



Agricultural Administration Building 2120 Fyffe Road
Columbus, OH 43210-1067

aede.osu.edu

aedegradservices@osu.edu

Department of Agricultural, Environmental, and Development Economics

Graduate Program Handbook

2023

Introduction

This document is designed to comply with The Ohio State University Graduate School Handbook, which requires every Graduate Studies Committee to publish and make available to all graduate students and faculty "a graduate program handbook, containing the policies, rules, and procedures relevant to its own graduate programs." The policies, rules, and procedures described herein supplement, but do not supersede or replace, those contained in the Graduate School Handbook. All graduate students and faculty members in the Department of Agricultural, Environmental, and Development Economics are expected to comply with the policies, rules, and procedures set forth in both the Graduate School Handbook and this Graduate Program Handbook.

The Department of Agricultural, Environmental, and Development Economics (AED Economics) of The Ohio State University is an internationally recognized leader in the disciplinary areas of agricultural, environmental, development, and regional economics. AED Economics faculty members are expected to collaborate with graduate students in conducting innovative theoretical and applied research and to develop and train graduate students for professional positions with academic, governmental, and nongovernmental institutions and private companies and corporations. To achieve these goals, departmental graduate curricula are updated regularly and make liberal use of course offerings and faculty resources in other departments throughout the University.

Graduate programs in the Department of Agricultural, Environmental, and Development Economics are administered by the AED Economics Graduate Program Faculty Leader and the AED Economics Graduate Studies Committee. The Graduate Studies Committee consists of the Graduate Program Faculty Leader, who also serves as Chair, plus at least two other graduate faculty members appointed by the AED Economics Department Chair, and one graduate student appointed by the AED Economics Graduate Student Association. The AEDE Academic Program Manager and AEDE Graduate Recruitment Coordinator also serve as a part of the graduate program committee. A discussion of the role of the department Graduate Program Committee is found in the Graduate School Handbook.

This Graduate Program Handbook includes departmental policies, rules, and procedures pertaining to the MAE, MS and PhD programs in AED Economics; departmental policies, rules, and procedures pertaining to Graduate Associateships; guidelines for fulfillment of the PhD Research Manuscript Requirement; guidelines for submission of the Doctoral Dissertation Proposal; and information on dual master's degree programs with the John Glenn College of Public Affairs.

Sincerely,

Dr. H. Allen Klaiber

Master of Applied Economics Program

General Graduate School policies, rules, and procedures governing master's degree programs are documented in the Graduate School Handbook. Policies, rules, and procedures that are specific to the MAE degree are documented in this section.

Application Deadlines

Applications must be submitted online via The Ohio State University Graduate Admissions website. All applicants must submit official undergraduate and graduate transcripts, three letters of recommendation, a statement of purpose, and a resume/CV. A GRE score is optional, though suggested for applicants that do not have calculus, statistics, and/or intermediate microeconomics coursework from their undergraduate career. The deadline for receipt of completed applications for those seeking admission for the class starting the upcoming autumn semester is posted on the GP Admissions website.

Admission Standards

It is recommended, but not required, that applicants have earned 1) a minimum grade point average of 3.1 on a 4-point scale in all previous undergraduate coursework, or equivalent AND strong grades received in at least an intermediate economics, introductory statistics and calculus classes OR a minimum score of 156 on the quantitative portion/a minimum score of 150 on the verbal portion of the Graduate Record Examination.

International Applicants

International applicants whose native language is not English and who do not possess a bachelor's degree or higher from a US university must submit Test of English as a Foreign Language (TOEFL) scores. Minimum scores for admission to The Graduate School at The Ohio State University can be found on the GP Admissions website along with other requirements of international graduate applicants. Temporary accommodations have been put in place for students to use the Duolingo test based considering COVID-19's effects on availability of TOEFL testing. Details can be found at gpadmissions.osu.edu. Upon arrival, international students are required to take an English placement examination. Based on the test results, students needing English instruction will be required to complete prescribed additional coursework in English.

Prerequisites

Students whose undergraduate majors are in areas other than economics or business are welcome to apply. Entering MAE students, however, are assumed to have successfully completed courses in Intermediate Microeconomics, Calculus, and Statistics. The equivalent courses at The Ohio State University are, respectively, Economics 4001.02, Mathematics 1131 or Mathematics 1151, and Statistics 1450. Students who have not successfully completed all these courses may be admitted to the MAE program, subject to conditions stipulated by the MAE Program Faculty Leader.

Start Date and Duration

Because the MAE program requires that certain core courses be taken in sequence, regular admission is granted only with an autumn semester start date. The MAE Program Faculty Leader may grant admission to the MAE program with other start dates under special circumstances.

Full-time students will be expected to complete all degree requirements in nine consecutive months, covering an autumn semester and a spring semester. However, a student may take longer, depending on the student’s long-term educational and professional objectives, funding availability, and other exceptional circumstances. Prospective and current graduate students are encouraged to discuss their options with the Graduate Program Manager or MAE Program Faculty Director.

Funding

Master’s students generally are not offered Graduate Associate appointments or other forms of funding/financial aid from departmental funding sources.

Academic Calendar

The Ohio State University operates on a semester academic calendar, consisting of 14-week autumn and spring semesters and a summer term consisting of 4-week sessions 1, 2, and 3; 6-week sessions 1 and 2; 8-week sessions 1 and 2; and a 12-week full summer term.

Credit Requirements

The MAE program requires a student to complete 31 credit hours of coursework:

Core Applied Courses – All Required		Cr.
Econ 6711	Survey of Microeconomics	4
Econ 6721	Survey of Macroeconomics	4
Core Quantitative Methods Courses – All Required		Cr.
AED Econ 6110	Applied Quantitative Methods I	4
AED Econ 6120	Applied Quantitative Methods II	4
AED Econ 6130	Applied Quantitative Methods III	4
AED Econ 6330	Benefit-Cost Analysis	3
Elective Courses – 9 Credit Hours Required		Cr.
AED Econ 6200	International Economics and Policy	3
AED Econ 6400	International and Regional Development	3
Econ 6731	Survey of Econometric Methods I	3
Econ 5001	Game Theory in Economics	3
Econ 5250	National and International Money Markets	3
Econ 5660	Financial Aspects of International Trade	3
Econ 5700	Industrial Organization	3
Econ 5850	Labor Economics	3
Econ 5860	Health Economics	3
Total Hours (Minimum):		32

MAE Elective Courses

Students are required to take a minimum of 9 elective credit hours, 6 of which must be at the 6000-level or above and offered by AEDE or ECON. If a student feels there is not a fit between offered AEDE or ECON elective courses and their career/educational goals, the student may petition to substitute classes from other departments with economic elements in course content for the suggested AEDE electives.

Students interested in pursuing a petition should email the AEDE Graduate Program Manager for more information about this option. In order to count toward the 32 required graduate degree credit hours, a course at the 5000-level must **not** be instructed by a graduate student enrolled at OSU.

Under exceptional circumstances, and subject to approval of the MAE Program Faculty Director, students will be permitted to deviate from the standard MAE program curriculum. Foreseeable exceptions include part-time students, and students enrolled in dual degree programs.

Faculty Advisor

The MAE Program Faculty Director will be assigned as the Faculty Advisor to all students when they enroll in the graduate program. Students needing to deviate from the standard MAE program must seek the written approval of the MAE Program Faculty Director.

Final Examination

As the MAE is a coursework-only degree, students are not required to complete any comprehensive examination or thesis.

Registration

Registration for AEDECON and ECON courses should be coordinated through the AEDE Graduate Program Manager.

Academic Progress

In order to maintain satisfactory academic progress, students must maintain a cumulative grade point average of 3.0 or better in all graduate courses. Students who fail to maintain satisfactory academic progress will be placed on Academic Probation by the Graduate School and will be prohibited from holding a Graduate Associateship or other employment appointment.

Dual Master of Public Affairs – Master of Applied Economics

Introduction

The Department of Agricultural, Environmental and Development Economics and the John Glenn College of Public Affairs collaboratively offer a dual Master of Public Administration – Master of Applied Economics degree program. Students completing this program earn two degrees: an MAE from the Department of Agricultural, Environmental, and Development Economics and an MPA from the John Glenn College of Public Affairs. The special structure of the dual degree program allows students to earn both degrees in less time than it would take to earn the degrees separately.

Admission

Students must separately apply and be admitted to both the AEDE MAE and Glenn College MPA programs in order to participate in the dual degree program. Application to the dual MPA-MAE program, however, need not be simultaneous. Students may initially apply to one of the constituent degree programs and seek admission to a dual degree program after matriculating at OSU.

A student seeking admission to the MAE program as part of a Dual Degree should reach out to the Graduate Program Manager of AEDE to discuss the program in detail. Once this is completed, the student should do the following:

- Request that their current department forward their original graduate school application to the AEDE Graduate Program Manager.
- Provide the AEDE Graduate Program Manager with an updated Personal Statement explaining why they want to pursue a Dual MPA-MAE degree and how it will help them reach their career goals.

Once these items have been received, the AEDE Graduate Program Manager and the MAE Program Faculty Director will make an admissions decision and email the applicant with the result and next steps.

Program Structure

The dual MPA-MAE degree is designed to be accomplished in 2 years. Students entering this program will interweave courses in AEDE with courses in the John Glenn College of Public Affairs. The dual MPA-MAE degree requires the student to complete a minimum of 68 credit hours, including 16 credit hours from AED Economics, a minimum of 26 credit hours in the MPA program, and 26 dual degree credits, which are approved by both academic units in which the student will earn a degree. Because it requires fewer credit hours for graduation, the MAE is considered the student's Secondary Academic Program. Electives may be taken from the Department of Agricultural, Environmental and Development Economics, the John Glenn School, or other Ohio State University academic units, subject to approval of the independent departments through which the student is seeking their degrees. Core courses and electives for the MAE portion of this degree are:

Secondary Program Core Requirements

Course Number	Course Title	Cr.
ECON 6711	Survey of Microeconomics	4
ECON 6721	Survey of Macroeconomics	4
AEDECON 6110	Applied Quantitative Methods I	4
AEDECON 6120	Applied Quantitative Methods II	4

Dual Degree Course Requirements

Course Number	Course Title	Cr.
AEDECON 6330	Benefit Cost Analysis	3
ECON/AEDECON Elective (6000+ level)	Applied Econ Elective	3
ECON/AEDE Elective (6000+ level)	Applied Econ Elective	3

MAE Dual Degree Elective Courses

Students are required to take at least 2 elective courses at the 6000-level or above offered by AEDE to provide them with experience applying economic concepts in various contexts. If a student feels there is not a fit between offered AEDE or ECON elective courses and their career/educational goals, the student may petition to substitute classes from other departments with applied economics course content for the suggested AEDE electives. Email the AEDE Graduate Program Coordinator for more information about this option. In order to count toward graduate degree credit hours, a course at the 5000-level must **not** be instructed by a graduate student enrolled at OSU.

Approved Elective Courses include:

- AEDECON 6200 International Economics and Policy
- AEDECON 6400 Regional and International Development
- AEDECON 6130 Quantitative Methods III

Other Elective Options Pending Instructor Assigned:

- ECON 5001 Game Theory in Economics
- ECON 5720 Comparative Institutional Analysis of Firms and Markets
- ECON 5250 National and International Money Markets
- ECON 5660 Financial Aspects of International Trade
- ECON 5700 Industrial Organization
- ECON 5850 Labor Economics
- ECON 5860 Health Economics
- ECON 6700 Methods in Economics
- ECON 6731 Survey of Econometric Methods I

Advising

Upon acceptance to the MPA-MAE dual degree program, a student must select one unit or the other to serve as their primary advising unit. They can choose to switch their primary advising unit during the program based on career interest and is free to set up advising appointments in their non-primary unit as necessary. The primary advising unit will work with students on curriculum planning, approve electives taken and assume responsibility for ensuring that the student's program meets all Graduate School regulations governing dual degree programs. Students are advised to seek all academic guidance relating to AEDE curriculum from the MAE Program Faculty Director or the AEDE Graduate Program Manager.

To graduate, a student must successfully complete all coursework as outlined above. There is no comprehensive exam or thesis component to this program.

Doctoral Program

General Graduate School policies, rules, and procedures governing doctoral degree programs are documented in the Graduate School Handbook. Policies, rules, and procedures that are specific to the AED Economics doctoral degree program are documented in this section.

Academic Calendar

The Ohio State University operates on a semester academic calendar, consisting of 14-week autumn and spring semesters and a summer term consisting of 4-week sessions 1, 2, and 3; 6-week sessions 1 and 2; 8-week sessions 1 and 2; and a 12-week full summer term.

Application Deadlines

Applications must be submitted online through The Ohio State University Graduate Admissions website. All applicants must submit Graduate Record Examination scores. The deadline for receipt of completed applications for those seeking admission to the class starting the following autumn with funding, is listed on the GP Admissions website; the deadline for those not seeking funding is rolling but admission without funding support is rarely offered.

Admission Standards

It is recommended, but not required, that applicants have earned 1) a minimum grade point average of 3.3 on a 4 point scale in all previous undergraduate coursework, or equivalent; 2) a minimum grade point average of 3.5 on a 4 point scale in all previous graduate coursework, or equivalent; 3) a minimum score of 163 on the quantitative portion of the Graduate Record Examination; and 4) a minimum score of 156 on the verbal portion of the Graduate Record Examination.

International Applicants

International applicants whose native language is not English and who do not possess a bachelor's degree or higher from a US university must submit Test of English as a Foreign Language (TOEFL) scores. It is recommended, but not required, that applicants have received a minimum score of 600 on the paper-based test or a 100 on the internet-based test. Upon arrival, international students are required

to take an English proficiency examination. Based on the test results, students needing English instruction will be required to complete prescribed additional coursework in English. Temporary accommodations have been put in place for students to use the Duolingo test based in light of COVID-19's effects on availability of TOEFL testing. Details can be found at gpadmissions.osu.edu.

Prerequisites

Students whose undergraduate majors are in areas other than economics or business are welcome to apply. Entering PhD students, however, are assumed to have successfully completed courses in Intermediate Microeconomic Theory, Intermediate Macroeconomic Theory, Calculus, and Statistics (see Appendix 6). The equivalent courses at The Ohio State University are, respectively, Economics 4001.02, Economics 4002.01, Mathematics 1151 and 1152, and Statistics 1450. Students who have not successfully completed all these courses may be admitted conditionally to the PhD program, subject to conditions stipulated by the Graduate Program Leader. An MS degree is not required for admission to the PhD program. Courses in Advanced Calculus, Linear Algebra and Real Analysis are highly recommended, but not required. The equivalent courses at The Ohio State University are, respectively, Mathematics 2153, Mathematics 2568 and Mathematics 5201.

Start Date and Duration

Because the PhD program requires that certain core courses be taken in sequence, regular admission is granted only for students starting the program autumn semester. The Graduate Program Leader may grant conditional admission to the PhD program with other start dates under special circumstances.

Full-time students may complete all PhD degree requirements in as few as four calendar years, but most students will take 5 years. Current graduate students are encouraged to discuss their options with the Graduate Program Leader and their Faculty Advisor.

Funding

Doctoral students are eligible for University Fellowships, Graduate Associateships, and other forms of funding and financial aid provided by the University and the Department. Such appointments cover tuition and fees and provide monthly stipends. Eligibility requirements for nomination for University Fellowships include an undergraduate grade point average of 3.6 on a 4.0 scale; eligibility requirements for nomination for Graduate Enrichment Fellowships, which are available to domestic applicants from underrepresented groups, include an undergraduate grade point average of 3.1 on a 4.0 scale.

Potential applicants who fail to strictly satisfy all the eligibility requirements for University and Graduate Enrichment Fellowship nomination, but come near to doing so, may be nominated for such Fellowships under special waivers that may be exercised by the Graduate Program Leader or may be offered funding by the Department from other sources of funding, if they possess exceptional records of academic and personal achievement. Prospective applicants to the doctoral program with outstanding records are encouraged to contact the Graduate Program Manager to discuss the possibility of funding.

Credit Requirements

The PhD program requires a student to complete a minimum of 90 graduate semester credit hours. Semester courses at the 4000-level and below, if offered by the Department of Agricultural,

Environmental, and Development Economics, do not carry graduate credit in the AED Economics PhD program. All courses at the 3000-level do not carry graduate credit, regardless of the host department.

Course Requirements

PhD students must take the non-credit bearing Math Camp offered by the Economics Department in July/August immediately preceding the start of classes in the first year. In addition, they must complete the following courses:

Microeconomics Theory Courses (required)		Cr.
Econ 8711	Microeconomic Theory IA	3
Econ 8712	Microeconomic Theory IB	3
Econ 8713	Microeconomic Theory IIA	3
Econ 8714	Microeconomic Theory IIB	3
Econometric Theory Courses (required)		Cr.
Econ 8731	Econometrics I	4
Econ 8732	Econometrics II	4
Applied Economics Courses (required)		Cr.
AEDECON 7110	Quantitative Methods I	3
AEDECON 7120	Quantitative Methods II	3
AEDECON 7130	Applied Econometrics I	3
AEDECON 7140	Applied Econometrics II	3
Foundations Courses (Required):		
AEDE 8101	Applied Welfare	4
AEDE 8102	Advanced Applied Econometrics	4
AEDE 8103	Seminal Readings and Writings	4
Frontiers Courses (At least 12 Credit Hours Total, Cr. Listed Represents 1 Class):		
AEDE 8201-8204	Field: Agricultural Economics	2
AEDE 8301-8304	Field: Environmental Economics	2
AEDE 8401-8405	Field: Development Economics	2
AEDE 8501-8502	Field: Regional Economics	2
AEDE 8601-8603	Field: Methods	2
Workshops and Seminar Courses (required)		Cr.
AEDECON 8800	Seminar in AED Economics	8
AEDECON 8895	PhD Research Seminar	6
Electives and Dissertation Research (Minimum)		30
Minimum Total Credit Hours		90

Under special circumstances, students will be permitted to deviate from the standard PhD program, subject to approval by the Graduate Program Leader and their Academic Advisor.

Seminar Courses

As part of the program requirements PhD students are required to take AEDECON 8800 and 8895, continually, after certain points in their course progression. This requirement is above and beyond the minimum credit hour requirement listed above. Please see that timing below:

1. AEDECON 8800: This course should be taken every Autumn and Spring semester beginning Year 2 in the program through Graduation.
2. AEDECON 8895: This course should be taken every Autumn and Spring semester beginning Year 3 in the program through Graduation.

AEDECON 8800 (Seminar) Guidelines

Each semester, students will be required to attend 8 seminars and complete a written assignment for each seminar attended, which will be submitted through a Carmen shell for the course (carmen.osu.edu). This assignment should be about 2 paragraphs in length and contain a summary of and reactions to the seminar.

AEDE will be bringing in some seminar speakers throughout the semesters, however, it is possible a student's TA or RA duties may conflict with the time of departmental seminars. If this is the case, students can attend seminars offered by other departments at The Ohio State University.

International students who experience conflicts with scheduling AEDECON 8800 due to EDUTL or Oral Proficiency requirements may request a one-term waiver of 8800 by contacting the Graduate Program Manager.

Dissertation Research Hours (AEDECON 8999)

Beginning Spring Semester of Year 2 students will round out their enrollment by scheduling AEDECON 8999 with their Faculty Advisor and the necessary number of credits to total 18 hours per term. This will continue through the completion of Candidacy Examination. Beginning the semester immediately following completion of the Candidacy Examination students will enroll in 1 Hour of 8999 with their Faculty Advisor.

Should the need arise for a student to take AEDECON 8999 prior to Spring Semester Year 2, that can be scheduled with the Graduate Program Chair.

Field of Specialization

PhD students are required to take at minimum a total of 12 credit hours of AEDE Frontiers courses (AEDE 8201-8603), It is suggested that students choose 6-8 credit hours of Frontiers coursework in their primary field of specialization and 4-6 credit hours in a secondary field of specialization. Students are able to take additional elective courses external to AEDE, however, these will not count toward the minimum number of AEDE Frontiers courses. The AEDECON frontiers courses cover: agricultural economics, environmental and resource economics, regional economics, development economics and methodology.

Faculty Advisor

All courses taken by PhD students must be approved by their Faculty Advisor. Each student admitted to the PhD program is assigned a tentative Faculty Advisor when they first enroll in the graduate program. Once a student determines that their interests lie in a particular specialty area, they should choose a permanent Faculty Advisor in that area. This choice must be made by the conclusion of the first semester of the second year. The Faculty Advisor must be a member of the AED Economics Graduate Faculty holding Category P status.

Guidance Committee

PhD students must select a Guidance Committee by the conclusion of the second semester of their second year. The Committee is composed of the student's Faculty Advisor, who serves as chair and at least two additional members of the University Graduate Faculty holding Category P status, unless an exception is granted by the Graduate Program Leader and the Graduate School.

Program of Study

PhD students must submit an approved Program of Study form to the Graduate Program Manager prior to the conclusion of the first semester of their second year (see Appendix 3). The program of study is to be developed with the assistance and explicit approval of the student's proposed Faculty Advisor. Failure to comply with this procedure will result in the suspension of funding until compliance is achieved.

Microeconomic Theory Examination

The PhD Microeconomic Theory examination is a written examination administered by the Department of Economics in June and July of each year. PhD students must take the examination in June, after the conclusion of their first year in the program. PhD students are expected to receive a "PhD Pass." PhD students who obtain an "MA Pass" from the grading committee will be allowed to continue their studies in the doctoral program. However, they will receive a warning letter from the Graduate School outlining that they must pass their Research Manuscript Requirement within two attempts, or they will be dismissed from the PhD program. PhD students who fail to obtain an "MA Pass" on their first attempt must retake the exam at the next scheduled offering if they wish to continue in the AEDE PhD program. Failure to obtain an "MA Pass" prior to the beginning of the second year will result in automatic dismissal from the PhD program, unless prior permission is granted by the Graduate Program Leader. If a student receives an "MA Pass" on their first attempt and wishes to retake the exam in pursuit of a "PhD Pass," they are allowed but not required to do so.

Research Manuscript Requirement

Doctoral students are required to submit a sole-authored research manuscript that meets high standards of scholarship and exposition at the conclusion of the first 4-week session of summer semester in their second year. Each manuscript is reviewed by two faculty evaluators, both of which must find the manuscript acceptable to receive a score of "Pass." If either faculty evaluator judges the manuscript unsatisfactory, the student will be provided a decision of "Revise and Resubmit" and a deadline by which they must submit a revised version of their manuscript to be reevaluated by the committee. Though all students in the doctoral program are required to complete this assignment,

processes are different for students who received a “PhD Pass” on the Microeconomic Qualifier Examination and those who received an “MA Pass.”

Students with an “MA Pass” on the Microeconomic Qualifier Examination: Failure to receive a grade of “Pass” after a second round of evaluation will result in automatic dismissal from the doctoral program for any student who received an “MA Pass” on the Microeconomic Qualifier Examination.

Students with a “PhD Pass” on the Microeconomic Qualifier Examination: Students who received a “PhD Pass” on the Microeconomic Qualifier Examination but fail to receive a grade of “Pass” after a second round of evaluation will lose departmental funding for the autumn semester. Additionally, they will receive a warning letter from the Graduate School outlining that they must complete a Research Manuscript addressing either their original research question or a different research question than originally submitted before a deadline during autumn semester, communicated in this letter. In order to remain in the program, the student’s new manuscript must be considered satisfactory by the Graduate Studies Committee upon its first and only review. Any student who manages to successfully submit a passing paper on their third try will have their funding reinstated for the following spring semester. Failure to submit a satisfactory new manuscript will result in automatic dismissal from the PhD program.

Guidelines for the preparation and submission of the research manuscript are provided as Appendix 1 to this Handbook.

Candidacy Examination

The PhD Candidacy Examination is administered by an Examination Committee consisting of at least four graduate faculty members. If the student's Guidance Committee consists of three members, then the Examination Committee shall consist of the student's Guidance Committee plus an additional member of the AED Economics Graduate Faculty. The student’s Faculty Advisor shall serve as Chair of the Examination Committee.

The Candidacy Examination consists of a written and an oral portion. The written portion of the Candidacy Examination consists of a written dissertation proposal that conforms to Guidelines provided in Appendix 2 of this Handbook. The dissertation proposal is intended to provide evidence that the student has set forth a plan of research that promises to contribute to the body of knowledge in the field of applied economics.

The oral portion of the Candidacy Examination is a two-hour oral examination that may focus on the dissertation proposal but may cover any aspect of the student's PhD program. Successful completion of the Candidacy Examination requires a unanimous vote of the Examination Committee and admits the student to PhD Candidacy. It is the student’s responsibility to submit the Application for Candidacy to the Graduate School by the published deadline. This form can be found on the GradForms website at gradforms.osu.edu.

Final Examination and Oral Examination

The Final Examination consists of a written and an oral portion. The Final Examination is administered by an Examination Committee consisting of the student's Guidance Committee plus a Graduate Faculty Representative appointed by the Graduate School. The student’s Faculty Advisor shall serve as Chair of

the Examination Committee. All policies in the OSU Graduate Student Handbook should be followed regarding this examination process.

The Final Written Examination consists of the two-week period before the student's Final Oral Examination and requires that the student send the dissertation, they intend to defend to their Examination Committee. If a Graduate Faculty Representative has not been assigned to the student's Examination Committee at the start of the written examination period, it is the responsibility of the student to send their dissertation to the Graduate Faculty Representative once they are assigned.

The Final Oral Examination, often called a Dissertation Defense, must be allotted two hours for its administration. At the discretion of the Chair of the Examination Committee, the student may be permitted to provide a presentation of the dissertation research, provided that at least one hour of the examination period is allotted to discussion of the research and to questions of and answers by the student. Successful completion of the final oral examination requires a unanimous vote of the Examination Committee. It is the student's responsibility to submit the Application for Final Exam to the Graduate School by the published deadline. This form can be found on the GradForms website at gradforms.osu.edu.

Academic Progress

In order to maintain satisfactory academic progress, a PhD student must maintain a cumulative grade point average of 3.0 or better in all graduate credit courses and must further satisfy the following requirements: i) pass the Microeconomics Theory Qualifying Examination prior to the end of the summer term of the first year; ii) fulfill the Research Manuscript Requirement prior to the deadlines outlined in this document; iii) pass the Candidacy Examination prior to the end of the first semester of the fifth year, and iv) complete all PhD requirements, including a successful Final Oral Examination, within five calendar years of enrollment in the PhD program. A PhD student who does not maintain satisfactory academic progress may be denied otherwise guaranteed departmental funding by the Graduate Program Leader. By a majority vote of the Graduate Studies Committee, a student who has failed to maintain satisfactory academic progress may be dismissed from the PhD program, subject to approval by the Graduate School.

Registration

Graduate Students should refer to the Graduate School's Handbook for enrollment requirements ([Section 3.1 Course Load](#)) based on Fellowship or Graduate Associate appointment and Pre-Candidacy/Post-Candidacy timing. Students are advised to schedule the following semester courses as soon as their Buckeyelink Appointment Window opens to ensure proper enrollment and billing processing. Students are responsible for their enrollments but may contact the Graduate Program Manager for assistance in the event they are not able to enroll in courses on their own.

Master's Degree

A student enrolled in the AED Economics PhD program and making satisfactory academic progress may be awarded an MS in AED Economics if the student satisfies all requirements for of the second-year research manuscript requirement. Student must follow all guidelines in the Grad School Handbook for applying for and meeting standards of graduation with an MS in the semester in which they are completing their Second Year Manuscript Requirement or Candidacy Exam.

Graduate Associateships

General Graduate School policies, rules, and procedures governing Graduate Associateships are documented in Section IX of the Graduate School Handbook. Policies, rules, and procedures that are specific to the AED Economics graduate program are documented in this section. AEDE Graduate Associates are required to meet the Standards of Satisfactory Academic Progress towards a Doctoral Degree, found in Appendix 4 of this document. Any AEDE Graduate Associate enrolled starting in Autumn 2018 or after is also required to meet the AEDE Standards of Progress for Graduate Associates, found in Appendix 5 of this document.

Duties

Graduate Associates may be required to teach classes; lead recitations and labs; counsel students; grade papers, homework assignments, and examinations; gather and analyze data; write proposals and reports; and assist faculty members, staff, and administrators as needed. Graduate Associate duties are determined and conveyed to the Graduate Associate by his/her assigned supervisor prior to the beginning of the term of assignment and may not exceed 20 hours per week. Graduate Associates are expected to be available to perform their duties on campus from the first day of regularly scheduled classes until the last day of finals, except in cases of excused illnesses, exigent personal circumstances, explicit consent of their supervisor and the Graduate Program Leader.

Graduate Associate Appointment Periods

While Graduate Associates (RA or TA) cover the 9-month period of Autumn and Spring semesters; they are processed on a semesterly basis. The appointments will be for 4.5 months each autumn and spring semester, and for 3 months during the summer, if applicable. The appointment periods are laid out below:

Autumn Semester: Begins mid-August through December.

Spring Semester: Begins January through mid-May.

Summer Semester: Begins mid-May through mid-August.

The department on average will have two or three summer TA opportunities which are competitive in nature. These Summer TA appointments typically require a physical presence in Columbus. Please note this is subject to change and department support over the summer is not guaranteed. However, individual faculty members drawing on sponsored research accounts on which they are Principal or Co-Principal Investigators may hire Research Associates (RA) over the summer and will communicate there hires to the Graduate Program Manager

Spoken English Requirement

New international graduate students for whom English is not their first language must certify their proficiency in spoken English before assuming Graduate Teaching Associate (GTA) duties that involve formal spoken presentations in front of course lectures, recitation sessions, or laboratory sessions. They may become certified through the following scores: TOEFL iBT Speaking 28 or higher, IELTS Speaking 8.5 or higher, or Oral Proficiency Assessment 4.0 or higher. The Oral Proficiency Assessment is administered by the Department of English as a Second Language (ESL). More information can be found here:

<http://esl.ehe.osu.edu/home/testing/spoken-english/>. Graduate Teaching Associateships that involve only grading and/or laboratory assistance do not require this certification.

Selection of Graduate Associates

The number of Graduate Associateships awarded by the AED Economics Graduate Program Leader in consultation with the Graduate Studies Committee is subject to availability of funds and departmental staffing needs. The Director will allocate available departmental associateships among graduate students according to the following priority criteria:

1. Incoming or continuing graduate students with guaranteed funding in their offer letters from the AED Economics Graduate Program Leader making satisfactory progress towards a degree
2. Currently funded PhD. students in years 1 through 5 without guaranteed funding in their offer letters from the AED Economics Graduate Program Leader making satisfactory progress towards a degree.
3. Previously funded PhD students in years 1 through 5 without guaranteed funding in their offer letters from the AED Economics Graduate Program Leader making satisfactory progress towards a degree
4. Previously unfunded PhD students in years 1 through 5 making satisfactory progress towards completion of degree.

Students not maintaining satisfactory progress may be denied departmental funding, even if they have not yet received the minimum support stipulated in their offer letters. The Graduate Program Leader reserves the right to deviate from these guidelines under extenuating circumstances that impact the Department's missions, including the need to staff courses with qualified teaching assistants.

The guidelines for selection of Graduate Associates documented here apply to the awarding of associateships by the AED Economics Graduate Program Leader from the Department Graduate Program budget, but not to the awarding of associateships by individual faculty drawing on sponsored research accounts on which they are Principal or Co-Principal Investigators.

Stipend Levels

With very few exceptions, Graduate Associates receive a standard base monthly stipend, the amount of which depends on the graduate program in which the Associate is enrolled. Base monthly stipends will be adjusted for fiscal year 2023-2024 and for subsequent fiscal years, pending budgetary availability, in accordance with the general University-wide salary increase approved by the University Board of Trustees at its annual spring meetings. Students who were awarded University Fellowships or OARDC/CFAES Fellowships and Associateships upon admission to an AED Econ graduate program may receive higher stipends, as documented in their original letters of offer.

Technology and Support Services

Graduate Students will receive a university issued laptop at the start of Year 1 and are responsible for the care and use of the device. Students are expected to use the services of supporting departmental personnel and equipment in completing Graduate Associate responsibilities. Graphic arts personnel support and the use of departmental copiers, computers, and laser printers are examples of services are

available to Graduate Associates. Authorization to use departmental support services is obtained through the Graduate Associate's supervisor and the University's Office of Technology and Digital Innovation.

When space and equipment is available, Graduate Students will be assigned to a designated office location and provided key access to this location that includes an individual desk and workstation. Additionally, students will have an assigned mail-slot in Ag Admin 320A. Note that all office and mail assignments and equipment usage is at the discretion of the department and is subject to change.

All University issued items will be assigned to the individual student. Laptop's will be assigned at the time of delivery by Technology Staff and keys will be issued in-person (signed out) with the AEDE Administrative Assistant. These items must be returned by in-person appointment only to the AEDE Administrative Assistant by 12:00 PM EST on the Friday before Commencement of the students graduating term or before they depart the Columbus, Ohio area during their graduating term (whichever comes first).

Students who are graduating under the University End-of-semester (EOS) option must return these items by in-person appointment only with the AEDE Administration Assistant by 4:00 PM EST the day after the EOS deadline of the students graduating term or before they depart the Columbus, Ohio area (whichever comes first).

All Graduate Associate's working on a Faculty Sponsored projects should ensure that all materials and information are backed up and stored for long-term use on an ongoing basis as instructed by the Supervisor and in accordance with university policy to ensure information is both secured and stored in the event of an emergency and the student's eventual departure.

Additionally, use of departmental support services is limited to departmental business. Specifically excluded, for example, are the use of departmental personnel and equipment in production of term papers, theses, and dissertations, printing of personal PhD course materials, and in data collection and processing related to coursework. Such needs fall under the heading of individual or personal business.

Meeting rooms may be scheduled through the AEDE Administrative Suite or Graduate Program Manager.

Termination of Appointment

Graduate Associateship appointments may be terminated by the Graduate Program Leader if it is determined that either 1) the Associate has failed to adequately perform duties assigned to him/her by his/her supervisor or 2) the Associate is failing to make satisfactory academic progress as defined in this Graduate Program Handbook. As documented in the Graduate School Handbook, a graduate student who has completed more than 10 graduate credit hours and whose Grade Point Average in all graduate courses is below 3.0 may not be appointed or reappointed as a Graduate Associate.

Grievance Procedures

A Graduate Associate with a grievance should consult first with his/her Faculty Advisor or Associateship supervisor. If this does not lead to satisfactory resolution of the grievance, the Associate should consult the Graduate Program Leader. The Graduate Program Leader may elect to involve the Department Chair, the Graduate Studies Committee, the Faculty Advisor, or other graduate faculty and professional

staff in discussions to resolve the grievance. If this process is unsuccessful, the Associate should consult the Department Chair with the objective of resolving the grievance through the Chair or through the university's process outlined in the Graduate Student Handbook.

Appendix 1

Procedures for Fulfillment of the AED Economics Doctoral Research Manuscript Requirement

Introduction

Each student is required to complete a sole-authored research manuscript that meets high standards of scholarship and exposition. The completed research manuscript must be submitted by electronic mail to the Graduate Program Leader by no later than the last day of the Summer 4-Week Session 1 by 5:00 pm EST. The deadline can be changed only with prior approval of the AED Economics Graduate Program Leader.

Objective

The Research Manuscript Requirement is designed to develop a PhD student's ability to conduct and communicate original, independent research in a manner appropriate for scholarly publication and presentation. Fulfilling the requirement verifies that a student is qualified to conduct scholarly research on the frontiers of economics and helps prepare the student for the research, writing, and oral defense efforts required to successfully complete a doctoral dissertation.

Content

The manuscript must address a question of scholarly significance in economics, ideally in the student's area of specialization. The manuscript should clearly pose the researchable question, appropriately place it within the relevant scholarly literature, and make substantive progress towards answering the question. The student may use whatever analytical tools are most appropriate to answer the question including, but not limited to, theoretical, econometric, numerical, and case-study methods. The manuscript must be free of glaring technical and interpretive mistakes.

Originality

The manuscript must be authored exclusively by the student and must be based on original research independently conducted by the student. The manuscript may be based on graduate coursework undertaken at The Ohio State University but must not be based on work conducted before entering the AED Economics PhD program or a project being completed as a Graduate Research Associate. The student's Faculty Advisor may offer broad guidance in preparation of the manuscript but may not contribute to the writing of the manuscript or offer specific editorial assistance. The manuscript must represent an independent effort on the part of the student and must include the following signed statement on the title page:

"This manuscript presents original research conducted independently by me, after joining the AED Economics PhD program, specifically in satisfaction of the AED Economics Research Manuscript Requirement."

Electronic Signature _____

Date _____

Format

The manuscript must be written in the form of a conventional journal article and will contain the following separate sections: a title page, a one-page abstract, a body not to exceed 25 pages, and references. The manuscript must be clear, readily legible, and conform to the following requirements:

a) the letters must not be smaller than 12 point; b) the manuscript must be double spaced; and c) margins, in all directions, must be at least 1 inch. Visual materials, including tables, charts, graphs, maps, and photographs must be included in the body of the manuscript and are subject to the 25-page limit. Students must follow accepted scholarly practices in citing source materials relied upon when preparing the manuscript. Reference citations must conform to American Journal of Agricultural Economics guidelines. There is no page limit for the references.

Evaluation

The manuscript must meet standards comparable to those used to evaluate contributed papers to major scholarly meetings though it does not have to be of publishable quality. The manuscript may represent only a modest departure from published work, but it must be well conceived, justified, and communicated.

The Graduate Program Manager will randomly appoint two AED Economics faculty reviewers to each manuscript. The faculty assigned to a paper may not be the student's advisor. Faculty members will evaluate the manuscript and confer a grade of "Pass" or "Revise and Resubmit." A manuscript judged to require revision will be returned by the Evaluation Chair to the student with review comments. The student will be required to address the review comments and submit a revised manuscript along with a cover letter explaining how they have addressed the concerns of the reviewers to the Evaluation Chair by the established deadline. Though all students in the doctoral program are required to complete this requirement, processes are different for students who received a "PhD Pass" on the Microeconomic Qualifier Examination and those who received an "MA Pass."

Students with an "MA Pass" on the Microeconomic Qualifier Examination: Failure to receive a grade of "Pass" after a second round of evaluation will result in automatic dismissal from the doctoral program for any student who received an "MA Pass" on the Microeconomic Qualifier Examination.

Students with a "PhD Pass" on the Microeconomic Qualifier Examination: Students who received a "PhD Pass" on the Microeconomic Qualifier Examination but fail to receive a grade of "Pass" after a second round of evaluation will lose departmental funding for the autumn semester. Additionally, they will receive a warning letter from the Graduate School outlining that they must complete a Research Manuscript addressing either their original research question or a different research question than what they originally submitted before the deadline communicated in this letter. In order to remain in the program, the student's new manuscript must be considered satisfactory by the Graduate Studies Committee upon its first and only review. Failure to submit a satisfactory new manuscript will result in automatic dismissal from the PhD program.

After all first-round manuscripts have been received and reviewed, the Graduate Studies Committee will confer a "Best Research Manuscript by a Second-Year PhD Student" award.

Appendix 2

Guidelines for AED Economics Doctoral Dissertation Proposals

Purpose

The doctoral dissertation proposal is intended to provide evidence that the student has set forth a plan of research that promises to contribute to the body of knowledge in the field of agricultural, environmental, and development economics. It is recognized, however, that experience gained while the research is being carried out will sometimes suggest to the student and his/her Guidance Committee that the dissertation should deviate from the outline in the proposal. The proposal does not prevent the Committee from approving such changes, nor does approval of the proposal constitute an agreement between the student and the Committee that the dissertation, when completed, will be approved.

Format

The proposal must be clear, readily legible, and conform to the following requirements: a) the letters must not be smaller than 12 point; b) the proposal must be double-spaced; and c) margins, in all directions, must be at least 1 inch.

Content

Title Page: The title page must include the title of the proposal, the date of the proposal defense, and the names and signatures of both the student and the student's Faculty Advisor.

Summary: The proposal must contain a summary of the proposed research, not more than one page in length. The summary should be a self-contained description of the proposed research activity. The summary should include a statement of objectives and methods to be employed. It must clearly address the intellectual merit of the proposed activity and the broader impacts resulting from the proposed activity. The Summary should be informative to other persons working in the same or related fields and, insofar as possible, understandable to a technically literate lay reader.

Description: The Description should provide a clear statement of the work to be undertaken and must ~~include:~~include objectives for the proposed research activity, the expected significance of the proposed research activity, and relation of the proposed research activity to the present state of knowledge in the field. The Description should outline the general plan of work, including the broad design of activities to be undertaken, and, where appropriate, provide a clear description of methods and procedures. It must describe as an integral part of the narrative, the broader impacts resulting from the proposed activities, addressing how the project will enhance scientific and technological understanding and/or generate benefits to society at large. The Description may not exceed 25 pages. Visual materials, including tables, charts, graphs, maps, and photographs must be presented within the 25-page limitation.

References: Students must follow accepted scholarly practices in providing citations for all source materials relied upon when preparing the proposal. Reference citations must conform to American Journal of Agricultural Economics guidelines. There is no page limit for the references.

Appendix 3

PhD. Program of Study Form

Submit the completed form to the Graduate Program Manager, who will forward it to Graduate Program Leader for final approval and signature. The form must be submitted by the last day of classes of autumn semester of the second year in order to be eligible for departmental funding the following semester. Please use the following abbreviations: AU=autumn semester, SP=spring semester, Su=May/summer session.

Student Name _____ Signature _____ Date _____

1st Year Required Courses

Course Number	Course Title	Cr.	Grade
ECON 8711	Microeconomic Theory IA	3	
ECON 8712	Microeconomic Theory IB	3	
ECON 8713	Microeconomic Theory IIA	3	
ECON 8714	Microeconomic Theory IIB	3	
ECON 8731	Econometrics I	4	
ECON 8732	Econometrics II	3	
AEDECON 7110	Quantitative Methods I	3	
AEDECON 7120	Quantitative Methods II	3	
AEDECON 7130	Applied Econometrics I	3	
AED ECON 7140	Applied Econometrics II	3	
AEDECON 8999	Research Hours (summer)	2	

2nd/3rd Year Required Courses

Please mark which Field Courses you intend to take during your second and third years of coursework. Students are required to take 12 credit hours of Foundations Courses* and 12 credit hours from the remaining Frontiers elective options.

Course Number	Course Title	Cr.	Taking?
AEDECON 8101*	Applied Welfare Economics	4	X
AEDECON 8102*	Advanced Applied Econometrics	4	X
AEDECON 8103*	Seminal Readings	4	X
AEDECON 8201	Advanced Agricultural Economics	2	
AEDECON 8202	Agricultural Finance	2	
AEDECON 8203	Agricultural and Food Systems Economics	3	
AEDECON 8204	Adv Topics in International Economics	2	
AEDECON 8301	Frontiers in Resource Economics	2	
AEDECON 8302	Nonmarket Valuation	2	

AEDECON 8303	Climate Change Economics	2	
AEDECON 8304	Econometric Methods in Environmental Economics	2	
AEDECON 8401	Human Capital	2	
AEDECON 8402	Econometrics in Development	2	
AEDECON 8403	Finance in Economic Development	2	
AEDECON 8404	Program Evaluation	2	
AEDECON 8405	Field Research for Policy Design	2	
AEDECON 8501	Frontiers in Regional Science	2	
AEDECON 8502	Urban and Regional Economics	2	
AEDECON 8601	Adv Economic Dynamics		
AEDECON 8602	Applied Comp, Math, and Quant Methods in Applied Economics	2	
AEDECON 8603	Survey Methodology	2	
AEDECON 8895	PhD Research Seminar	1	3rd Year Only
AEDECON 8800	Seminar in AED Economics	1	X
AEDECON 8999	Research hours	Variable	

Required Seminar Courses – 4th through 5th Years

Course Number	Course Title	Cr.
AEDECON 8800	Seminar in AED Economics	2
AEDECON 8895	PhD Research Seminar	2
AEDECON 8999	Research Hours	Variable

Expected Examination Schedule

Examination	Term and Year
Microeconomics Qualifying Exam	
Second Year Research Manuscript	
PhD Candidacy Examination	
Oral Dissertation Defense	

Exemptions

In order to maintain satisfactory academic progress, unless otherwise approved by the Graduate Program Leader, the Microeconomic Theory qualifying examination must be passed by the end of the summer term of the first year; the Doctoral Research Manuscript requirement must be fulfilled before respective deadlines for students receiving MA and PhD Passes on Microeconomic Qualified Exam; the PhD Candidacy Examination must be passed before the end of the autumn term of the fifth year; and

the oral dissertation defense must be passed by the end of the summer term of the fifth year. If, based on what you know now, you face extenuating circumstances that will prevent you from meeting this timetable, please provide an explanation on a separate sheet stapled to this form.

Approvals

Advisor: _____
(print) (sign) (Date)

Graduate _____
Program (print) (sign) (Date)

Graduate Chair Notes

Revised August 2021

Appendix 4

Standards of Satisfactory Academic Progress towards a Doctoral Degree

The following serve as guidelines for determining satisfactory progress towards a graduate degree for the purpose of determining a student's eligibility to maintain their AEDE Graduate Associateship. If a student does not make satisfactory academic progress at any point during their time in the AED Economics doctoral program, they may lose eligibility for funding.

In order to maintain satisfactory academic progress toward a Ph.D. in the AED Economics Ph.D. program, students must meet specific benchmarks during specific years in the AED Economics program. Students must:

Year 1

- Earn and maintain a cumulative GPA of 3.0 or higher in all graduate credit courses.
- Successfully complete the Microeconomics Qualifier Exam at an M.S. level or higher prior to the end of summer term of the student's first year in the AED Economics doctoral program.

Year 2 (having met requirements for prior years)

- Earn and maintain a cumulative GPA of 3.0 or higher in all graduate credit courses.
- Receive a grade of "Pass" on the Second Year Research Manuscript Requirement by the respective dates for students earning a MA or PhD Pass in the Microeconomic Qualifier Exam
- Establish a primary advisor on record through completion of the Plan of Study Form by the end of autumn semester during the student's second year in the AED Economics doctoral program.
- Complete a minimum of 2 field sequences in AEDE.

Year 3 (having met all requirements for prior years)

- Earn and maintain a cumulative GPA of 3.0 or higher in all graduate credit courses.
- Complete all required coursework for the AED Economics doctoral program.

Year 4 (having met all requirements for prior years)

- Earn and maintain a cumulative GPA of 3.0 or higher in all graduate credit courses.
- Establish a research trajectory through professional conference presentations.

Year 5 (having met all requirements for prior years)

- Earn and maintain a cumulative GPA of 3.0 or higher in all graduate credit courses.
- Successfully defend candidacy exam by the end of autumn semester of the student's fifth year in the AED Economics doctoral program
- Have established a research trajectory through professional conference presentations.
- Have established a research trajectory by submission of peer-reviewed publication.

Appendix 5

AEDE Standards of Progress for Graduate Associates

The Department of Agricultural, Environmental, and Development Economics (AEDE) relies upon Graduate Associates (GAs) to support the teaching and research activities of the department. All students wishing to maintain eligibility for future departmental GA positions must meet the following standards. These guidelines are specific to students serving in departmentally funded Graduate Associate positions.

Spoken English Requirement

In accordance with the Graduate Student Handbook (Section 2.7), any international or permanent resident graduate students for whom English is not the first language must certify their proficiency in spoken English before assuming GTA duties. This is typically done through the Oral Proficiency Assessment (<https://esl.ehe.osu.edu/home/testing/spoken-english/>) at Ohio State University.

Any AED Economics GTA who does not score a C4.0 or above on the Oral Proficiency Assessment must be continuously enrolled in the appropriate course(s) suggested by the ESL office until they reach a certification level of C4.0, beginning in the autumn semester of their second year in the AED Economics Ph.D. program. All AEDE GTAs are required to reach a certified C4 level by the beginning of spring semester in their third year in the AED Economics Ph.D. program.

Satisfactory Academic Progress

All Graduate Associates funded by AED Economics are required to meet satisfactory progress benchmarks as outlined in the *AED Economics Graduate Student Handbook*. This document includes all requirements as set forth by the Graduate School and the Department of Agricultural, Environmental, and Development Economics.

Students in their sixth year of the AED Economics doctoral program will not be considered eligible for Graduate Associate positions barring extenuating circumstances. The Graduate Studies Chair may override this guideline due to departmental staffing needs if necessary.

GA Performance

All Graduate Associates will be evaluated by the instructors and faculty they serve in their positions at the end of every semester. Any departmentally funded GA must receive a rating of “Satisfactory” on all job performance metrics in order to maintain eligibility for future Graduate Associate positions. Any Graduate Associate who is not meeting expectations related to duties assigned by faculty or instructors will attend a meeting to review expectations along with time to recalibrate performance before any official action is taken.

Adherence to HR Guidelines and Policies

Graduate Associates are employees of the Department of Agricultural, Environmental, and Development Economics and The Ohio State University. Therefore, all GAs is subject to policies outlined by the Office of Human Resources in the College of Food, Agricultural, and Environmental Sciences.

Appendix 6

PhD Program Prerequisite Course Descriptions Agricultural, Environmental, and Development Economics

Below are descriptions of courses students are expected to have completed prior to entering the AED Economics PhD program. The Ohio State Course equivalents are given in parenthesis.

Intermediate Microeconomic Theory

Theory of consumer behavior; theory of the firm; costs and production; factor price determination; general equilibrium. (Economics 4001.02)

Intermediate Macroeconomic Theory

Analysis of the determinants of national output, income and employment levels; theory of economic growth and progressive equilibrium in an economy. (Economics 4002.01)

Introduction to Statistics

Topics include probability, descriptive statistics, correlation, regression, design of experiments, sampling, estimation, and testing; emphasis on applications, statistical reasoning, and data analysis using statistical software. (Statistics 1450)

Calculus and Analytic Geometry I

Limits, continuity, derivatives, Mean Value Theorem, extrema, curve sketching, related rates, differentiation of the trig, log, and exponential functions. (Math 1151)

Calculus and Analytical Geometry II

Integral, area, fundamental theorems of calculus, logarithm and exponential functions, trigonometric and inverse trigonometric functions, methods of integration, applications of integration, polar coordinates. (Math 1151 and 1152)

Calculus and Analytic Geometry III

Indeterminate forms, Taylor's formula, improper integrals, infinite series, parametric curves, and vectors in the plane; vectors, curves, and surfaces in space. (Math 1152)