



THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES

Agricultural & Resource Economics

Applied Econometrics and Data Analytics

Applied Economics and Policy Analysis

Master of Science Handbook

2020-2021 Academic Year

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<https://cals.arizona.edu/arec>

In this handbook are details regarding the rules and procedures relevant to the M.S. program in the Agricultural & Resource Economics Department at the University of Arizona.

Please note these four essential UA Graduate College websites for the most current information:

(A) Graduate College: <http://grad.arizona.edu>

(B) Policies and Procedures: <http://grad.arizona.edu/policies>

(C) New and Current Students, parents, for professional development, and wellness:
<http://grad.arizona.edu/currentstudents>

(D) General catalog <http://catalog.arizona.edu/>

These websites contain the formal statements of university and department minimum requirements for all degrees. Students are expected to be familiar with these requirements, particularly those relevant to coursework, scholarship, exams, residency, and deadlines for filing required documents.

The UAccess Student website, <https://uaccess.arizona.edu/>, within the Student Center search for classes feature provides a complete list and brief description of courses that carry graduate credit (courses numbered 500 and above).

To view how-to guides for UAccess Student Center
<https://it.arizona.edu/documentation/student-center-how-tos>

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1. Program History

The University of Arizona Department of Agricultural and Resource Economics (AREC) was established over 75 years ago with only two faculty members. In the early days of the department, research and extension activities focused primarily on Arizona agriculture. Within the first two decades, however, the department began to increase its regional, national, and even international presence through a variety of research projects, including one in Brazil. By the early 1970s, the department had doubled in size and water issues had become a focal point of AREC research. Throughout the 1980s and early 1990s, the department continued to grow and focus on the research it had gained recognition for in earlier years. The advent of the 1990s and early 2000s brought about significant changes. Yet, today, despite declining resources, the Department of Agricultural and Resource Economics continues to be recognized for high quality faculty, policy-relevant research, and impressive undergraduate and graduate programs.

The AREC department is home to 10 teaching and research faculty (3 of whom who hold extension/research appointments), 2 extension economic impacts analysts, and 3 support staff skilled in student advising, technical editing and graphic design, and administration and financial services.

Three emeritus faculty, one former faculty member, and one current faculty member have been selected as Fellows of the American Agricultural Economics Association (AAEA), a recognition of career accomplishments in agricultural and resource economics. Similarly, two faculty members have won career recognition through the Western AEA.

In its 2017 rankings of master's programs in Economics, The Financial Engineer ranked the Department's master's program as 13th in the nation among private and public institutions, and 7th among only public institutions.

2. Admissions

2.1. Admission Requirements

Completion of a four-year baccalaureate degree, or its equivalent from a non-U.S. institution, is necessary for enrollment in the graduate program. Applicants to our M.S. programs typically have completed coursework in economics through both intermediate microeconomic and intermediate macroeconomic theory. Master's degree candidates should have had at least one course in statistics and one course in calculus.

- Graduate College Online Application, see our program descriptions at the Grad College website for full details
 - <http://grad.arizona.edu/programs/programinfo/ARECMSAEDA>
 - <http://grad.arizona.edu/programs/programinfo/ARECMSAEP>
- Unofficial Transcripts (Official translation in English, from previous institution), submitted through Graduate College Online Application. Official transcripts will be requested if we offer admission recommendation.
- Three Letters of Recommendation in PDF format-names and email addresses will be entered by the application through Graduate College Online Application.
- Statement of Purpose/Personal Statement in PDF format-submitted through Graduate College Online Application.
- 3.0 minimum undergraduate GPA on a 4.0 scale or 3.0 GPA within a minimum of 12 units of graduate level coursework.
- Official GRE Scores: 70th percentile or better in the quantitative portion is recommended. The institution code is 4832 for the University of Arizona and 0101 for the Department. Submitted officially from ETS. In the online application, applicants must enter their unofficial scores, but official scores must be submitted by ETS to the University of Arizona. Applications are incomplete if self-reported scores are not submitted with the application.

- Official TOEFL Scores: Required for students from countries where the native language is not English. The institution code is 4832 for the University of Arizona and 99 for the Department. Submitted officially. Students with a 4-year degree from an official English-speaking language country do not need to submit English Speaking Proficiency testing scores.
- International students (of non-English speaking countries):
 - Minimum TOEFL (Paper-based) Score: 550
 - Minimum TOEFL (Internet-based) Score: 80
 - Minimum IELTS (overall band score): 7

2.2. Graduate Assistantships

All students which submit an admission application by the annual priority deadline of February 1st are reviewed for possible graduate assistantships (GA). A separate application for GA is not necessary for this department. Earning an AREC GA position is a competitive process, as such, not all admitted students are offered GA by the Department. Students will be contacted if they are selected to be a departmental GA via email with an official offer letter. Both teaching and research assistantships are available each academic year. Students that wish to apply for Spring admission are not eligible for AREC GA, as funding is awarded on an academic year basis, which begins in Fall semesters.

Continuing GAs must make satisfactory progress each semester and earn a minimum 3.0 semester GPA as well as maintain a minimum cumulative 3.0 GPA.

3. Curriculum in AREC M.S.

The AREC M.S. degree has two academic plan options from which students may choose: Applied Economics and Policy Analysis (AEPA), is structured to be completed in 4 semesters; Applied Econometrics and Data Analytics (AEDA), is structured to be

completed in 3 semesters and does not require a thesis. Those that wish to pursue a Ph.D. typically take the AEPA plan. See section 3.2 for details of each plan.

The AREC MS degree requires 30 units, 15 of which come from what are considered Core courses. AREC 596A our seminar course, is considered a Core course, however, due to the variance in required seminar units for AEDA vs AEPA seeking students, seminar is not counted in this 15 Core units. AEDA seeking students are expected to complete 3 seminar units over time, and AEPA seeking students are expected to complete 4 seminar units over time. Enrollment in the seminar course is required each semester. It may be repeated for credit each semester, with each earned unit of seminar to be counted towards meeting the 30 total degree required units. A number of individual lectures are offered each semester as part of AREC 596A seminar, with specific topics and descriptions posted for each seminar. Light coursework and lectures may be required in addition to attending seminar presentations. Overall attendance is essential and expected.

3.1. The Minimum Requirements of the Program

Students are required to complete:

- A minimum of 30 graduate units with a minimum 3.0 cumulative GPA;
- 15 core units are required as part of the 30 total units;
- AREC 596A is required to be completed each semester degree is in progress.
 - AEDA seeking students will complete 3 total units from AREC 596A.
 - AEPA seeking students will complete 4 total units from AREC 596A.
- AEPA seeking students must complete a minimum of 6 thesis units (AREC 910) as part of the 30-unit total;
- AEDA seeking students are required to complete AREC 559 as part of the 30-unit total.

- If awarded a graduate assistantship (GA), 10 graduate level unit enrollment minimum is required each semester, as well as maintaining a minimum 3.0 GPA.
- Successful progress with GA duties is required to maintain GA appointment. GA is a privilege which is not offered to all admitted students.

3.2. Concentrations

- *Applied Econometrics and Data Analytics*

Our M.S. program in Applied Econometrics and Data Analytics offers outstanding opportunities as a terminal degree. In just 18 months, you will be prepared for challenging and fulfilling jobs as econometricians, data scientists, risk managers, credit analysts, economists, and policy analysts in the private sector and in governmental and non-governmental organizations.

- *Applied Economics and Policy Analysis*

Our program in Applied Economics and Policy Analysis will pave the way for excelling in premier Ph.D. programs in agricultural and resource economics. This two-year program, which requires students to write a thesis, provides superb preparation in academic research. Master's graduates in this program gain admission and garner financial support at top agricultural and resource economics programs including UC Berkeley, Cornell, UC Davis, Maryland, Minnesota, Vanderbilt, and Washington State University. Our past graduates have placed exceedingly well in academic jobs, securing tenure-track assistant professorships in universities such as Ohio State University, University of Florida, Purdue, Tufts University, and University of Utah.

3.3. *AREC minor for Ph.D. students*

A minor is available from this department for Ph.D. seeking students, once admitted to the desired UA Ph.D. program; the student should submit the AREC minor application form at <https://economics.arizona.edu/graduate/minor>.

- The minor consists of 12 graduate level required units, view the requirements at <https://economics.arizona.edu/graduate/minor>.

3.4. *Accelerated Master's Program (AMP)*

The AREC AMP is open to active, current University of Arizona students enrolled in the AREC undergraduate programs of Agribusiness Economics and Management with the Agricultural Economics emphasis (ABEM-ECON) and Agribusiness Management (ABEM-MGMT), and the Environmental and Water Resource Economics (EWRE). Students with the ABEM or EWRE major are eligible for either of our graduate programs Applied Econometrics and Data Analytics (AEDA) or Applied Economics and Policy Analysis (AEPA). Students interested in applying to AREC AMP must have at least 75 earned/completed units at the time of application submission and must have at least 90 earned/completed units prior to admission to AMP. Prior to admission a minimum 3.3 cumulative GPA is required, if the GPA falls below 3.3 prior to admission or 90 units are not completed, the student will not be allowed to begin the AREC AMP. The Graduate Record Exam (GRE) is required, however, it may be submitted along with your AMP application or it may be submitted no later than Feb. 1 in the year the student will complete their undergraduate degree. The quantitative GRE minimum score required for admitted students into this program is the 70th percentile.

During a student's 3rd year, they should prepare to apply to this program for the next soonest Fall semester, February 1st is the annual deadline for the application submission. This department's incoming AMP cohort begins in Fall semesters only. It is

during their 4th year/senior year that the admitted AMP student will take graduate level AREC courses that will count toward their undergraduate and graduate degrees. Up to 12 total graduate level units are permitted to be shared between both degrees, 6 graduate units in the Fall semester and 6 graduate units in the Spring semester. While an undergraduate student, taking the 12 permitted graduate level units in courses numbered 500-599, tuition will be charged at the undergraduate tuition amount.

After the bachelor's degree has been completed and the student is taking only graduate AREC MS degree courses, tuition will then be charged at the graduate tuition amount. Should the undergraduate degree not be completed at the completion of the 12 graduate AMP units, the student's tuition will begin charging at the graduate level tuition cost and the student will no longer be eligible for undergraduate aid or scholarships nor graduate assistantships. AMP students while an undergraduate student, are not eligible for graduate assistantships, only once they have successfully and completely transitioned to a fully graduate level student status and no longer AMP, will they be eligible for available graduate assistantships/scholarships.

3.5. *Schedule of Course Offerings*

All Core courses are ordinarily completed during the first year of study: AREC 504 and AREC 548 in the first semester and AREC 513 and AREC 549 during the second semester. Students ordinarily complete AREC 580 prior to completing any of the Core classes during a three-week intensive review in July/August. If a student requests Spring admission and the department approves this, the student may start the program in the Spring semester, it is recommended that the student take elective courses in the first (Spring) semester followed by AREC 580 and Core classes in the second (Fall) and third (Spring) semesters.

Fall semester course offerings:

AREC 504 – Production Economics
AREC 512 – Development Economics
AREC 516 – Microeconomics of Agricultural Development
AREC 548 – Introduction to Statistical Methods in Economics
AREC 559 – Advanced Applied Econometrics
AREC 575 – Economics of Water & Environ. Markets & Incentive-based Policies
AREC 580 - Math for Economists (Course completed in July/August)
AREC 596A – Seminar required each semester
AREC 910 – Thesis

Spring semester course offerings:

AREC 513 – Consumption Economics and Price Analysis
AREC 549 – Applied Econometric Analysis
AREC 550/450 – Financial Management for Agribusiness
AREC 579/479 – Economic Analysis of Water, Food & Environmental Policies
AREC 596A – Seminar required each semester
AREC 910 – Thesis

3.6. *Satisfactory Academic Progress*

AREC M.S. students are expected to:

- Maintain a 3.0 GPA each semester.
- *Maintain a 3.0 GPA in core courses (AREC 504, 513, 548, and 549). Students may earn a grade of C in a core course as long as the overall GPA in the core courses is at least 3.0. (*Effective Fall 2021 cohort)
- Successfully complete each of the Core courses for the program and all other unit requirements.
- Successfully complete a thesis and thesis defense for those in the AEPA plan.
- For those in the AEDA plan, students must successfully complete a final oral exam.
- Complete all steps within UAccess Grad Path.

Not making satisfactory academic progress means the student has not maintained a 3.0 GPA and is not making progress through the Core courses. Evaluation of satisfactory academic progress will be made each semester with final grades and at the end of the student's graduate career with their final oral exam or thesis and thesis defense.

The UA Graduate College has established guidelines, for which departments must follow in order to dismiss a graduate student from the program. Students should be aware of these by reviewing them from the Graduate College website at

<https://grad.arizona.edu/policies>

3.7. *Co-convened Courses*

Some graduate courses are held in conjunction with upper level undergraduate courses, although graduate students must complete additional work. Such classes are typically based on lectures rather than discussion. AREC Core courses are not jointly convened.

3.8. *Individual Studies*

Graduate students can register for different kinds of individual study and research/thesis credits. Up to nine of these credits (including the required 6-units of AREC 910 thesis credits for AEPA students) can be applied to unit requirements for the M.S. degree. A student is permitted to exceed nine such credits, but only 9 will count toward their degree total units. Graduate College policy states no more than 50% of the required degree units may have alternative grading of S/P. This means of the 30 required units for AREC MS degree, a student may only 15 or less units from independent study/research/seminar/thesis units. In the following list, the number in brackets refers to the number of credits permitted each semester, not the number of credits allowed for degree completion.

- AREC 593 Internship [1 to 5 units]
- AREC 599 Independent Study [1 to 6 units]

- AREC 699 Independent Study [1 to 3 units]
- AREC 900 Research [1 to 6 units]
- AREC 910 Thesis [1 to 8 units]

3.9. *Course Load*

During fall and spring semesters, full-time status per the Graduate College requires enrollment in 9 units of graduate credit. Three to four courses (9 - 12 units) per semester constitute typical full-time enrollment. **Please note**, AREC GA students must enroll in a minimum of 10 graduate level units each semester, commonly, non-GA students will also enroll in at least 10 graduate level units to maintain degree completion timeline.

Per the [UA General Catalog](#), “A student who has completed all course work, the thesis/dissertation unit requirements, has advanced to candidacy, is working on the thesis/dissertation, and is not employed as a Graduate Assistant/Associate or student worker may apply for [advanced status](#), which allows 1 unit of 900-level credit for full-time status. The full-time status enrollment minimums apply to students wishing to defer federal loan repayments, to international students with F or J visa status, and/or to students receiving University funding other than wages.” These policies are subject to change. Please refer to the latest General Catalog for current policies.

It is Graduate College policy that in a student’s final semester, the student must be continuously enrolled in at least 1 graduate level unit to earn their degree. To see this and all other Graduate College degree requirements visit

<http://grad.arizona.edu/gsas/degree-requirements>.

3.10. Advising and Mentoring

Successful graduate study relies on effective relationships between the student and the advising faculty member(s). Upon arrival in the program, new students should schedule a time to meet with the Director of Graduate Studies (DGS) for advising, unless they have identified an advisor prior to beginning the program. Students should meet with the DGS and/or their advisor at the start of their first semester to discuss educational objectives and plan a tentative program of study. Student and advisor typically share similar research interests. Students are encouraged to develop and maintain informal mentoring relationships with different faculty members, including but not limited to those faculty who are formal members of the student's final oral exam or thesis committees.

The formal advising relationship is agreed to by mutual consent through discussion between the student and the faculty member concerned. A student may change advisors, but the change must again be by mutual consent, and should be done in consultation with the DGS.

New students are also strongly encouraged to introduce themselves on arrival to the Department Head, staff, and members of the faculty. New students are to be available for the mandatory AREC orientation, which occurs three weeks before the beginning of Fall classes. AREC 580 also starts three weeks before Fall classes begin. Students holding graduate assistantships are to be available one week prior to the beginning of classes for training sessions and assisting in course preparation. Continuing graduate students should consult with their mentors and advisors as often as necessary during each semester, and with the Director of Graduate Studies at least once each year or whenever necessary. Students are responsible for planning enough to ensure appropriate course registration, and to meet any filing deadlines specified by the Graduate College. Graduate students should work with the Graduate Program Coordinator regarding dates and deadlines and all enrollment questions/concerns.

3.11. Semester-To-Semester Guide

[GradPath](#) is the online system that manages the creation, routing, and approval of all Graduate College degree programs. All forms that graduate students are required to submit to the Graduate College are within GradPath. The ability to utilize GradPath begins with completion of the first form titled, “Responsible Conduct of Research.” Once this form is completed, the additional required forms will be made available to you. The next step is the “Plan of Study”, where students will enter the courses and units they have and will take toward this degree. Once submitted it is approved at the Dept. level and Graduate College. The Plan of Study may be resubmitted as many times as necessary to have it list only the courses applicable to the AREC MS degree. The third form is the “Masters Committee Appointment Form”, this is where the student will indicate whether or not they are completing a thesis, identify their thesis advisor for their thesis defense or a faculty advisor for their final oral exam, as well as their two additional committee members.

The tables below illustrate the semester-by-semester plan for AEPA and AEDA full time students. Students are not bound to this route, but it is the most efficient pathway to degree completion. The two charts below show a full-time student’s semester-by-semester plan for both AEPA and AEDA seeking students. Working part-time is possible with this degree and although unusual, this pathway will need to be worked out on a case-by-case basis with the student, program coordinator and the DGS.

AEPA Plan

1st Fall

Course	Units	Required Core?
AREC 504	3	✓
AREC 548	4	✓
AREC 580	2	✓
AREC 596A	1	✓
Total	10	

1st Spring

Course	Units	Required Core?
AREC 513	3	✓
AREC 549	3	✓
AREC 550, 577, 579, or Grad Elective	3	
AREC 596A	1	✓
Total	10	

2nd Fall

Course	Units	Required Core?
AREC 910 Thesis units	3	✓
AREC 559, 512, 516, 575 or Grad Elective	3-4	
AREC 512, 516, 575 or Grad Elective	3	
AREC 596A	1	✓
Total	10-11	

2nd Spring/Completion Term

Course	Units	Required Core?
AREC 910 Thesis units, enrollment in 8 units to reach full-time status	8 (3)	✓
AREC 596A	1	✓
Total applied to degree	4	

Upd 10/2020

AEDA Plan

1st Fall

Course	Units	Required Core?
AREC 504	3	✓
AREC 548	4	✓
AREC 580	2	✓
AREC 596A	1	✓
Total	10	

1st Spring

Course	Units	Required Core?
AREC 513	3	✓
AREC 549	3	✓
AREC 550, 577, 579, or Grad Elective	3	
AREC 596A	1	✓
Total	10	

2nd Fall/Degree Completion Term

Course	Units	Required Core?
AREC 559	4	✓
AREC 512, 516, 575 or Grad Elective	3	
AREC 512, 516, 575 or Grad Elective	3	
AREC 596A	1	✓
Total	11	

Upd 10/2020