

The Unofficial Ph.D. Guide to the Department of Applied Economics

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Required Courses

Microeconomics

Macroeconomics

Econometrics

Welfare Economics

Applied Economic Methods

Microeconomics

ECON 8001-8004: Microeconomic Analysis; or

ECON 8101-8104: Microeconomic Theory.

ECON 8001-8004: Microeconomic Analysis (The minor sequence)—This sequence is intended for Ph.D. students outside of the Department of Economics. In addition to students from the Department of Applied Economics, Ph.D. students from the Carlson School of Management, the Division of Health Policy and Management, and the Department of Industrial Relations also tend to take this sequence. The sequence gives students a foundation for future work in all the fields of Applied Economics and it is usually taken in the first year as a Ph.D. student. Every course in the sequence uses problem sets as a central part of the learning process. Homework assignments are often rigorous and students are strongly advised to work in groups to successfully complete these activities. Students who have already taken this sequence are usually willing to provide guidance on the best approaches to solving problems or proving some of the theorems discussed in the course.

Professor Hurley will teach both Fall 2009 mini-semesters (ECON 8001-8002). During the Spring semester Professor Werner will teach the ECON 8003 mini-semester and Professor Richter will probably teach the ECON 8004 mini-semester. Due to changes and circumstances within the Economics Department, the instructor lineup (and hence, course content) has seen a fair amount of variation during the past few years. In previous years, Professor Richter has taught the first semester sequence, with a particular focus on the first and second welfare theorem. For the second semester sequences, despite the variation in the instructors scheduled to teach these courses, the sequences mostly focus on asymmetric information and public economics.

8001-8002 with Professor Hurley

The first two mini-semesters of the Microeconomics sequence cover consumer and producer behavior in competitive and monopoly markets; general equilibrium analysis; welfare evaluation; and the first and second theorems of welfare economics.

Professor Hurley is VERY organized. All of his notes are posted ahead of time online (although sometimes not until moments before class), as are his homework assignments, answer keys, and exams. Please see his syllabus on his website to get an idea of the lecture topics (we made it through 20 in 2008). Professor Hurley responds to emails very quickly and is very approachable. You will cover a lot of material and need to dedicate at least 20-30 hours outside of class to both studying and homework. If you have had Micro at the Master's level, much of the course may seem like review at first, but soon you will realize that he goes into much more detail and the difficulty level is much higher. This will be apparent when you attempt the weekly homework assignments.

Professor Hurley references his notes during lecture, but do not rely on them instead of taking your own notes! He is great at giving examples during lecture that are not included in the online notes & also goes into much more detail during lecture. He throws out a lot of questions during lecture that come straight from Microeconomic Theory by Mas-Colell, Whinston, and Green (MWG), and he really enjoys when students answer him in class. He writes on the board quite a bit and tends to make small errors in labeling, so if you think something is wrong, it probably is and he is very friendly if you point out an error.

Professor Hurley had ten homework assignments consisting of 2-4 questions each. He usually distributes the assignments on Tuesdays and they are due the following Tuesday. Work with a group of 2-3 others. Each must turn in their own copy, though! Start the assignments individually during the week and get together on Saturday or Sunday to compare answers. He provides his TAs with a copy of the answer key, so they have the opportunity to ask him questions beforehand (which you will discover is very helpful once you sit through the much less organized 8003-8004 sequence).

Professor Hurley has 2 midterms exams at the end of each mini-semester. Each exam had 4 questions: 2 lower point questions similar to exams, 1 that might be similar to a difficult homework question, and the 4th is usually a concept from a difficult homework question but with a major twist. His exams are very fair and you should not feel as though he is trying to throw you a curveball with them. There is typically one very tough question on the test intended to create some distribution for grades.

NOTE: The previous instructor (Richter) spent nearly all of 8001 developing/expanding the Edgeworth Box & Walrasian Equilibrium. Hurley covers this in one lecture and it is not on any exams or homeworks, but I am only noting this because on the Spring 2009 Micro Prelim, the first (required) question was from Richter's course and it dealt with the Edgeworth Box. Students will update you after the Fall 2009 Micro Prelim about the status of the EB. It is worth noting that you might need to find course materials from pre 2008-2009 courses in order to pass the prelim. Hurley attempted to make the course more mathematically rigorous than Richter & also moved at a much faster pace.

8003 with Professor Werner

Professor Werner is currently scheduled to teach ECON 8003 this academic year. Last year, the focus of this sequence was preferences under uncertainty, risk and risk aversion, game theory, and optimal allocation of public goods. Professor Werner provides lecture notes for the covered material, and these should be used as a guide. You should read the course text, MWG, or books with simpler treatments (risk & uncertainty) to help you learn, especially for the first half of the mini. Introductory game theory is also covered.

For teaching style, Professor Werner gives formal weekly homework assignments aimed to help gain a better understanding of the course material. It is important to work on the problem sets in groups. Professor Werner also provides plenty of sample exam questions for study purposes. These are very important since similar questions may appear on midterms and finals.

8004 with Professor Allen

In the past, Professor Allen taught this sequence. Last year, the overall theme of Professor Allen's course was information economics. She picked up on the concepts on uncertainty and risk introduced by Professor Werner. Professor Allen emphasizes asymmetric information. She also covered a series of equilibrium concepts with great technical abstraction. There is also room for interesting classroom discussion, especially during the topics of adverse selection and moral hazard.

She gave two homework sets during the mini, which were very long. Again, working with your classmates is very important. Although the homework sets are crucial study material, exams usually include several surprises. This should not discourage you. This added level of difficulty is usually taken into consideration when grading.

ECON 8101-8104: Microeconomic Theory (The major sequence)—This microeconomics sequence is known as the major sequence. It is required for Ph.D. students in the Department of Economics and fulfills our Department's microeconomic course requirements. If you would like to study microeconomics at a more advanced (mathematical) level and feel that you have a relatively good microeconomic theory and mathematical (advanced calculus at a minimum) background, the Graduate Club suggests that you consider taking the major sequence in lieu of the minor sequence. The Department of Economics strongly encourages students taking the major sequence to concurrently enroll in a yearlong course in real analysis. The math skills taught in the first semester of real analysis are essential to the material covered in this sequence and you will have a large disadvantage if you have not seen the material. The major sequence emphasizes microeconomic theory and mathematical proofs. It offers a thorough coverage of microeconomic topics and if you are considering pursuing an academic career in Economics, this sequence may be more beneficial than the minor sequence. If you are considering taking this course it may be helpful for you to consult with your intake advisor and the students who have taken the course in the past.

Grading is based on the homework, midterm, and a final. As in most courses, teamwork is strongly encouraged although the homework assignments are to be turned in independently. The major sequence has a different preliminary exam than the minor sequence exam. However, APEC students who take the major sequence may choose to meet the department's microeconomics exam requirements by taking either of the microeconomics preliminary exams. The course content varies depending on the professor teaching that mini-semester. In the recent past, the general structure has been as follows:

First mini-semester: Producer and Consumer Theory (Exchange Economy); and Risk and Uncertainty (Expected Utility Hypothesis). Professor Werner is currently scheduled to teach this mini semester for Fall 2009. Tips: appendix of class handout, appendix of MWG.

Second mini-semester: General Equilibrium Theory (Exchange Economy); and Existence, Pareto Optimality, and First and Second Welfare Theorems. Professor Allen is currently scheduled to teach this mini semester for Fall 2009. Tips: listen carefully, write crazily, and make sure to record most of what Professor Allen says in class, don't ignore the papers Professor Allen recommends to read.

Third mini-semester: Noncooperative Game Theory (Nash Equilibrium and refinements, and Complete and Incomplete Information). Professor Rustichini is currently scheduled to teach this mini semester for Spring 2010. Tips: group work, rely on Myerson's book.

Fourth mini-semester: Spring 2008, Decision Theory and violations of the Expected Utility Hypothesis (Allais Paradox and Ellsberg Paradox). Spring 2009, Social Choice Theory, Cooperative Game Theory, and Mechanism Design. Professor Chung is currently scheduled to teach this mini semester for Spring 2010. Tips: if Professor Sau repeats last year, almost all that he teaches can be

found in the last three chapters and the Appendix A of Chapter 18 of MWG, the exercises in MWG are helpful.

Macroeconomics

Econ 8105-8108: Macroeconomic Theory — This is a one-year sequence of macroeconomic theory that is required for the first-year Ph.D. students in the Department of Economics. Applied Economics students are required to take only the first two mini-semesters of the course; however, some choose to take the full sequence and even the associated prelim. Throughout the sequence, students learn tools and theory to analyze the behavior of aggregate variables (such as output and capital stock) in an economy. As in the micro sequence, the focus is on general equilibrium, not partial equilibrium.

This year, Timothy Kehoe will be teaching the first half-semester and Fabrizio Perri will be teaching the second-half semester. As these are not the professors that have been teaching these courses over the past few years, there is no guideline on what to expect.

Historically, though, Professor Larry Jones taught the first half-semester and Professor V.V. Chari taught the second half-semester. Professor Jones' class was based mostly on Recursive Methods in Economic Dynamics by Stokey, Lucas, and Prescott (SLP) and his own typed notes. Most of this course was devoted to developing the Arrow-Debreu equilibrium to studying economic growth, with variations on tax and monetary schemes. Professor Chari's course also used SLP as a reference and added material from Recursive Macroeconomic Theory by Ljungqvist and Sargent. This class built on the concept of an Arrow-Debreu equilibrium to study additional topics, such as growth dynamics, uncertainty and stochastic dynamic programming, overlapping generations models, asset pricing, search and matching models, and inflation.

There is no way around it - these courses are very time consuming. This fact should be taken into consideration when scheduling other classes, activities, etc. In previous years, students were given approximately one assignment per week. Each homework assignment can be expected to be from 20 to 50 pages (handwritten)—and many of them will take several days, if not an entire week, to complete. While each assignment is turned in individually, working in groups is an important key to success. Depending on the professor, some problem sets were much longer, but then students were allowed to turn in assignments as a group. In these situations, in previous years, students formed groups and the write-ups averaged a combined 70-80 pages, handwritten. While this cut down on the individual workload, it put much more onus on the responsibility to learn all the material covered in each week's problem set. The homework problems tend to be good practice. You may feel frustrated at the beginning, but after you do a few of the homework assignments, you will gradually learn the format and better understand how to deal with certain kinds of problems. If you fully understand every exercise in the homework, you should do well on the exams too. [TIP: There

is a solution manual to SLP that can be ordered from Amazon; this can be VERY helpful for when you get stuck on problems. However, you should be careful about using the solution manual as there are some incorrect answers in the manual.]

Last year, each class had a midterm and a final exam. That's four exams for the semester. The exams tend to be long and difficult. The expectation is not necessarily that students will do well or even finish. In fact, the high score on Professor Chari's midterm last year may not have been much higher than 50%. Consequently, grades tend to get "curved" quite a bit. Last year, the TA was primarily responsible for assigning grades (with Jones and Chari seeming to sign-off on his "recommendations"). At the end of the day, while you are likely to get "beat up" quite a bit by homework assignments and exams, the final grades tend to come out "okay." That is, generally speaking, most folks will get at least a "B" (if history is to repeat itself).

In terms of preparation for these courses, you probably cannot have too much math background. The most useful course you can take to prepare for this sequence is the 5000-level course in real analysis (the Economics students all take it concurrently). While you will be able to survive without this training, things will definitely come easier (and you will likely learn much more) if you have this background; homework assignments tend to assume that you do. If you do not have a background in real analysis, you may find picking up Rudin's Principles in Mathematical Analysis helpful to have as a reference when using concepts such as metric spaces, convergence of sequences, contraction mappings, and continuity to solve problems and proofs (although SLP has a primer as well). Another useful course in dynamic optimization has recently been taught in Applied Economics by Professor Frances Homans. Dynamic optimization and dynamic programming techniques are used regularly throughout the macro sequence, so having this skill set ahead of time can be a significant help. Currently, we do not have the information about who are scheduled to teach the third and fourth mini-semesters in Spring 2010. So, not much can be said about what this part of the sequence will entail.

Econometrics

APEC 8211-8212 — These courses are the first year introductory courses in econometrics. APEC 8211 covers classical multiple linear regression, stochastic regressors, heteroscedasticity, autocorrelated disturbances, panel data, and discrete dependent variables. APEC 8212 covers specification tests, instrumental variables, heteroscedasticity, panel data, simultaneous equations, bootstrap methods, limited dependent variable models, semiparametric estimation, econometrics of program evaluation, general method of moments, time series, and hazard models.

Professor Gerard McCullough[?] will be teaching APEC 8211 in the Fall of 2009. In the past, Professor Q. Q. Huang taught APEC 8211. Professor Huang's course was fast-paced and rigorous. The students are exposed to a lot of information very quickly. At times one might feel as though

they are not absorbing what is being covered. Do not be discouraged by this. At the end of the semester, when preparing for the final exam, students realize that they have learned a great deal.

Professor Paul Glewwe taught APEC 8212 in the Spring of 2009. Professor Glewwe's course was also fast-paced and rigorous. However, he distributes typed lecture notes before the start of each lecture with the material he will cover that particular day. This is both helpful and a great temptation. Some might think, erroneously, that the printed lecture notes are a perfect substitute for lecture attendance. They are not!

In the past, group work and study has been encouraged. A format that worked well for most students was to form a study group at the beginning of the Fall semester and then meet with the group up to a few times a week throughout the academic year. Groups often seemed to meet after an assignment was distributed and assign each member a problem or problems to concentrate their efforts on. Then the group will meet to discuss their solutions and/or progress on their respective parts. At some point while completing the assignment, group members must meet to review the proposed solutions with one another to ensure that each group member has a competent mastery of the material (each student must turn in his or her own work, but can be assisted by other students). Also, remember that group work is not possible on exams!

Since each semester course is 4 credits with around 10 assignments, a great deal of time and effort will be spent on lecture and even more on the assignments. This is a time intensive course. The earlier you develop a study group and form a regular meeting schedule the better.

Welfare Economics

APEC 8203: Applied Welfare Economics and Public Policy — This course should ideally be taken in the spring of the first year as a philosophical foundation for future coursework and research in policy areas. It is a prerequisite for many of the field courses. Professor Ford Runge teaches this course. While many courses in the first year of the program focus on the development of specific tools, this course, while also addressing certain tools (e.g., consumer and producer surplus measures), has a more general focus. The reading list is large and quite technical. Most of the important points are covered in the class lecture. The majority of the time is spent on welfare theory. The last few weeks of the class examine how welfare theory has been applied in the “real world.” Topics covered include the following: the history of welfare economics; basic concepts such as consumer and producer surplus; market failure issues such as externalities, public goods, and the free-rider problem; distribution aspects such as social welfare functions and coordination norms; and empirical and policy issues such as trade policy and property rights.

Based on previous years, exams could either be in-class or take-home. You will be responsible for all of the information presented in class, and it is important to pay careful attention when taking notes. Professor Runge tends to speak quickly, and some students report that it is difficult to keep up with the lectures. If you find this to be a problem, it may be advisable to tape record the classes (with the Professor Runge's permission).

It is not uncommon for one or more exam questions to rely on your understanding of the assigned readings. The reading list is extensive, but not unmanageable. It is prudent to read the articles as they are assigned, as it is difficult to review them all at once before exams. Take-home exams tend to have an essay question which requires that you read several articles and synthesize the main concepts.

Applied Economic Methods

Students are required to complete at least two of the following:

APEC 8202: Mathematical Optimization in Applied Economics

APEC 8205: Applied Game Theory

APEC 8206: Dynamic Optimization

ECON 8117-18: Non-cooperative Game Theory

HRIR 8811: Advanced Quantitative Research Methods in HRIR

MATH 8441: Numerical Analysis & Scientific Computing I

APEC 8202: Mathematical Optimization in Applied Economics — This course serves as an important tools course and as a prerequisite for many other courses in the Applied Economics program. Professor Jeff Apland teaches the course. In general, this course applies mathematical programming techniques to economic problems. In this class, mathematical optimization concepts are reviewed, and structures and economic interpretations of various models of the firm, consumer, household, sector and economy are examined. Model building and solution techniques are illustrated using examples and computer exercises. For the mathematical programming sections, the software program GAMS is used. Some students, especially those with no programming background, find GAMS to be somewhat frustrating at first. However, numerous examples are provided in class and one can generally get up to speed pretty quickly by carefully following (and experimenting with) the examples.

There is some variation in the degree to which dynamic programming is covered. In any case, students who desire more in-depth coverage of dynamic programming should consider taking APEC 8206. Written and computer exercises, a midterm, and a final exam are the basis for grading in this course. Ph.D. students should take this course in the fall of their first year.

APEC 8205: Applied Game Theory — The Applied Game Theory class covers 5 main topics:

Static games of complete information

Dynamic games of complete information

Static games of incomplete information

Dynamic games of incomplete information

Equilibrium dynamics

Applied Game Theory will be offered in Spring 2010. Professor Hurley and Professor Polasky are scheduled to teach this course.

APEC 8206: Dynamic Optimization Applications in Economics and Management — This course provides a solid introduction to dynamic optimization techniques. Last year, the course began with a review of differential equations then moved on to the calculus of variations and optimal control. Next, discrete time dynamic optimization was covered for both deterministic and stochastic problems. At the end of the course, we returned to continuous time problems, with a focus on stochastic problems.

Last year this course was taught by Professor Homans. This course is demanding – you will be expected to complete quite a few rather demanding homework assignments. However, completing these assignments is critical to your understanding of the material – dynamic optimization simply cannot be learned without practice. It is well worth the effort to make sure you thoroughly understand each homework problem.

There were three exams during the course. Based on the class history, exams could be either take-home or in-class. The exams sometimes include fairly difficult problems, especially the take-home exams. The difficulty is often not in solving the problem, but in setting the problem up. However, the exam questions tended to closely follow the homework problems; if you pay close attention to how the homework problems needed to be setup, you will have a significant advantage when taking the exams. Further, some take-home exam questions were more difficult than homework questions;

if you are given a take-home exam, you should expect to spend much more time working through the exam than you would for an in-class exam.

Matlab is used extensively during the discrete time portion of the course. For some students, trying to learn to program in Matlab while learning to solve dynamic programs at the same time can be frustrating. It may be useful for students with little or no programming experience to work through one or more of the online Matlab tutorials before taking the course. Also, working through the examples in Miranda & Fackler's book can help you understand the materials better. However, students with programming experience will find Matlab to be fairly intuitive.

MATH 8441: Numerical Analysis & Scientific Computing I — This course has been recently added to the list. Hence, we do not have any information or guidance at this point. Students who are interested in taking this course should contact the instructor directly to obtain details on prerequisites and course content.

Note also that you may take other graduate courses to meet the Applied Economics Methods requirement, but they must first be approved by the DGS. To get approval, you must submit a written request to the DGS with the course name, course description/syllabus, and an explanation regarding how the course will provide you with skills that are broadly applicable to your research interests. The DGS will consider your request and either approve it, deny it, or ask for additional information. For more information, please refer to the graduate student handbook.

Department of Applied Economics Fields

There are currently seven Ph.D. fields of study available within the Department of Applied Economics:

Consumer Behavior & Household Economics

Natural Resources & Environmental Economics

Trade & Development

Production & Marketing Economics

Health Economics

Policy Analysis

Labor Economics

In addition to the microeconomic preliminary exam, every Ph.D. student is required to pass two written field exams administered by the Applied Economics Department (see the "Minor Programs" section for an exception to this rule).

Consumer Behavior & Household Economics

APEC 8401: Consumer Behavior and Policy

APEC 8402: Information and Behavioral Economics

APEC 8403: Demand Analysis and Household Economics

APEC 8404: Labor Economics

The Consumer Behavior & Household Economics field focuses on applied microeconomic theory of the consumer and household. Topics include consumer demand analysis, intra-household allocation decisions, human capital and education, labor supply, choice under uncertainty, and behavioral economics. The courses offered for this field are helpful supplements for anyone who is interested in learning more about microeconomic theory; they build on what is taught in the microeconomic sequence ECON 8001-8004.

APEC 8401: Consumer Behavior and Policy (2 credit mini-semester. Prerequisites: APEC 5151 or equivalent, APEC 8203). This course covers analytical and empirical treatments of consumers' economic behavior, household decision making, and the demand for quality characteristics. Experimental economics, empirical analysis of consumer behavior and household decisions, as well as basic consumer survey techniques are also addressed. Particular attention is devoted to policy-related issues. The course is currently taught by Professor Ben Senauer. This course can be taken before the econometrics course without much difficulty.

APEC 8402: Consumption Economics (2 credit mini-semester. Prerequisites: Econ 8001 or equivalent or concurrent, APEC 8401). This course covers new theories of consumer behavior combining economic and psychological models. It also examines whether human behavior is consistent with standard economic models. Topics include expected and non-expected utility theory, information economics, bounded rationality, prospect theory, choice over time, and rational addiction with applications to empirical work. The class is currently taught by Professor Jean Kinsey. This course can also be taken before the econometrics course without much difficulty.

APEC 8403: Demand Analysis and Household Economics (2 credit mini-semester. Prerequisites: Econ 8001 or equivalent or concurrent, APEC 8402). The course begins with lectures on household

and individual behavior, starting with demand analysis and then branching at the end of the semester into education and other issues. It focuses on functional forms for static demand systems, labor supply in static demand, separability / aggregation theory and empirical work, econometrics techniques used on demand analysis, intertemporal consumption, consumption dynamics and permanent income and intrahousehold allocation. This course is currently taught by Paul Glewwe. A significant amount of detailed information is presented on demand analysis. It is best to have taken econometrics before taking this course.

APEC 8404: Labor Economics and Human Capital (2 credit mini-semester. Prerequisites: Econ 8001 or equivalent or concurrent). In this course, we covered applied microeconomics as it relates to labor supply and human capital; decisions made by households and the resulting outcomes in the labor market. Topics include household labor supply, earnings functions, the theory of human capital, wage structure and determination, and government tax and transfer policies. This course is currently taught by Liz Davis. Having already taken econometrics will help.

Students should expect to complete all four courses (8 credits) in preparation for the field examination. Students should be aware of the cycle in which this course is taught. Every third semester there are no consumer behavior and household economics courses - so make sure to plan carefully from the beginning of your program by observing when these classes will be offered.

Natural Resources & Environmental Economics

APEC 8601: Natural Resource Economics

APEC 8602: Economics of the Environment

APEC 8601: Natural Resource Economics - Professor Polasky and Professor Homans have taught this course in the past. In the future, it will be taught by Professor Huang. The class deals with optimal management of natural resources. Analytical tools used in this course include dynamic optimization techniques (optimal control and dynamic programming). Cases of non-renewable resources (minerals, oil, fossil aquifers) as well as renewable resources (aquifers, fisheries, etc.) are analyzed. This course is technical and requires a good understanding of differential and integral calculus.

Much of the course content requires an understanding of dynamic optimization. Thus, APEC 8206 (Dynamic Optimization) should ideally be taken before this class. Previously, students without this background were offered a short lecture to give them enough understanding of dynamic optimization to get through the course. These students reported that their lack of previous exposure to dynamic optimization was not an insurmountable hurdle to success in the class. However, APEC

8206 is officially a prerequisite for this class, so you should seek approval from the professor before registering if you do not meet this requirement.

Previously, each lecture began with a short class discussion, usually focusing on how one might begin to specify a model related to some natural resource issue. The remainder of the lectures was devoted to the readings assigned for that day. There were several homework assignments. Most of the questions were either analytical or required that a model be specified. Keep in mind that model specification questions often appear simple at first glance, but can be quite difficult and time consuming. We were also asked to write a short essay on one of the problems (formatted as an article). Expectations for this essay were high and such essays should be taken very seriously (e.g. make sure to clearly specify all steps in your arguments, check grammar closely and so on). Based on the class history, exams could be either take-home or in-class. In either case, students will be expected to know the models presented in class and to be able to synthesize concepts.

APEC 8602: Economics of the Environment - Professor Jay Coggins teaches this course. The course covers recent developments in the field of environmental economics. The first half of the course deals with welfare theory, benefit-cost analysis, market failures and pollution control via taxes and permits. During the second half of the course, we covered contingent valuation, hedonics and uncertainty. In addition, global warming and biodiversity/sustainability were given some treatment in the course.

Students are required to complete several homework assignments (mostly analytical), two exams and a term paper. Homework assignments were sometimes long, but sufficient time was given to complete them. Thus, students who started the assignments early were much more comfortable. Group work on homework assignments was permitted and proved quite helpful. The exam questions were similar to abbreviated homework assignments, although not all of the exam material appeared on homework assignments. The term paper was taken very seriously. You will be allowed to choose a research topic related to environmental economics. The research must be original and must have an analytical component. You will be expected to turn in a proposal and a final paper. Students were also required to give a short, semi-formal presentation on their research.

Both classes (APEC 8601 and 8602) form the Natural Resources and Environmental Economics field and students are expected to take both in preparation for the written preliminary field exam.

Trade & Development

APEC 8701: International Economic Development, Growth & Trade

APEC 8702: Economic and Trade Policy: Sectoral and Institutional Issues

APEC 8703: Microeconomic Analysis of Economic Development

APEC 8701: International Economic Development, Growth & Trade - This class is taught by Professor Terry Roe, and its objective is to acquaint, inform and otherwise make students conversant with the major and current issues in development economics. Also, it is intended to provide students with key tools and methods for analyzing these issues. Prior to this class, one should have a good understanding of general equilibrium theory, since most of the topics covered in this class rely on it (see microeconomics sequence discussed above). The list of readings for this class may seem large at the beginning, but summaries of the most relevant readings as well as lecture notes are provided in class.

The first part of this class provides a general overview of the evolution of the economic conditions of different countries and groups of countries. In addition, the course investigates the effect of economic policies on the agricultural sector. It also examines the development and effects of various types of financial crises.

Second, the course introduces the subject of growth accounting, including the estimation of GDP functions and the effects of technical change on labor productivity.

Subsequently, the course introduces a sequence of macroeconomic models, starting with simple two sector static general equilibrium models (Heckscher-Ohlin-Samuelson Model). Comparative statics theorems (Stoplier-Samuelson and Rybczynski Theorems), along with applications in trade, international transfers, and foreign aid, are addressed.

In the last part of the course, dynamic (growth) two and three sector models are taught, including the Solow and Ramsey models. Using a social accounting matrix, techniques for model calibration are introduced. Mathematica is used to solve and analyze the three sector dynamic models.

Although the mathematical models provide the analytical foundation, Professor Roe really wants students to understand and soundly interpret the economics of what is happening. The course grade is based on homework and a final exam.

APEC 8702: Economic and Trade Policy: Sectoral and Institutional Issues - This course covers theoretical research on the international flows of goods, services, and factors of production. Professor Pamela Smith teaches this course. It includes frontier studies in the international trade and multinational literature. The course also covers institutional and sectoral issues related to international trade and multinational activities.

This course is not a lecture course. Rather, students are expected to read the course articles and present them in class. Students should also be prepared for extensive class discussions. The course grade is based on class presentations, exams and a project.

Professor Smith emphasizes depth of understanding over breadth of coverage. When an article is assigned, one student will be chosen to present it. You will know in advance which article(s) you will present. However, all students will be expected to come to class ready to discuss the assigned article(s). To encourage preparation, Professor Smith requires students to write a short summary of each assigned article. Thus, students who are to present an article usually end up leading a class discussion instead. It is wise to invest some time into writing the article summaries as they will be very valuable later when you are reviewing for exams (and for the field exam).

The expectations for the class project are higher than for a typical class writing assignment. You will be expected to produce original Ph.D.-level research that could potentially be published in a journal or other professional forum. Professor Smith is flexible in allowing you to choose a topic, so this is a good opportunity to explore data and literature relevant to your research agenda (of course, the topic must be within the scope of the class).

Previously, the exams were in-class. Students were expected to synthesize the literature and to be able to draw conclusions based on the literature. To help in preparation for exams, Professor Smith provided several "synthesis questions" to help students see the linkages in and evolution of the trade and multinationals literature. Although the exact synthesis questions may not appear on the exam, they are very helpful in preparation. As with the article reports, it is wise to prepare good answers to these questions as they are useful in studying for the class and field exams.

APEC 8703: Microeconomic Analysis of Economic Development - Professor Paul Glewwe started teaching this course for the first time in Spring 2004 with Professor Philip Pardey. The course focuses on microeconomic issues of development. It is based on lectures and extensive typed lecture notes will be provided. The first half of the course (taught by Professor Glewwe) focuses on the microeconomics of development, including household models, models of markets (land, labor credit), risk and insurance, infrastructure. Professor Glewwe then covers a variety of topics, including measurement of poverty and inequality, health issues (particularly child health), gender and fertility, education, migration and growth. The last few weeks of the course are taught by Professor Pardey who focuses on research and development, particularly issues related to measurement of productivity, technical change and the welfare effects of R&D in an international context.

This course moves quickly, particularly during the first half of the semester. In the Spring 2010 semester, there were very few homework assignments. Students worked in groups to solve the

problems. The difficulty of the problems in the homework assignments is quite variable - some problems can be solved in minutes and others require hours of collaborative work.

Since a large amount of material was covered, it was very important that we reviewed the notes frequently and thoroughly in preparation for exams. There was a midterm and a final exam. Over the past few years, the final has always been an in-class, closed book exam. Based on previous years, the midterm may be either open or closed book. Exams tend to require that several analytical problems be solved in addition to answering a few short-answer questions. Whether or not the test is open book, it is crucial to work with the models discussed in-class before taking the test - in this case, practice and familiarity with the details of the models is very important. (Hint: this may seem obvious, but if the notes say something like "this would be a good homework/exam question" it is a good idea to work out the problem.)

The three classes APEC 8701, 8702 and 8703 are all part of the Trade & Development field but only two have to be taken to pass the written preliminary field exam. They are taught in sequence starting with APEC 8702 this fall (2009).

Production & Marketing Economics

APEC 8801: Production Economics

APEC 8802: Financial Economics

APEC 8803: Marketing Economics

APEC 8804: Managerial Economics

APEC 8801: Production Economics (3 credits) - This course covers aspects of production theory, axiomatic representations of multi-output technologies and input, output and directional distance functions. Other topics include cost, revenue, and profit functions, duality, input/output separability, jointness/non-jointness in production, index numbers and measures of efficiency/productivity. Journal articles make up the majority of the required readings. In the past, course work has consisted of several problem sets, a term paper and a take-home midterm and/or final. The course is normally taught by Professor Rodney Smith.

APEC 8802: Financial Economics (2 credits) - Main theories of asset pricing under the assumptions of uncertainty, competitive markets, and symmetric information. Also covered are equilibrium/arbitrage models of financial markets with econometric applications, and pricing/use of

derivatives. Thus, it is recommended that students have some background in econometrics before taking this course. This course is normally taught by Professor Pederson.

APEC 8803. Marketing Economics (2 credits) - This course focuses on literature in agricultural marketing economics, with some attention paid to seminal literature in this area. The course begins with a review of market structure, conduct, and performance. Particular attention is devoted to vertical linkages and interdependency across markets over space, time and product forms. In addition, product diversity and quality are discussed. The literature discussed in this course is often empirical and some background in econometrics is helpful. Professir Liu typically teaches this course.

APEC 8804. Managerial Economics (2 credits) - This course focuses on journal articles in industrial organization area. Topics include incentives, contracts, property rights and ownership. Information and advertising, R&D and innovation, standards and network externalities and price discrimination are also covered. Professor Yeap teaches this course.

Students should expect to complete three courses for at least 6 credits in preparation for the field examination. For APEC 8801 and 8803, being able to solve past prelim questions is very helpful. For APEC 8802, it would be important to read the assigned papers, focusing on the model specifications, assumptions and applications. APEC 8804 is conceptually more rigorous (not mathematical), and students are expected to understand basic concept of each theory and model, and know why the particular empirical method has been used in papers covered in class. One should be able to tie empirical method with the theory.

Health Economics

The subject matter of health economics is the determination of the prices and quantities of scarce resources devoted to health and the combination in which those resources are employed. Health care markets display several distinctive features, including uneven and unpredictable incidence of illness, external effects, lack of consumer knowledge, widespread payment by third party insurers, restricted market entry, and non-profit motives of suppliers. Much of the creative work in the field arises from exploring the implications of these unique characteristics. Health economics draws heavily upon econometric methods to test the implications of these characteristics for the determination of prices and distribution of resources.

The field currently comprises three semester long courses and a written field examination that draws on concepts, theories, and methods covered in the field courses. The field courses are as follows.

PUBH 6832: Economics of the Health Care System - The production of health, the demand for health capital, the demand for health care, insurance theory, the market for health insurance, managed care and price discrimination, the market for physicians' services, production and cost of health care, institutions, technology, shortages, licensure, hospital theory, long-term care, equity and efficiency, role of government in the health economy, regulatory interventions, taxes and subsidies, cost-effectiveness analysis, Medicaid and Medicare, and national health insurance and reform.

This course is usually offered in the fall semester and is currently taught by Professor John Nyman. The course has weekly quizzes, so one has to keep up with the readings. No term paper or presentation is required for this class.

PUBH 8811: Research Methods in Health Care - Estimation of problems that arise in the context of health services research and health problems, including discrete and limited dependent variables, skewed distributions, and endogenous sample selection bias. This course is usually offered in the fall semester and is currently taught by Professor Bryan Dowd. As the description implies, this course applies econometrics to the health care sector issues. No term paper or presentation is required for this class.

PUBH 8821: Health Economics II - Examines applications of microeconomic theory to health services research through selected readings from the published and unpublished health economics literature. This course is usually offered in the spring semester and is taught by Professor Robert Town. The requirements for this course comprise a term paper and two presentations (a published paper and your term paper).

Students should expect to complete all three courses in preparation for the field examination. There is an extensive reading list for the field examination with about 70 to 80% of the readings being from the field courses. So it is important to read and make good summaries of the papers while taking the classes. This will significantly reduce the burden of readings when preparing for the field examination. Although Pubh 8820 (Health Economics I) is not listed as a field course for APEC students it would be useful to audit that class since there will be questions from that class on the field examination.

Policy Analysis

The Policy Analysis field is relatively new. Only a few students have officially enrolled in the field. Therefore, please refer to the Graduate Student Handbook and/or speak with your advisor for the latest information.

The field requires completion of two courses (6 credits) in preparation for the field exam. Students may choose two of the following:

PA 8002: Policy Analysis

APEC 8991: Advanced Topics in Applied Economics: Public Finance

PA 8312: Analysis of Discrimination

PA 8002: Advanced Policy Analysis - This class examines different program designs (random, quasi-experimental and non-experimental) and techniques (i.e. propensity scores, fixed effects models, instrumental variables, regression discontinuity design, interrupted time series) used to evaluate policies. This is an interesting applied class that makes use of some of the topics learned in the Econometrics sequence class. It applies them to real situations that policy analysts, consultants and researchers face when define, investigate or evaluate a policy situation. They used STATA last year. It is not a requirement to have a previous knowledge of the software, but it is helpful to have been exposed to it. They have 4 quizzes, 3 debates and 4 assignments during the whole semester. The reading material is so helpful and interesting to follow. Professor Temple and Professor Myers have taught this class. You can take better advantage of this class if you have previously taken Econometrics.

PA 8312: Analysis of Discrimination - This class is divided into two parts. The first one is theoretical and mainly examines the history of racial and gender discrimination in the US and the different economic techniques used to deal with it. Even if you are not particularly interested in racial or gender discrimination, the techniques learned in the class are so useful and can be applied to a broad array of topics. Students are required to write a critique of one of the elective readings each week and a total of three quizzes on the core readings are taken. Debates on a specific topic are also an important component of this class. Two groups are formed and each of them has an antagonist position on a topic. The idea behind it is that a policy analyst needs to know how to argue, defend and basically "sell" his position to his client (government, NGO, advisory committee, etc). The second part of the semester is devoted to learn how to apply different discrimination approaches in the real world. All the sessions are in the lab and biweekly assignments are a main component of this part. At the end of the class, students are required to present an annotated critique on discrimination. It can be theoretical or empirical and refer to any kind of discrimination. This is an excellent class, since this is the area of expertise of Prof. Myers.

Labor Economics

The Labor Economics field is also newer. It is possible that the courses available for the field exam will change, so please speak with your advisor or the DGS for the latest information.

APEC 8404: Labor Economics and Human Capital (2 credit mini-semester. Prerequisites: Econ 8001 or equivalent or concurrent). In this course, we covered applied microeconomics as it relates to labor supply and human capital; decisions made by households and the resulting outcomes in the labor market. Topics include household labor supply, earnings functions, the theory of human capital, wage structure and determination, and government tax and transfer policies. This course is currently taught by Professor Liz Davis. Having already taken econometrics will help.

HRIR 8860: Analysis of Current Labor Market Theory and Empirical Research - This course is taught by Colleen Manchester out of the Carlson School of Management. It is a seminar course that meets once a week and involves reading, discussing, and presenting labor economics journal articles. Students also write summaries of some articles and write a research proposal. There is a lot of material covered and it involves a lot of reading. This course is useful for developing research ideas, and it is very helpful, and recommended, to have already taken the Econometrics sequence.

HRIR 8870: Seminar: Labor Relations and Collective Bargaining - This course is currently listed as the third course in the labor field. However, this course is likely to change in the future.

The field requires completion of two these courses in preparation for the field exam.

Preliminary Exams

Below are some preliminary exam tips suggested by Ph.D. students.

Look at old preliminary exams and thoroughly work through old exams before taking your exam. Past microeconomic theory preliminary exams (both from the minor and major sequence) are now available in portable document file format on the Department of Economics web page (<http://www.econ.umn.edu/prelims/>). Typically, the prelim exam for Microeconomics will be taken after the first year (if a microeconomics sequence has been completed by then) and the field exams are taken after you have taken the appropriate classes. Although there is no class requirement to take the prelim or field exams, it is highly recommended that the course be taken since the exam is largely based on class material.

Find a study group to work with before taking an exam. Consider critiquing each other's write-ups of answers to preliminary questions. Look at the "study notes" of your predecessors in the program. These can be quite helpful. Keep a list of proofs you need to know. Learn them completely as there will be no time during the examination to reflect on how to prove a particular property of a function or some theorem. Even if you answer a test question incorrectly (i.e., via "bad" algebra), the most

important thing is to present your answer in a logical process that includes clear definitions of key terms and ideas. Correctly setting up the problem, using proper logic, and documenting your process are more important to the faculty correcting the exam than your algebra skills. Don't try to finesse an answer with vague arguments (state what you know, period). Read the whole examination before you start the first question and start with the questions you know the best first. Spend your last two to three days before the exam reviewing and relaxing. Stress is the "enemy" when you are taking any of the field examinations or preliminary examinations. It is especially important to take time to play and exercise before the test.

Note that for field exams, unlike the microeconomics preliminary examination, you will find that having a strong grasp of the literature of the field (usually reading from course) is equally as important as the ability to solve "mathematical" problems, so do not forget to review the literature and know the articles from classes along with practicing problem solving. As with the microeconomics prelim, previous field exams can be useful in helping you develop a sense of the likely format of the exam and the types of questions that may be asked. APEC field exams from previous years can be found at http://www.apecgrad.umn.edu/Previous_Field_Exams_2002-2009.html/. Also, different field exams are quite distinct from one another. For example, the Trade & Development field exam is based on a combination of two (out of three) required courses, which students choose prior to the exam. Students who have strong mathematical background are recommended to take the APEC 8701 & APEC 8703 combination, while students with strength in conceptual understanding would be better off taking the APEC 8701 & APEC 8702 combination. For other fields, the exams are mostly based on all required courses.

Minor Programs

Economics Minor

Statistics Minor

Conservation Biology Minor

Other Minors

The Department allows students to pursue minors. The respective graduate school departments determine requirements for a graduate minor degree. In some cases an Applied Economics Ph.D. student can substitute a minor degree for a passing grade on a preliminary exam administered by the program. Therefore, students in an "approved" minor program are only required to pass one field exam instead of the usual two. However, approval to replace a field exam with a minor can only be granted by the Applied Economics Graduate Program's DGS.

There are currently three approved minors for APEC students. There is a possibility of having other minors approved as well. Please consult with the DGS for more information.

Even if you cannot substitute a minor degree for a field exam, you may still find value in pursuing a minor degree. Please consult the appropriate graduate school program and DGS for more information on minor degree requirements. In addition, if you are interested in pursuing a minor degree, please discuss your plans with our program's DGS. The following is a brief summary of the current approved minors in the Applied Economics Graduate Program.

Economics Minor

Requirements for a doctoral minor in Economics include taking five or more courses from the following list: Econ 8001-2-3-4 or 8101-2-3-4, and 8105-6-7-8; plus completion of at least two other 8xxx level Economics courses. All courses must be taken A-F, with no grade lower than C and no more than two course grades of C.

In addition, students must pass the microeconomics preliminary exam for minors or majors, and either the macroeconomics preliminary exam for majors or one of the Department of Economics field exams. Students from our department have minored in such Department of Economics' fields as Industrial Organization, Macroeconomics, and International Trade. Other Department of Economics fields include Financial Economics, Public Economics, and Labor Economics.

Statistics Minor

The Department of Statistics has some of the premiere Bayesian, decision theory, and regression intellectuals in the country. The requirements for an approved minor in Statistics have recently been revised by the Department of Applied Economics. Students interested in a Statistics minor should talk to the Applied Economics DGS before choosing to pursue the minor.

The minor requires:

STAT 5101-5102 or STAT 8111-8112

APEC 8211-8212, ECON 8201-8204 or ECON 8205-8208

In addition, students must take a minimum of 8 credit hours from:

STAT 5201 - Sampling Methodology in Finite Populations (3 cr)

STAT 5303 - Designing Experiments (3 cr)

MATH 5262 - Introduction to Stochastic Processes (4 cr)

STAT 5401 - Applied Multivariate Methods (3 cr)

STAT 5421 - Analysis of Categorical Data (3 cr)

STAT 5601 - Nonparametric Methods (3 cr)

STAT 8311 - Linear Models (4 cr)

STAT 8312 - Linear and Nonlinear Models (3 cr)

STAT 8321 - Regression Graphics (3 cr)

STAT 8511 - Time Series Analysis (3 cr)

It may be possible to substitute other graduate-level courses in statistics or math; contact the DGS or your advisor for more information. Notice that credits from STAT 5302 (Applied Regression Analysis) cannot be counted as part of the required eight elective credits.

Topics covered in the statistics theory sequences include probability theory, distributions, method of moments, maximum likelihood estimation, regression, and Bayesian inference. The 8000 level courses are intended for Statistics Ph.D. students, thus they provide a rigorous treatment of the theory in addition to the application. These classes benefit students with a strong interest in Statistics who would like a challenge. Some prior background in Statistics is recommended.

Students who are getting a minor in Statistics have one or more Statistics faculty member on their committee and are encouraged to take more statistics courses than just the minimum required. Most of the non-theory courses require good computer skills in addition to the knowledge and time to

complete the assignments. The computer software programs often used in these classes are R, Statistix, MULTILEG, Mac-Anova, SAS, and SPlus. All the software required can be purchased through the bookstore or is available on public use computers (or on a mainframe) for the students' use throughout the semester. R and Mac-Anova can be downloaded for free from the Statistics department website. The website also contains code and help information for these two packages.

Note that the statistics minor administered by the Department of Statistics is somewhat different from the Applied Economics approved minor. Please consult with the DGS from our department and/or the DGS from the Department of Statistics to determine which is most appropriate for you.

Students who take a statistics minor might consider pursuing a Master's in Statistics. After completing the minor requirements, there are only a few more classes that need to be taken. STAT 5303 and STAT 5421 are required for the MS degree, so taking these courses as part of required eight elective credits for the minor minimizes your additional burden if you decide to pursue the MS degree. The MS does require STAT 5302, however econometrics courses can be substituted for that course (please see the DGS before making any substitutions). Recently, the prelim requirement for this degree was removed. Besides the coursework, all Masters students need to complete a project. If you are interested, please visit the website of the Department of Statistics or contact the DGS of the Statistics department.

Conservation Biology Minor

This approved minor allows students to add a natural science component to their graduate program. It is suited for the student who is interested in the growing area of ecological economics. The interdisciplinary nature of conservation biology means that the student can, upon approval from appropriate DGSs, design a degree program over a wide variety of departments across the University, including ecology, fisheries and wildlife, and forestry. (For example, notice the extensive choices under section 3 below).

To fulfill the minor in Conservation Biology the student must satisfy the following four requirements:

1. The courses required for a minor in Conservation Biology:

FW 8452, Conservation Biology, 3 credits

CBio 8004, Economic and Social Aspects of Conservation Biology, 3 credits

CBio 8001, Conservation Biology Seminar, 1 credit

The first two courses comprise the core of the conservation biology program. All conservation biology students take them in their first year. They are co-taught by Steve Polasky (who has a joint appointment in Applied Economics and Ecology) and Dave Smith (from Fisheries and Wildlife). The first course deals with fundamental principles of conservation biology, while the second applies these principles to a series of case studies. The Conservation Biology Seminar consists of weekly presentations from a diverse range of presenters on topics spanning the field of conservation biology. All that is required for getting credit is regular attendance and this seminar must be repeated over two semesters.

2. The following additional Conservation Biology courses:

EEB 5053, Ecology: Theory and Concepts, 4 credits

APEC 8991, Special Topics in Conservation Economics, 2 credits, with associated research paper (see 4. below)

3. At least one other 5xxx- or 8xxx-level course in biological sciences (3 credits minimum). Some suggested courses include:

EEB 5033, Population and Quantitative Genetics, 4 credits

EEB 5963, Modeling Nature and the Nature of Modeling, 3 credits

EEB 5321, Evolution of Social Behavior, 3 credits

EEB 5327, Behavioral Ecology, 3 credits

EEB 8641 (also MATH 8641), Spatial Ecology Seminar, 3 credits

ENT 5321, Ecology of Agriculture, 3 credits

FR 5104, Forest Ecology, 4 credits

FR 5142, Tropical Forest Ecology, 3 credits

FR 5146, Science and Policy of Global Environmental Change, 3 credits

FR 5153, Forest Hydrology and Wetlands, 3 credits

FW 5051, Analysis of Populations, 3 credits

FW 5571, Avian Conservation and Management, 3 credits

FW 5603W, Habitats and Regulation of Wildlife, 3 credits

FW 5604W, Fisheries Ecology and Management, 3 credits

FW 8459, Stream and River Ecology, 3 credits

FW 8465, Fish Habitats and Restoration, 3 credits

HORT 5071, Restoration and Reclamation Ecology, 3 credits

LA 5204, Landscape Ecology, 3 credits

NRES 5021, Plant Resource Management and the Environment, 3 credits

NRES 5061, Water Quality: Management of a Natural Resource, 3 credits

NRES 5575, Wetlands Conservation, 3 credits

4. A required conservation biology paper. A student taking the conservation biology approved minor will be required to prove mastery of the synthesis of economics and conservation biology by writing a paper that is deemed acceptable by an interdisciplinary committee of professors. The Committee will consist of three professors, with at least one member from each of the graduate faculties of Applied Economics and Conservation Biology. The topic of the research paper must be jointly acceptable to the student and the committee. Ideally, this paper will ultimately be a part of the student's dissertation. When it is completed, the committee will evaluate the paper and decide whether to pass the student, allow revisions before making a final determination, or fail the student.

For more information on this minor, students should talk to Professor Stephen Polasky.

Other Minors

There are minor programs available in other departments such as Ecology, Business, Forestry, Biostatistics, and Water Resources that have been explored by Applied Economic students in the past. Talk to our DGS if you plan to pursue a non-approved minor. Finally, when you are done, let the Graduate Club know about your experience and any suggestions you would have for incoming graduate students.