must be selected from the following three:

1. Development Economics
   ARE/ECN 215A (4) I Microdevelopment Theory & Methods I
ARE/ECN 215C (4) III Microdevelopment Theory & Methods II
ARE/ECN 215D (4) III Environmental and Economic Development

2. Natural Resource & Environmental Economics
   ARE 276 (4) I Environmental Economics
   ARE 277 (4) III Natural Resource Economics
   ARE 254 (4) II Dynamic Optimization Techniques with Economic Applications

3. Agricultural Economics
   ARE 231 (4) I Supply and Demand for Agricultural Products
   ARE 232 (4) II Agricultural Commodity Markets
   ARE 233 (4) III Agricultural Policy

   The Second field can be selected from the above three, from number 4, or any three-course field in the Department of Economics.

4. Econometrics
   ARE 240C (4) I Econometric Theory
   ARE 240D (4) II Topic in Econometrics
   ARE 240E (4) III Special Topics in Applied Econometrics

Sample Course Schedule for Doctor of Philosophy Degree
* Required courses

**Year One**
**FALL QUARTER**
   ARE 200A (5)* Microeconomic Theory
   ARE 202A (3)* Applied Microeconomics: Introduction to Research Methods; Consumer and Producer Behavior
   STA 133 (4)* Mathematical Statistics for Economists

**WINTER QUARTER**
   ARE 200B (5)* Microeconomic Theory
   ARE 202B (3)* Applied Microeconomics II: Welfare Analysis and Imperfect Competition
   ARE 240A (4)* Econometric Methods

**SPRING QUARTER**
   ARE 200C (5)* Microeconomic Theory
   ARE 202C (3)* Applied Microeconomics III: Mathematical Programming; Dynamic Optimization
   ARE 240B (4)* Econometric Methods

**Summer After Year One**
Pass Microeconomic Theory Preliminary Examination
Pass Applied Microeconomics Preliminary Examination
Pass Econometrics Preliminary Examination
Year Two
(Supposing student is interested in natural resources in developing countries.)

FALL QUARTER
- ARE/ECN 215A (4) Microdevelopment Theory & Methods I
- ARE 240C (4) Econometric Theory
- ARE 276 (4) Environmental Economics

WINTER QUARTER
- ARE 254 (4) Dynamic Optimization Techniques for Economic Systems with Applications
- ECN 200D (5) Macroeconomic Theory
- ARE 232 (4) Agricultural Commodity Markets

SPRING QUARTER
- ARE/ECN 215C (4) Microdevelopment Theory & Methods II
- ARE/ECN 215D (4) Environmental and Economic Development
- ARE 277 (4) Natural Resource Economics

Summer After Year Two
- Prepare Research Essay
- Advance to Candidacy

Year Three
- Dissertation Prospectus completed and approved by Graduate Advisory Committee
- Additional Elective Coursework
- Dissertation Research

Summer after Year Three
- Dissertation Research

Year Four
- Dissertation Research

Additional Program Requirements

Research Essay
The emphasis on applying microeconomic theory encourages students to begin thinking about dissertation topics early in the program. During the summer following the second year, each student completes a research essay that reviews the existing literature with regard to a reasonably specific research question. The purpose of the essay is to identify a research focus, to select one or more advisors, to identify funding sources, and to serve as a basis for the oral qualifying examination. Click here for information on the procedures for completing the research essay requirement.
Oral Qualifying Examination
The comprehensive oral qualifying examination is taken after satisfactory completion of all course work, including the field requirements and the research essay. A five-person examining committee is appointed by Graduate Council, upon the recommendation of the Departmental Graduate Administrative Committee. Usually all five are faculty from the Department of Agricultural and Resource Economics, but sometimes those with special expertise are invited from other UC Davis departments or UC campuses. The chair of the dissertation committee may not chair the oral qualifying examination committee. The student is advanced to candidacy upon satisfactory completion of the examination, which concentrates on the material put forward in the research essay, although it is not limited to that material.

The oral qualifying examination is completed and the student advances to candidacy prior to the fall quarter of the third year. Click here for information on the procedures for completing the oral qualifying examination requirement.

Dissertation Prospectus
A dissertation prospectus describes the student’s plan for completing the dissertation. The dissertation prospectus is completed during the third year of the program. Click here for information on the procedures for completing the dissertation prospectus requirement.

Dissertation
The Davis faculty places a high priority on Ph.D. dissertation research. The faculty and students have considerable interaction at all stages of research. Support facilities for library research, quantitative analysis, and the Departmental data processing service are excellent. Sixteen UCD graduate students have received doctoral dissertation awards and six have received honorable mention from the American Agricultural Economics Association, since the establishment of the Ph.D. program at Davis. Numerous other research awards have been received for joint faculty/student research reports.

Time to Complete the Ph.D. Degree
Students entering the Ph.D. program with an M.S. in Agricultural and Resource Economics from UC Davis, or a comparable degree, can complete their Ph.D. within four years, by following a normal program. This would involve the minimum of two years of course work, a maximum of six months to complete the dissertation research prospectus and pass the advancement-to-candidacy comprehensive oral examination, and 15 months to complete the dissertation. The time requirements may vary according to the previous experience and employment status of the student. Most students finish in their fifth or their sixth year.
Attachment A.

Procedures for Completing the Preliminary Examination Requirement

Students must complete three preliminary examinations: the Econometrics Examination, which addresses empirical methods; the Microeconomic Theory Examination, which addresses economic theory, and the Applied Microeconomics Examination, which addresses the application of theory to empirical questions. Students are allowed a total of six attempts to pass all three examinations. No more than three attempts may be used for a single exam. Each exam is offered twice a year. All offerings are held between the end of spring quarter and the beginning of fall quarter. Thus, a student who wishes to use a third try on an exam must wait until the next summer.

Timing. Students who enroll in the full core are required to take all three examinations in the summer following their first year. Students who split the core are required to take the Econometrics Examination at the end of their first year, and the other two examinations at the end of the second year. During the spring quarter, students are required to register for each exam. Failure to do so by the deadline will result in the forfeiture of one of the six opportunities to complete the preliminary exam requirement, including the forfeiture of one of the (maximum) three opportunities to pass the exam in question. The GAC will notify students of this deadline once; while additional reminders may be provided, a failure to sign up for the exam given this initial notification will be entirely the responsibility of the student. Students are required to take the first scheduling of each examination, which is in June or early July. Failure to take this exam will result in the forfeiture of one of the six opportunities to complete the preliminary exam requirement, including the forfeiture of one of the (maximum) three opportunities to pass the exam in question. Failure to take any subsequent scheduled exams that are necessary to meet the preliminary examination requirement will result in the forfeiture of one of the six opportunities to complete the preliminary exam requirement, including the forfeiture of one of the (maximum) three opportunities to pass the exam in question.

Exam Preparation and Grading. The Econometrics and Applied Microeconomics exams are written and graded by a committee of at least three faculty members who are appointed by the GAC chair. At least one member of the committee must not be an instructor in the course sequence commonly taken as preparation for the exam: ARE 240A and ARE 240B for the Econometrics exam, and ARE 202A-C for the Applied Microeconomics exam. The Microeconomic Theory exam is administered jointly with the Economics Department.
Attachment B

Procedures for Completing the Research Essay, Oral Qualifying Examination, and Thesis Prospectus Requirements

Requirements
There are four requirements associated with the identification of your thesis topic: selection of a general topic and two-member essay committee, preparation and submission of a research essay, completion of an oral qualifying examination, and preparation and submission of a research prospectus. Each of the four requirements has a deadline. A failure to meet a deadline is a failure to make normal progress. If you do not make normal progress, you are ineligible for employment, and the department will not pay your out-of-state tuition.

First, you identify two faculty members who will review (and, if it is satisfactory, sign) your essay reviewing a specific body of literature, and the general area in which you intend to write your essay, by May 15. This requirement is satisfied by notifying the Graduate Program Assistant, currently Kris Carpenter. The research area may be broadly defined at this point: biotechnology, for example, or community-based management of natural resources.

Second, you prepare a research essay. The essay reviews the existing literature with regard to a reasonably specific research question. Information on preparing your essay is included below. You should consult with your two-member essay committee when defining a question and identifying papers. Five paper copies and one electronic copy of your essay, and five paper copies of your reviewed articles are due to the Graduate Program Assistant eight weeks prior to the first day of the fall quarter at the beginning of your third year, if you did not split the core, and at the beginning of your fourth year if you did split the core. Failure to meet this deadline may result in it being impossible for your oral examination to be scheduled in time for you to continue to make normal progress.

Third, you take an oral qualifying examination based on your research essay. The oral qualifying examination may be scheduled no sooner than four weeks after your approved essay and copies of the reviewed articles are submitted to the Graduate Program Assistant. These four weeks will provide examiners with enough time to review your materials, and Graduate Council with sufficient time to appoint your examination committee. Your exam committee will have five members. Ordinarily, two of these members will be the two faculty members who signed your essay. All members of your examination committee must approve your essay as a sufficient basis for an oral qualifying examination prior to the examination itself. Approval in this case constitutes agreement to convene the scheduled examination; no formal signature is required. If your examiners determine that your essay is an insufficient basis for an examination, then your examination will be postponed. You may appeal their decision in writing to the GAC.

A satisfactory essay is one that identifies a coherent research question, reviews the most relevant economic literature, is written clearly and logically, and is grammatically
correct. It is your responsibility to have someone edit your essay, if necessary. Your essay need not include a formal model, or a description of a data set and intended empirical work, although it may include these elements, if available. However, including such items does not substitute for meeting the criteria for a satisfactory essay.

Failure to submit a satisfactory essay could result in your failure to make normal progress, if the examination cannot be rescheduled before the deadline for advancing to candidacy. Similarly, we expect that you will be available to take your oral qualifying examination for at least three of the four weeks prior to the first day of the fall quarter, in order to allow sufficient flexibility to schedule an exam. Normal progress requires that you complete your oral qualifying examination prior to the final day for advancement to candidacy of the fall quarter of your third year, if you did not split the core, and prior to the beginning of the fall quarter of your fourth year, if you did split the core.

Finally, you choose a 3-member dissertation committee, and complete a 10-page research prospectus, which addresses your thesis research. In no case should the prospectus be more than 20 pages. Ordinarily, for continuity of advice, the dissertation committee will contain one or more members of the essay or examining committees. The prospectus must be signed by all three members of your dissertation committee, and approved by the GAC. Normal progress requires that you submit your prospectus by the end of the spring quarter of your third year, and that it is approved by the end of the summer quarter after your third year (fourth year for core splitters).

Guidelines for Research Essays

Please compose an essay to elucidate an existing literature in an area that would be relevant to your possible dissertation. Your essay might even become the first draft of a literature review chapter in your dissertation, although you are not required to write your dissertation on the topic of your essay. The essay should demonstrate your ability to define and evaluate a research question. Be sure to note the criteria for a satisfactory essay described in the requirements section.

The size of the topic should be equivalent to something covered in a more cursory manner in part of a second-year Ph.D. course, e.g., water markets, econometric tests for market integration, anti-dumping trade legislation, tropical deforestation, spatial configuration of processing plants, environmental amenities within GNP, regulation of network utilities. If the number of plausible references is less then seven or so, the topic is too small; if greater than forty or so, the topic is too large. The list of the literature need not be comprehensive, but important articles or books should all be covered; those more important articles should serve as the focus of your essay. The ten or so most important articles you will distribute to the oral examination committee. The essay should be about 15 to 25 pages, as appropriate, but no longer than 30 without good reason. The purpose of the essay is not to annotate a bibliography - a string of abstracts reveals little - but to synthesize the literature, to describe how theory has been implemented in empirical work, and to point out what questions remain unanswered.
Suggested Schedule
All official deadlines are documented above. The following is a suggested schedule that can guide you in planning. The schedule below is written for non-core splitters. Core splitters may substitute third year for second throughout. Of course, you may plan for a much earlier oral examination if you wish. Your exam may be scheduled as soon as the spring quarter ends and you have officially completed all of your Ph.D. coursework. If you are a core splitter, you may choose to take your exam during the spring quarter, depending on your class schedule in your third year.

Fall-Spring, Second Year. While you are completing your coursework, you will undoubtedly identify some specific topics that interest you, if you have not already done so. Course papers are an excellent opportunity to explore a specific question. Do discuss these topics with faculty members who have interests in the same area, whether or not you have had them as instructors. In addition to suggestions and feedback on your ideas, you will be able to start identifying potential committee members.

Spring, Second Year. By this point, you should have identified one or two faculty members to serve as advisors, and have identified a specific area of research for your proposal and, ideally, your thesis. This will allow you to plan a schedule with your advisors for completing your research essay, so that you can take into account research trips, vacations, and other absences. For example, if your advisor will be unavailable for three weeks beginning July 1, you may wish to draft your research essay a bit more rapidly in order to obtain comments prior to his/her departure. You should communicate with your advisors regarding how much time they require to read and return an essay draft when planning your schedule with them. You must notify the Graduate Program Assistant of your two-member committee no later than May 15.

Early July, Second Year. By now, you should have identified the articles that you will review for your essay, and at least outlined the research essay text.

Early August, Second Year. Submit your signed research essay and copies of the reviewed articles to the Graduate Program Assistant no later than eight weeks before the first day of the fall quarter. This deadline provides us with enough time to schedule all orals, and flexibility to accommodate faculty schedules. Keep in mind that the Office of Graduate Studies requires the oral examination to be completed and the paperwork submitted nearly a week before the first day of the fall quarter in order for you to advance to candidacy for that quarter. Also remember that the first day of the fall quarter is a few days before the first day of classes. You may consult the Course Schedule issued by the university for the exact dates.

September, Second Year. Complete your oral examination, and identify a three-member dissertation committee, in order to advance to candidacy for fall quarter. If necessary, you may petition to change the composition of your committee after you have advanced to candidacy.

Fall-Spring, Third Year. In cooperation with your committee, prepare a 7-10 page dissertation prospectus. Ideally, within a few weeks of completing your qualifying examination, you and your major advisor should map out a plan for the year that will
enable you to progress on your thesis. The prospectus should largely be a natural outgrowth of this progress. Submit the signed prospectus (one paper copy, signed, plus an electronic copy) to the Graduate Program Assistant for the GAC to review prior to the end of the spring quarter of your third year.

Following the Third Year. Complete your dissertation. Congratulations! You’re another successful UCD ARE graduate.