

# **UNDERGRADUATE HANDBOOK**

## **Resource Economics and Management**

### **Bachelor of Science**

Majors Covered:

Agribusiness Management

Environmental and Energy Resources Management

Environmental and Natural Resource Economics

**2020-2021**

### **Contact Information**

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### **Introduction**

This handbook provides current and prospective West Virginia University students with background information about the degree, Bachelor of Science in Resource Management, offered by the Division of Resource Economics and Management in the Davis College of Agriculture, Natural Resources, and Design.

The Division of Resource Economics and Management offers a diverse range of expertise and interests among its faculty. These interests include: agribusiness management, organic and local food marketing, agricultural policy and environmental impacts, energy and its environmental impacts, environmental economics and policy, entrepreneurship, international, rural and regional development, sustainable agricultural development, and watershed management and water quality.

The Division of Resource Economics and Management offers a Bachelor of Science in Resource Management under three majors: (1) Agribusiness Management, (2) Environmental and Energy

Resources Management, and (3) Environmental and Natural Resource Economics.

- The Agribusiness Management major is for students who will pursue professional careers in private industry (with an emphasis in agribusiness or food), small business, or relevant government agencies. The coursework requirements provide the graduate with a broad-based education, which enhances the student's ability to further their professional career skills. Interested students may prepare for graduate or law school.
- The Environmental and Energy Resources Management major aims to provide a strong foundation for those students interested in pursuing a career focusing on the business of energy production and utilization along with associated environmental management, regulatory and policy issues. Students completing this interdisciplinary major can pursue a career in the growing energy and environmental sectors of the economy, whether in private business, government, consulting, or entrepreneurial ventures of their own design. The program emphasizes the core components of both business and STEM (science, technology, engineering and math) learning in its curriculum.
- The major in Environmental and Natural Resource Economics prepares students for careers in environmental policy and natural resource management. Students in this major are advised to select electives in the natural sciences to strengthen their science background. Because of the demand for positions in environmental and natural resource fields, graduates may wish to continue their education in graduate school. Thus, this major prepares students for graduate study in a number of areas: applied economics, business, environmental and resource economics, or law school.

In addition to a Bachelor of Science degree, three minors are offered within the program: (1) Agribusiness Management, (2) Agricultural and Natural Resources Law, and (3) Environmental Economics. To sign up for a minor, talk to your academic advisor. More information is available at: <http://catalog.wvu.edu/undergraduate/minors/>.

## **Vision Statement**

The faculty in the Division of Resource Economics and Management will provide each undergraduate with an educational experience designed to facilitate their chosen career goals. Educational experiences will be provided under three majors: (1) Agribusiness Management, (2) Environmental and Energy Resources Management, and (3) Environmental and Natural Resource Economics. The goal of the Agribusiness Management major is to provide students with a breadth of knowledge in both the social and natural sciences upon which further professional training can be based. The goal of the Environmental and Energy Resources Management major is to provide students with the analytical framework, toolkit and problem-solving skills to better function in a complex and changing energy, economy, and environmental management setting. The goal of the Environmental and Natural Resource Economics major is to provide students with the necessary training for the application of economic theory and analysis to natural resource and environmental management issues.

## Fact Sheet Information

### Basic facts of all majors:

- As of fall 2019, 219 students were enrolled: 70 in Agribusiness Management, 26 in Environmental and Natural Resource Economics, and 123 in Environmental and Energy Resources Management.
- At this time, in-state tuition applies for some out-of-state students.
- There are no restrictions on enrollment or pre-majors.
- Degree programs are flexible to meet the interests of individual students.
- Many students are transfers from other majors, particularly Business & Economics, Animal Science, and Engineering.
- Most courses are taught on the Evansdale campus.
- A capstone experience (consisting of an internship, senior thesis or study abroad) is required for graduation.

### Agribusiness Management major

- Student interests related to food and agriculture, small business, or graduate/law school.
- Courses cover breadth of skills related to business: accounting, economic theory, enterprise development, finance, law, management, and marketing.
- Students in this major from Ohio may qualify for in-state tuition.
- Most students obtain private sector employment with: agribusiness firms, farms or small businesses.
- About 18% of graduates go on to graduate school.

### Environmental and Energy Resources Management major

- Intended to produce graduates who comprehend the big picture about energy and who are prepared for a variety of jobs in the energy industry, government regulatory agencies, consulting firms, or starting their own business.
- Most students obtain internships with energy-related industries and/or regulatory agencies.

### Environmental and Natural Resource Economics major

- Prepares students for careers in environmental policy and natural resource management within private industry and relevant government agencies.
- Students in this major from Ohio may qualify for in-state tuition.
- Combines coursework in social and physical sciences.
- Most graduates obtain employment in the private sector while about 20% seek a graduate education.

## **Division of Resource Economics and Management Features**

Spreadsheet, word processing, statistical, and econometric software packages are available in two college-maintained computer labs in the Agricultural Sciences Building – G08 and G10. Some computers have advanced graphics and geographical information system (GIS) software. These labs are used for teaching, but if there is no class, they are open to students Monday through Friday from 8 a.m. to 9 p.m.

The Natural Resource Analysis Center (NRAC) is an important asset closely associated with the division where students who are interested in GIS and spatial analysis may have an opportunity for student employment or internships. NRAC provides geospatially based research, teaching and service focused on environmental and natural resource issues for West Virginia, the surrounding Appalachian region, and beyond. NRAC is a multi-disciplinary research and teaching facility within the Davis College of Agriculture, Natural Resources and Design, originally established in 1990. Areas of expertise at NRAC include landscape analysis, watershed-based modeling and applications, remote sensing, spatial decision support, energy issues, and economic development. For more information check out: <https://www.nrac.wvu.edu/home>.

## **Capstone Experience**

Dr. Byrd serves as Undergraduate Coordinator. She is assisted by faculty as well as the Division of Resource Economics and Management's professional academic advisor, Barry Stephens. Dr. Byrd and Dr. Collins approve and oversee all student capstone experiences for the Division.

In order to better prepare students for their careers, a capstone experience is required of each student in all three of the majors in the Division of Resource Economics and Management (REM): Agribusiness Management, Environmental and Energy Resources Management, and Environmental and Natural Resource Economics.

For Agribusiness Management (AM) majors, this capstone experience is 3 to 6 credit hours and generally takes place during their junior and/or senior years or in the summer prior to their last year. This capstone experience offers each student three options: (1) completion of a professional field experience internship (ARE 491), (2) completion of a senior thesis (ARE 496), or (3) completion of a study abroad experience (ARE 491).

For Environmental and Energy Resources Management (EERM) majors this capstone experience is an internship that meets a minimum of 3 credit hours (ARE 491) that takes place during their junior and/or senior years or in the summer prior to their last year. EERM majors may also substitute completion of a study abroad experience (ARE 491) or completion of a senior thesis (ARE 496).

For Environmental and Natural Resource Economics (ENRE) majors, this capstone experience is a total of 3 credit hours for completion of a senior thesis (ARE 496). Students will enroll for 1 credit hour of ARE 496 in the semester preceding the one during which they complete their

thesis. Students then will enroll for 2 credit hours of ARE 496 for the following semester, during which they complete their thesis.

Each student will be responsible for developing their own internship, senior thesis, or study abroad experience. Exploration of internship opportunities or senior thesis ideas is developed when the student is enrolled in the career development class (ARE 488) during the fall semester of their junior year.

If a student is considering the study abroad option, advance planning of at least one year prior to studying abroad is required in order to be prepared to complete this option.

Each proposed internship (ARE 491), senior thesis (ARE 496), or study abroad experience (ARE 491) must be reviewed by the student's undergraduate advisor and the REM Undergraduate Coordinator, Dr. Elizabeth Byrd, prior to registration into the internship or senior thesis courses. Each proposed internship (ARE 491) must be reviewed by the course instructor prior to registration into the internship course. See Mr. Barry Stephens for details regarding the EERM capstone experience.

#### **Requirements for the Internship Option:**

- Work with your advisor to determine an appropriate internship experience given your career goals.
- You must work at least 75 hours at the internship for each WVU credit hour earned.
- For AM and EERM majors, a minimum of 3 credit hours are needed (225 hours of work), and a maximum of 6 credit hours (450 hours of work) are possible for the capstone requirement.
- ENRE majors may obtain credit for an internship by registering for ARE 491 and following the internship requirements given here. However, their internship will count as an ENRE restricted elective but not as their capstone experience.
- Registration for ARE 491 (internship) requires approval of either Dr. Byrd, Undergraduate Coordinator (AM majors), or Barry Stephens (EERM majors), course instructors.
- **Prior to the start of your internship and registration for ARE 491** an internship description form must be filled out completely to receive approval of your internship and for you to be cleared to register for ARE 491.

**AM majors go here:** [https://wvu.qualtrics.com/jfe/form/SV\\_cLJGBA7ymb61Ppj](https://wvu.qualtrics.com/jfe/form/SV_cLJGBA7ymb61Ppj)

**EERM majors go here:** [https://wvu.qualtrics.com/jfe/form/SV\\_6fGzLSDEEbgmfWJ](https://wvu.qualtrics.com/jfe/form/SV_6fGzLSDEEbgmfWJ)

- If your internship takes place during the summer, you are required to register for ARE 491 as an off-campus summer course during the summer. You will register online but first Dr. Byrd or Mr. Stephens must clear you to be able to do so. *Payment for off-campus summer courses is per credit hour and possibly will not be covered by financial aid, so plan accordingly.*
- If a student is doing an internship where all the work hours occur during the summer, a student must enroll in ARE 491 during the summer. A student doing internship work hours during the summer is allowed to enroll for fall or spring semester credit hours only if their work hours for the internship extend into the fall or spring semester.

- You should retain, and may be required to submit, pay stubs or another record of your work hours.
- Your supervisor must complete an evaluation form of your internship experience. This form will be sent by Dr. Byrd or Mr. Stephens to your internship supervisor using contact information that you provide.
- Two written reports that should be submitted through eCampus are required (keeping a daily journal during your internship will help with these reports):
  - (1) a one-page progress report submitted at about the halfway point of your internship
  - (2) a final report of your internship experience (5-7 pages)
    - Describe the business or agency you worked for and its overall goals and objectives.
    - Describe your responsibilities and duties within the company or agency.
    - Discuss what you learned on the job.\
    - Explain what skills and knowledge you applied from your WVU coursework.
    - Discuss how this internship will help your future career goals.
    - Explain what you consider were the best features of your assignment and why.
    - What suggestions would you make (to your employer and/or to WVU) to improve the professional field experience.
    - How would you rate your overall performance as an employee during your internship? In what areas did you excel and where do you need to improve.
    - Did you receive an offer of future employment as a result of your professional field experience?

### **Requirements for the Senior Thesis Option:**

- A senior thesis is required for all ENRE majors to meet their WVU capstone experience requirement.
- Completion of a senior thesis involves independent research by the student under guidance of a faculty member. Students completing a senior thesis project should discuss possible topics with appropriate REM professors or other faculty at WVU.
- One goal of a senior thesis is for the student to submit a research paper that, with revisions by the faculty advisor, could be submitted for presentation at a professional conference or for publication as a journal article.
- This research should involve development of research objectives and hypotheses, an extensive literature review, and where feasible, gathering data (such as a conducting a survey or collecting data from government agencies), applying appropriate statistical or mathematical analyses of the data, and interpreting the results.
- Completing a senior thesis is done over two semesters, so students should plan accordingly. The first semester of senior thesis work should take place in the fall semester (assuming spring graduation), and students are required to register for 1 credit of ARE 496. During this semester they will formalize their idea, review appropriate literature, determine a research question and method, and create an outline. The second semester of senior thesis work will take place in the spring, and students are required to register for 2 credits of ARE 496. During this semester they will perform the research

(data analysis, etc.), write a first draft that will be reviewed by their supervising professor, present their research to their peers and faculty, and turn in their final thesis.

- The final research paper will be graded based on the expectations of your supervising faculty member. An eCampus site will be available for the course each semester where the syllabus will convey important guidelines, deadlines, and grading criteria.
- Approval to register for ARE 496 (senior thesis) requires completion of the Senior Thesis Description Form each semester. **This link will take you to the form:**  
[https://wvu.qualtrics.com/jfe/form/SV\\_6r2y7W2ToVvJ95z](https://wvu.qualtrics.com/jfe/form/SV_6r2y7W2ToVvJ95z)
- Once the Senior Thesis Description Form has been reviewed by Dr. Byrd, Undergraduate Coordinator, and she has verified its content with your supervising professor, you will be cleared to register for ARE 496.

### **Requirements for the Study Abroad Option:**

- This option is available to AM and EERM majors. For ENRE majors, study abroad may allow for credits that count as restricted electives but will not meet the capstone experience requirement.
- The study abroad experience must follow the guidelines established by the WVU Office of Global Affairs (<https://studyabroad.wvu.edu/>).
- A student must be enrolled as a full-time student during their study abroad experience and complete at least 9 credit hours of course work that are transferred to West Virginia University.
- During the study abroad experience, each student is expected to participate in outside classroom activities (seminars, student organizations, field trips, etc.), attend local events, travel, and keep at least a weekly journal of their activities.
- During the semester immediately following their return to West Virginia University, each student must register for 3 credits of ARE 491. To do this **fill out the study abroad form available here:** [https://wvu.qualtrics.com/jfe/form/SV\\_0dq3kr1QdCfX7zT](https://wvu.qualtrics.com/jfe/form/SV_0dq3kr1QdCfX7zT).
- A written report (5-10 pages) and oral presentation (10-15 minutes) on your study abroad experience to fellow students and/or program faculty must be satisfactorily completed to receive a grade for ARE 491.
- Contact Dr. Byrd if you are interested in using the study abroad experience to meet your capstone experience requirement.
- Opportunities for funds to help engage in study abroad
  - The Gilman Scholarship Program is open to U.S. citizen undergraduate students who are receiving Federal Pell Grant funding at a two-year or four-year college or university to participate in study and intern abroad programs worldwide.  
<http://www.iie.org/Programs/Gilman-Scholarship-Program>

## **Tracking Progress toward Graduation**

Using DegreeWorks, students can track their progress toward graduation. This system is accessed via the DegreeWorks link in the WVU Portal. It provides students with instant access to what degree requirements have been met and what requirements still remain. A student should work with their academic advisor to make sure that DegreeWorks correctly reflects their progress toward

graduation. For all majors, a four-year plan of study is provided in this handbook to provide guidance on what needs to be completed for graduation. Students can also develop a more individualized plan of study using DegreeWorks.

## Graduation

In order for students to graduate from West Virginia University, they must fulfill four broad requirements: (1) have a minimum GPA of 2.0 overall and in their major, (2) meet the credit hour requirement of the degree (120 hours for all REM majors), (3) meet the university requirements of the General Education Foundation (GEF) coursework, and (4) meet the requirements of their chosen major as discussed in the degree descriptions of this handbook. Check DegreeWorks and with your academic advisor to verify that all graduation requirements have been met. During a student's last semester at WVU, **a student expecting to graduate must complete an application to graduate by the given deadline.** This is done online but the Davis College Academic Affairs office can help you with the graduation application process.

## General Education Foundation

The General Education Foundation (GEF) contains eight objectives. Courses that meet GEF requirements are available at the registrar's website: <http://registrar.wvu.edu/gef>. Four courses offered within the ARE program can be used to satisfy GEF requirements (see Table 1).

### REM courses that meet GEF objectives.

Course Number and Title	GEF Objective
ARE 150 <i>Intro. Agricultural and Agribusiness Economics</i>	4
ARE 187 <i>Energy Resource Economics</i>	2A
ARE 220 <i>Intro. Environmental and Resource Economics</i>	4
RESM 140 <i>Sustainable Living</i>	7

## Within WVU Transfer Information

Both the Agribusiness Management and the Environmental and Natural Resource Economics majors are very receptive to transfer students. With over 50 credit hours of free and restricted electives, most students can easily transfer into either major and not fall behind their graduation schedule. Table 2 contains information about approved substitutions for required courses that are commonly taken by transfer students prior to their entry into either major. With the "What if" option in DegreeWorks, students can determine how their currently completed courses satisfy requirements of any of the three REM majors.

### Commonly accepted substitutions for ARE major courses.

Required Course	Approved Substitute
ARE 110	ACCT 200 or ACCT 201
AGEE 110	CS 101
ARE 150	ECON 201



## Restricted Electives

All three majors feature a requirement of restricted electives. Agribusiness Management majors are required to complete 30 hours of restricted electives. Environmental and Energy Resource Management majors are required to complete 36 hours of restricted electives. Environmental and Natural Resource Economics majors are required to complete 22 hours of restricted electives. Restricted electives are chosen jointly by the advisor and student based on the student's career interests and plans after graduation.

## Important Links

DegreeWorks: <http://registrar.wvu.edu/dw>  
Ecampus: <http://ecampus.wvu.edu/>  
STAR: <http://star.wvu.edu/>  
GEF Course List: <http://registrar.wvu.edu/gef>  
Schedule of Courses: <http://courses.wvu.edu/>  
Minors Description List: <http://catalog.wvu.edu/undergraduate/minors/>  
Transferring Courses from other colleges or universities:  
[http://admissions.wvu.edu/admissions/university-requirements/transfer\\_equivalency](http://admissions.wvu.edu/admissions/university-requirements/transfer_equivalency)

## Agribusiness Management Major

The goal of this major is to provide students with a breadth of knowledge that will prepare them for entry-level management positions or starting their own enterprise in a variety of rural, land-based, agricultural and/or food-related businesses. Students with this major can expect to find employment in: agribusiness (including nursery and landscaping) firms or farms, financial institutions, or state and federal government agencies dealing with land use, food and agriculture. Employment in these areas requires the essential components of this major: a broad educational background combined with knowledge of managing natural resource-based businesses. By selecting appropriate coursework in consultation with their advisor, the flexibility of this major provides students with the opportunity to create their own area of expertise or follow course tracks for entrepreneurship, equine management, food science and technology, horticulture, or livestock, as well as to pursue coursework in preparation for graduate school.

After completing this major, students will be able to:

1. Demonstrate an understanding of major concepts in accounting, management, marketing, finance, and business law.
2. Utilize relevant software for analysis in business applications.
3. Demonstrate critical thinking skills and problem-solving abilities related to agribusiness management.
4. Communicate effectively in a business or professional setting (written and oral).
5. Work cooperatively within a business or professional setting.

A minimum of 120 credit hours and a major GPA of 2.0 are required for graduation in this major.

### Course Requirements

### Credit Hours

#### General Education Foundations

- |  |     |
|--|-----|
| 1. Composition and Rhetoric (ENGL 101 and 102 or ENGL 103) | 3-6 |
| 2. Science and Technology<br>GEF 2A or GEF 2B              | 4-6 |
| 3. Mathematics and Quantitative Skills                     | 3   |
| 4. Society and Connections                                 | 3   |
| 5. Human Inquiry & the Past                                | 3   |
| 6. The Arts & Creativity                                   | 3   |
| 7. Global Studies & Diversity                              | 3   |
| 8. Focus*  | 9   |

#### First-Year Seminar

1

#### Required Courses

34

- ARE 110, 150 or ECON 201 (GEF 4), ARE 204, 360, 382, 422, 431, 461, 482, 484, 488  
AGEE 110 or CS 101  
ECON 202 (GEF 8)  
STAT 111 (GEF 3)

Restricted Electives	30
<p>The restricted electives must be selected in consultation with the student’s advisor, include at least four courses from the Davis College, and selected from the list below: Upper-division (300-400 level) courses from the following subjects: ADV, AGBI, AGEE, ARE, AGRN, ANNU, ANPH, ANPR, A&amp;VS, AEM, BIOL, COMM, DSGN, ECON, ENLM, ENTO, ENTR, ENVP, FIN, FDST, FMAN, FOR, GEOG, GEOL, HORT, HN&amp;F, LARC, LDR, PLSC, POLS, PSYC, PR, RPTR, RESM, SOCA, WMAN, WGST, and WDSC.</p> <p>STAT at 200-level or higher.</p> <p>AGEE 220 Group Organization and Leadership</p> <p>AGRN 202 &amp; AGRN 203 Principles of Soil Science and Principles of Soil Science Laboratory</p> <p>ARE 220 Introductory Environmental and Resource Economics</p> <p>ANNU 260 Animal Nutrition</p> <p>A&amp;VS 251 Principles of Animal Science</p> <p>A&amp;VS 281 Introduction to Equine Care and Use</p> <p>DSGN 280 Sustainable Design and Development</p> <p>FDST 200 Food Science and Technology</p> <p>HORT 220 General Horticulture</p> <p>MATH 150 Applied Calculus</p> <p>PLSC 206 Principles of Plant Science</p> <p>POLS 210 Law and the Legal System</p>	
University Capstone Course Requirement (ARE 491 or 496)	3
Free Electives*	17
<b>Total</b>	<b>120</b>

\*Some restricted or free electives may also be counted in GEF 8 (Focus). Number of free electives may vary depending on courses chosen throughout your university career.

## Recommended Schedule of Courses for the Agribusiness Management Major

### Year 1

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 150 (GEF 4)	3	AGEE 110	3
ENGL 101 (GEF 1)	3	GEF 5, 6, or 7	3
GEF 2B (BIOL 101 & 103)	4	GEF 5, 6, or 7	3
GEF 5, 6, or 7	3	Free Elective	3
ANRD 191 (First-Year Seminar)	1	STAT 111 (GEF 3)	3
Credit hours	14	Credit hours	15

### Year 2

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 110	3	ECON 202 (GEF 8)	3
ARE 204	3	GEF 8 Focus Course	3
ENGL 102 (GEF 1)	3	Restricted elective	3
Restricted elective	3	Restricted elective	3
Free elective	3	Free elective	3
Credit hours	15	Credit hours	15

### Year 3

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 360	3	ARE 431	3
ARE 382	3	ARE 482	3
ARE 488	1	Restricted elective	3
Restricted elective	3	GEF 8 Focus Course	3
Restricted elective	3	Free elective	4
Free elective	3		
Credit hours	16	Credit hours	16

**SUMMER: ARE 491 (University Capstone - 3 credit hours)**

### Year 4

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 422	3	ARE 484	3
Restricted elective	3	ARE 461	3
Restricted elective	3	Restricted elective	3
Free elective	4	Restricted elective	3
		Free elective	1
Credit hours	13	Credit hours	13

Students who major in Agribusiness Management may desire to continue their education by going to graduate school. Those who want to go to graduate school in agricultural and resource economics should consider the following **Graduate School Track**.

### Year 1

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 150 (GEF 4)	3	AGEE 110	3
ENGL 101 (GEF 1)	3	GEF 5, 6, or 7	3
GEF 2B (BIOL 101 & 103)	4	GEF 5, 6, or 7	3
GEF 5, 6, or 7	3	MATH 126 (college algebra)	3
ANRD 191 (First-Year Seminar)	1	Free elective	3
Credit hours	14	Credit hours	15

### Year 2

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 110	3	ECON 202 (GEF 8)	3
ARE 204	3	STAT 211 (instead of STAT 111)	3
ENGL 102 (GEF 1)	3	Restricted elective	3
MATH 150	3	Restricted elective	3
Free elective	3	Free elective	3
Credit hours	15	Credit hours	15

### Year 3

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 360	3	ARE 431	3
ARE 382	3	ARE 482	3
ARE 488	1	ECON 425 (Restricted elective)	3
STAT 201 (Restricted elective)	3	ARE 411 (Restricted elective)	3
ARE 401 or ECON 301 (Restricted elective)	3	Free elective	4
Free elective	3		
Credit hours	16	Credit hours	16

**SUMMER: ARE 491 Internship or ARE 496 Senior Thesis (University Capstone - 3 credit hours)**

### Year 4

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 422	3	ARE 484	3
ECON 421 (Restricted elective)	3	ARE 461	3
ECON 302 (Restricted elective)	3	ARE 450 (Restricted elective)	3
Free elective	4	Restricted elective	4
Credit hours	13	Credit hours	13

Students who major in Agribusiness Management who want to focus on plants and horticulture should follow this **Horticulture Track**. (Student will be able to declare Horticulture Minor).

### Year 1

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 150 (GEF 4)	3	AGEE 110	3
ENGL 101 (GEF 1)	3	GEF 5, 6, or 7	3
GEF 2B (BIOL 101 & 103)	4	GEF 5, 6, or 7	3
GEF 5, 6, or 7	3	Free Elective	3
ANRD 191 (First-Year Seminar)	1	STAT 111 (GEF 3)	3
Credit hours	14	Credit hours	15

### Year 2

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 110	3	ECON 202 (GEF 8)	3
ARE 204	3	PLSC 206 (Restricted elective)	4
ENGL 102 (GEF 1)	3	Restricted elective	3
HORT 220 (Restricted elective)	3	Free elective	5
Free elective	3		
Credit hours	15	Credit hours	15

### Year 3

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 360	3	ARE 431	3
ARE 382	3	ARE 482	3
ARE 488	1	HORT 300+ (Restricted elective )	3
AGRN 202 & 203 (Restricted elective)	4 3	HORT 400+ (Restricted elective)	3
Free elective	3	Free elective	3
Credit hours	17	Credit hours	15

**SUMMER: ARE 491 (University Capstone - 3 credit hours)**

### Year 4

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 422	3	ARE 484	3
HORT 400+ (Restricted elective)	3	ARE 461	3
Restricted elective	3	HORT 400+ (Restricted elective)	3
Free elective	5	HORT 310 (Restricted elective)	3
Credit hours	14	Credit hours	12

AGRN 202 and AGRN 203 Principles of Soil Science, PLSC 206 Principles of Plant Science, HORT 220 General Horticulture, HORT 330 Plant Propagation, HORT 441 Garden Center Management, HORT 444 Handling and Storage of Horticultural Crops, HORT 445 Greenhouse Management, HORT 310 Vines to Wines.

<http://catalog.wvu.edu/undergraduate/minors/horticulture/>

Students who major in Agribusiness Management who want to focus on horses should follow this **Equine Studies Management Track**. (Student will be able to declare an Equine Studies Minor: Management Track. There is also an Equine Studies Minor: Science Track and an Equine Studies Minor: Equine Assisted Activities and Therapies Track).

### Year 1

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 150 (GEF 4)	3	AGEE 110	3
ENGL 101 (GEF 1)	3	GEF 5, 6, or 7	3
GEF 2B (BIOL 101 & 103)	4	GEF 5, 6, or 7	3
GEF 5, 6, or 7	3	Free Elective	3
ANRD 191 (First-Year Seminar)	1	STAT 111 (GEF 3)	3
Credit hours	14	Credit hours	15

### Year 2

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 110	3	ECON 202 (GEF 8)	3
ARE 204	3	A&VS 282 (Restricted elective)	1
ENGL 102 (GEF 1)	3	A&VS 330 (Restricted elective)	3
A&VS 281 (Restricted elective)	3	Restricted elective	3
Free elective	3	Free elective	4
Credit hours	15	Credit hours	14

### Year 3

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 360	3	ARE 431	3
ARE 382	3	ARE 482	3
ARE 488	1	ANPR 344 (Restricted elective )	4
Restricted elective	3	Free elective	5
Restricted elective	3		
Free elective	3		
Credit hours	16	Credit hours	15

**SUMMER: ARE 491 (University Capstone - 3 credit hours)**

### Year 4

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 422	3	ARE 484	3
Restricted elective	2	ARE 461	3
Restricted elective	3	A&VS 343 (Restricted elective)	3
Free elective	5	A&VS 370 (Restricted elective)	3
		Free elective	3
Credit hours	13	Credit hours	15

A&VS 281 Introduction to Equine Care and Use, A&VS 282 Equine Handling and Ground Training Lab, A&VS 330 Equine Facility Design and Management, A&VS 343 Equine Hoof and Limb, A&VS 370 Riding Theory and Techniques, ANPR 344 Advanced Horse Management.

[http://catalog.wvu.edu/undergraduate/minors/equine\\_management/](http://catalog.wvu.edu/undergraduate/minors/equine_management/)

Students who major in Agribusiness Management who want to focus on animal production (cattle, dairy, lamb, and/or poultry) should follow this **Livestock Track**.

### Year 1

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 150 (GEF 4)	3	AGEE 110	3
ENGL 101 (GEF 1)	3	GEF 5, 6, or 7	3
GEF 2B (BIOL 101 & 103)	4	GEF 5, 6, or 7	3
GEF 5, 6, or 7	3	STAT 111 (GEF 3)	3
ANRD 191 (First-Year Seminar)	1	Free elective	3
Credit hours	14	Credit hours	15

### Year 2

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 110	3	ECON 202 (GEF 8)	3
ARE 204	3	ANNU 260 (Restricted elective)	3
ENGL 102 (GEF 1)	3	Restricted elective	3
A&VS 251 (Restricted elective)	4	Free elective	5
Free elective	3		
Credit hours	16	Credit hours	14

### Year 3

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 360	3	ARE 431	3
ARE 382	3	ARE 482	3
ARE 488	1	A&VS 400+ (Restricted elective )	3
ANPR 300+ (Restricted elective)	4	Free elective	5
Free elective	3		
Credit hours	14	Credit hours	14

**SUMMER: ARE 491 (University Capstone - 3 credit hours)**

### Year 4

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 422	3	ARE 484	3
A&VS 400+ Restricted elective	3	ARE 461	3
Restricted elective	3	A&VS 400+ (Restricted elective)	3
Free elective	6	Restricted elective	3
		Free elective	3
Credit hours	15	Credit hours	15

A&VS 251 Principles of Animal Science, A&VS 409 Food Animal Diseases, A&VS 410 Calving Management, A&VS 411 Dairy Heifer Management, A&VS 412 Lambing Management, ANNU 260 Animal Nutrition, ANPR 336 Dairy Cattle History/Selection, ANPR 341 and ANPR 343 Beef Production and Lab, ANPR 350 Milk Production, ANPR 367 and ANPR 369 Poultry Production and Lab.



Students who major in Agribusiness Management who want to focus on the food industry should follow this **Food Science and Technology Track**. (Student will be able to declare a Minor in Food Science and Technology).

### Year 1

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 150 (GEF 4)	3	AGEE 110	3
ENGL 101 (GEF 1)	3	GEF 5, 6, or 7	3
GEF 2B (BIOL 101 & 103)	4	GEF 5, 6, or 7	3
GEF 5, 6, or 7	3	Free Elective	3
ANRD 191 (First-Year Seminar)	1	STAT 111 (GEF 3)	3
Credit hours	14	Credit hours	15

### Year 2

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 110	3	ECON 202 (GEF 8)	3
ARE 204	3	CHEM 111	4
ENGL 102 (GEF 1)	3	Restricted elective	3
FDST 200 (Restricted elective)	3	Free elective	6
Free elective	3		
Credit hours	15	Credit hours	16

### Year 3

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 360	3	ARE 431	3
ARE 382	3	ARE 482	3
ARE 488	1	HN&F 171 (Restricted elective )	3
FDST 308 (Restricted elective)	3	Restricted elective	3
Restricted elective	3	Free elective	2
Free elective	3		
Credit hours	16	Credit hours	14

**SUMMER: ARE 491 (University Capstone - 3 credit hours)**

### Year 4

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 422	3	ARE 484	3
FDST 365 (Restricted elective)	3	ARE 461	3
Restricted elective	1	HN&F 350 (Restricted elective)	3
Restricted elective	4	Restricted elective	1
Free elective	3	Free elective	3
Credit hours	14	Credit hours	13

FDST 200 Food Science and Technology, FDST 308 Food Plant Sanitation, FDST 365 Muscle Foods Technology, HN&F 171 Introduction to Human Nutrition, HN&F 350 Cross-Cultural Cuisine.

[http://catalog.wvu.edu/undergraduate/minors/food\\_science\\_and\\_technology/](http://catalog.wvu.edu/undergraduate/minors/food_science_and_technology/)

## Environmental and Energy Resources Management Major (EERM)

The objective of this major is to examine the interdisciplinary relationships involved in the business of energy production and utilization along with associated environmental management, regulatory and policy issues. This major will provide a strong foundation for students interested in pursuing a career in the growing energy and environmental sectors of the economy, whether in private business, government, consulting, or for entrepreneurial ventures of their own design. The program emphasizes the core components of both business and STEM (science, technology, engineering and math) learning in its curriculum.

After completing this, major students will be able to:

1. Demonstrate an understanding of major concepts in energy and environmental resource economics, legal issues related to natural resource and environmental management, and enterprise creation and demonstrate critical thinking skills and problem-solving abilities related to these areas.
2. Utilize relevant software for data analysis in energy and environmental applications and general business settings.
3. Communicate effectively in a business or professional setting (written and oral).
4. Work cooperatively within a business or professional setting.

A minimum of 120 credit hours and a major GPA of 2.0 are required for graduation in this major.

### Course Requirements

### Credit Hours

#### General Education Foundations

- |  |     |
|--|-----|
| 1. Composition and Rhetoric<br>(ENGL 101 and 102 or ENGL 103)  | 3-6 |
| 2. Science and Technology<br>GEF 2A or GEF 2B (BIOL 101 & 103) | 4-6 |
| 3. Mathematics and Quantitative Skills                         | 3   |
| 4. Society and Connections                                     | 3   |
| 5. Human Inquiry & the Past                                    | 3   |
| 6. The Arts & Creativity                                       | 3   |
| 7. Global Studies & Diversity                                  | 3   |
| 8. Focus*  | 9   |

#### First-Year Seminar

1

#### Required Courses

37

ARE 187, 201, 382, 488,  
ARE 491 (University Capstone Course Requirement)  
ECON 202  
RESM 440, 480  
Select one of the following:  
ECON 225 or STAT 211

Select 12 credits from the following:

AGRN 202 and 203  
BIOL 101 and 103  
CHEM 111 and 111L  
GEOL 101 and 102  
GEOL 103 and 104  
PHYS 101  
PLSC 206

Restricted Electives*	36
Selected and approved in consultation with advisor. Must include at least 12 credits from each of the three restricted elective categories: Energy, Environment, Economics and Entrepreneurship. See Restricted Electives List on page 20.	
Free Electives*	12-15
<b>Total</b>	<b>120</b>

\*Some restricted or free electives may also be counted in GEF 8 (Focus). Number of free electives may vary depending on courses chosen throughout your university career.

## Recommended Schedule of Courses for the Environmental and Energy Resources Management Major

### Year 1

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ANRD 191 (First-Year Seminar)	1	ARE 187 (GEF 8)	3
ARE 150 (GEF 4)	3	GEOL 101 & GEOL 102	4
ARE 201	3	MATH 150 (GEF 3)	3
BIOL 101 & 103 (GEF 2B)	4	GEF 5, 6, or 7	3
ENGL 101 (GEF 1)	3	Free Elective	3
Credit hours	14	Credit hours	16

### Year 2

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 204 ( <i>Econ and Entrepreneur</i> )	3	AGRN 202 & AGRN 203	4
GEOG 205 ( <i>Environment</i> )	3	ECON 202 (GEF 8)	3
ENGL 102 (GEF 1)	3	STAT 211 (GEF 8)	3
GEF 5, 6, or 7	3	GEF 5, 6, or 7	3
Free Elective	3	Free Elective	3
Credit hours	15	Credit hours	16

### Year 3

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 220 ( <i>Econ and Entrepreneur</i> )	3	ARE 482 ( <i>Econ and Entrepreneur</i> )	3
ARE 488	1	ENVP 415 ( <i>Environment</i> )	3
DSGN 340 ( <i>Energy</i> )	3	RESM 450 ( <i>Energy</i> )	3
RESM 440	3	RESM 480	3
Free Electives	3	Free Electives	3
Credit hours	13	Credit hours	15

**SUMMER: ARE 491 (University Capstone - 3 credit hours)**

### Year 4

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 382	3	AGRN 455 ( <i>Environment</i> )	3
GEOG 207 ( <i>Environment</i> )	3	ARE 431 ( <i>Econ and Entrepreneur</i> )	3
Free Electives	9	RESM 460 ( <i>Energy</i> )	3
		ARE 440 ( <i>Energy</i> )	3
		Free Electives	1
Credit hours	15	Credit hours	13

## **Restricted Electives List:**

### 1. Energy (minimum of 12 credits with six credits at the 400 level)

ARE 440	Futures Markets and Commodity Prices
ARE 445	Energy Economics
ARE 485	Economics of Water Resources and Energy
DSGN 340	Design for Energy Efficiency
DSGN 470	LEED Green Building Systems (PR: DSGN 280)
ENGR 310	Energy Engineering
GEOL 472	Energy Geology (PR: GEOL 101&102 and GEOL 103&104)
RESM 450	Land Use Planning Law
RESM 460	Energy Project and Program Management
WDSC 444	Bio-Based Energy Systems

### 2. Environment (minimum of 12 credits with six credits at the 400 level)

AGRN 455 <u>or</u> ENVP 455	Reclamation of Disturbed Soils
ARE 485	Economics of Water Resources and Energy
ENVP 355	Environmental Sampling and Analysis (PR: BIOL 101&103 and BIOL 102&104 and CHEM 115 and CHEM 116)
ENVP 415	Hazardous Waste Training
ENVP 460	Environmental Impact Assessment (PR: BIOL 101&103 and BIOL 102&104 and CHEM 115 and CHEM 116)
GEOG 205	Natural Resources
GEOG 207	Climate and Environment
GEOG 415	Global Environmental Change (PR: GEOG 107 or equivalent or consent)
RESM 444	Advanced GIS for Natural Resource Management (PR or Concurrent RESM 440)
WMAN 200	Restoration Ecology

### 3. Economics and Entrepreneurship (minimum of 12 credits with six credits at the 400 level)

AGEE 421	Agricultural and Natural Resource Communications
ARE 204	Agribusiness Management <u>or</u> BUSA 320 Survey of Management
ARE 220	Introductory Environmental and Resource Economics.
ARE 380	Agribusiness Sales and Management
ARE 401	Applied Demand Analysis <u>or</u> ECON 301 Intermediate Micro-Economic Theory (PR: ARE 150 or ECON 201)
ARE 410	Environmental and Resource Economics (PR: ARE 401 or ECON 301 or consent)
ARE 422	New Venture Creation
ARE 431	Marketing Agricultural Products
ARE 445	Energy Economics
ARE 450	Agricultural, Environmental & Resource Policy (PR: ARE 150 or ECON 201)
ARE 461	Agribusiness Finance
ARE 482	Enterprise Operation Law
ARE 484	Agribusiness Strategic Management
ECON 302	Intermediate Macroeconomic Theory (PR: ARE 150 or ECON 201 and ECON 202)

## Environmental and Natural Resource Economics Major

The objective of this major is to provide students with the necessary training for the application of economic theory and analysis to environmental and natural resource issues. The flexibility of this major allows students to design (with their advisor) a program of study which focuses on environmental and natural resource issues tailored to the student's own interests (such as water use and quality, soil protection, waste management, ecosystem management, and land use). The curriculum reflects the breadth of training required to prepare students for careers in private and government sectors dealing with environmental and natural resource management and policy analysis. Many students, upon completion of this degree, may find it desirable to obtain a graduate degree to expand their career opportunities. Students completing this degree will be prepared for graduate study in environmental and natural resource economics and policy.

After completing this major, students will be able to:

1. Apply the tools of economic analyses to environmental issues.
2. Demonstrate how to apply economic theory to the management of renewable and non-renewable natural resources.
3. Articulate the laws and regulations related to environmental protection, energy use, and management of natural resources.
4. Demonstrate the utilization of quantitative analysis tools.
5. Communicate effectively in a business or professional setting (written and oral).

A minimum of 120 credit hours and a major GPA of 2.0 are required for graduation in this major.

### Course Requirements

### Credit Hours

#### General Education Foundations

- |  |     |
|--|-----|
| 1. Composition and Rhetoric (ENGL 101 and 102 or ENGL 103) | 3-6 |
| 2. Science and Technology                                  | 4-6 |
| 3. Mathematics and Quantitative Skills                     | 3-4 |
| 4. Society and Connections                                 | 3   |
| 5. Human Inquiry & the Past                                | 3   |
| 6. The Arts & Creativity                                   | 3   |
| 7. Global Studies & Diversity                              | 3   |
| 8. Focus   | 9   |

#### First-Year Seminar

1

#### Required Courses

44

ARE 150 or ECON 201 (both GEF 4), 187 (GEF 8), 220, 382, 410, 445, 450, 488  
AGEE 110 or CS 101  
ECON 202, 225, 301, 302, 421, 425  
MATH 150 or MATH 153 & 154 or MATH 155  
RESM 440 and 480

#### Restricted Electives

22

Selected and approved in consultation with advisor, student must select either an approved minor or at least four courses at the 300 or 400 level – either from Agronomy (AGRN), Agricultural and Resource Economics (ARE), Economics (ECON), Environmental Protection (ENVP), Forest Management (FMAN), or Forestry (FOR). Courses that are required for the major can also count toward a minor but do not count toward the 22 required credits of restricted electives. Other courses approved for restricted electives are ENVP 155 and AGRN 202 & AGRN 203.

University Capstone Course Requirement (ARE 496)	3
Free Electives	13
<b>Total</b>	<b>120</b>

## Recommended Schedule of Courses for the Environmental and Natural Resource Economics Major

### Year 1

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ANRD 191 (First-Year Seminar)	1	ARE 150 (GEF 4)	3
ENGL 101 (GEF 1)	3	CS 101	4
MATH 124 (GEF 3)	3	ENVP 155 (Restricted Elective)	3
GEF 2B (BIOL 101 & 103)	4	ECON 225	3
GEF 5, 6, or 7	3	MATH 150	3
Semester Total	14	Semester Total	16

### Year 2

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 220	3	AGRN 202 & 203 (Restricted Elec)	4
ECON 202	3	ARE 187	3
ENGL 102 (GEF 1)	3	GEF 5, 6, or 7	3
GEF 5, 6, or 7	3	Free Elective	6
GEF 8 (CHEM or GEOL)	4		
Semester Total	16	Semester Total	16

### Year 3

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 382	3	ARE 440 (Restricted Elective)	3
ARE 488	1	ARE 445	3
ECON 301	3	ECON 302	3
RESM 440	3	RESM 480	3
Restricted Elective	3	Free Elective	3
Free Elective	3		
Semester Total	16	Semester Total	15

### Year 4

FALL	Cr. Hrs.	SPRING	Cr. Hrs.
ARE 496 (Senior Thesis: Capstone)	1	ARE 410	3
ECON 421	3	ARE 450	3
ENVP 355 (Restricted Elective)	3	ARE 496 (Senior Thesis: Capstone)	2
Restricted Elective	3	ECON 425	3
Free Elective	3	Free Elective	3
Semester Total	13	Semester Total	14



## **Resource Economics and Management Minors**

### **Agricultural and Natural Resources Law Minor**

A minimum GPA of 2.0 is required in all minor courses.

#### **Minor Requirements:**

ARE 382 Agricultural and Natural Resources Law

RESM 450 Land Use Planning Law

RESM 480 Environmental Regulation

#### **Select one of the following:**

ARE 482 Enterprise Operation Law

ENLM 400 Energy Land Management Contracts 1 (PR: ENLM 300)

#### **Choose one of the following:**

ARE 450 Agriculture, Environmental and Resource Policy (PR: ARE 150 or ECON 201)

ENLM 420 Energy Land Management Contracts 2 (PR: ENLM 400)

FOR 421 Renewable Resources Policy and Governance (PR: Consent)

RESM 455 Practice of Land Use Planning

**Total Hours 15.**

### **Agribusiness Management Minor**

A minimum GPA of 2.0 is required in all minor courses.

#### **Minor Requirements:**

ARE 110 Agribusiness Accounting

ARE 204 Agribusiness Management

ARE 461 Agribusiness Finance

#### **Select one of the following:**

ARE 431 Marketing Agricultural Products

ARE 435 Marketing Livestock Products

#### **Choose one of the following:**

ARE 382 Agricultural and Natural Resources Law

ARE 422 New Venture Creation

ARE 440 Futures Markets and Commodity Prices

ARE 482 Enterprise Operation Law

ARE 484 Agribusiness Strategic Management

**Total Hours 15.**

### **Environmental Economics Minor**

A minimum GPA of 2.0 is required in all minor courses.

#### **Minor Requirements:**

ARE 220 Introductory Environmental and Resource Economics

ARE 401 Applied Demand Analysis (or ECON 301 Intermediate Microeconomics)

ARE 410 Environmental and Resource Economics (PR: ARE 220)

#### **Select one of the following:**

ARE 187 Energy Resource Economics  
ARE 201 Principles of Resource and Energy  
ENVP 155 Elements of Environmental Protection  
FOR 140 West Virginia Natural Resources

**Choose one of the following:**

ARE 382 Agricultural and Natural Resources Law  
ARE 450 Agriculture, Environmental and Resource Policy (PR: ARE 150 or ECON 201)

**Total Hours 15.**

## **Undergraduate Courses**

### **Agricultural and Resource Economics (ARE)**

110. *Agribusiness Accounting*. Fall and Summer Online. 3 Hours. Introduction to accounting for agricultural, rural and small business managers. Emphasis on the accounting cycle, analysis and interpretation of financial statements, income taxes, and managerial accounting. (Students having prior college credit in accounting are not eligible for this course.)

150. *Introductory Agricultural and Agribusiness Economics*. Fall and Spring and Summer Online. 3 Hours. Introduction to basic agricultural economics and agribusiness concepts, and the application of these concepts to agricultural and agribusiness issues.

187. *Energy Resource Economics*. Fall and Spring. 3 Hours. Introduction to fossil and renewable sources of energy; the effects of energy use on the environment; and relationships between energy, politics, and economic development.

201. *Principles of Resource and Energy*. Fall. 3 Hours. Analyzes problems important or peculiar to mineral industry economics: exhaustion, externalities, risks, production cycle, industry structure, pricing, role of minerals in development and trade, resource planning, energy, metals, industrial minerals.

204. *Agribusiness Management*. Fall and Summer Online. 3 Hours. Overview of the agribusiness decision-making process, and the functions of agribusiness management; analysis of financial statements and budgeting for evaluating profitability of alternative enterprises and practices.

220. *Introductory Environmental and Resource Economics*. Fall and Spring and Summer Online. 3 Hours. Economic analysis of environmental pollution, natural resource conservation and management, outdoor recreation, public land use, wildlife resources, water use, property rights, and benefit-cost issues.

293A-Z. *Special Topics*. 1-6 Hours. Investigation of topics not covered in regularly scheduled courses.

360. *Current Issues in Agriculture*. Fall and Summer Online. 3 Hours. Course focusing on the current scientific, ethical, legal, economic and political issues relating to agriculture. Students

conduct group and individual research, discuss topics in an informal debate format and summarize positions in a written form. This course also meets the university writing requirement.

380. *Agribusiness Sales and Management*. Spring. 3 Hours. This course is designed to provide students with essential spreadsheet and sales skills they can apply regardless of their chosen profession. The course will cover spreadsheet basics and students will apply that knowledge to problems related to agricultural and resource economics.

382. *Agricultural and Natural Resources Law*. Fall and Summer Online. 3 Hours. Introduction to legal concepts, principles and practices related to environmental, natural resource, and agricultural issues; in the context of the legal system within which statutes are enacted, administered and enforced.

401\*. *Applied Demand Analysis*. Fall. 3 Hours. Consumer demand economics applied to environmental, natural resource, and agricultural issues; analysis of factors that influence demand and determine prices; special applications to non-market, environmental, and natural resource amenities.

406\*. *Applied Quantitative Methods*. Spring. 3 Hours. PR: ARE 150. Application of basic quantitative concepts and methods applied to agribusiness and natural resources. Topics include applied economics, statistics, mathematics, and financial concepts and decision-making tools for determining optimum allocation of resources for production processes.

410. *Environmental and Resource Economics*. Spring. 3 Hours. PR: ARE 220, or consent. Economic analysis of natural resource and environmental problems; management of renewable and non-renewable resources and environmental amenities; market failure, externalities, benefit-cost and risk analysis; property rights and the “taking” issue.

411. *Rural Economic Development*. Spring. 3 Hours. Economic trends, development policies, and analysis of rural economies in the United States. Rural diversity, development concepts, rural planning, public programs and policies, and community analysis methods.

420. *Adaptation and Mitigation Strategies for Addressing Climate Change*. Spring. 3 Hours. PR: Junior or Senior Standing. This course identifies mechanisms that may be used to offset or reduce the effects of a changing climate. It addresses options that can help to protect agriculture and food production, protect human health, improve water resources and ecosystems services, and provide for the energy needed for continued economic activity. Students cannot receive credit for both ARE 420 and ARE 620.

422. *New Venture Creation*. Fall. 3 Hours. In this course, students will learn the process of starting a new venture. The student will gain an in depth understanding of the framework and process by practicing the techniques on a startup of the student’s choice.

431. *Marketing Agricultural Products*. Spring. 3 Hours. Organization, functions, and analysis of the agricultural marketing system. Food consumption, exports, price analysis, marketing costs,

market power, commodities futures market, food safety, and government regulations.

435. *Marketing Livestock Products*. Summer Online. 3 Hours. Livestock marketing practices and policies. Supply and demand, livestock price cycles, grading, market alternatives, processing and retailing. Economic analysis of alternatives, current issues and trends.

440. *Futures Markets and Commodity Prices*. Spring. 3 Hours. Analysis of price-making forces which operate in the marketplace; emphasis on major agricultural and mineral commodity and futures markets.

445. *Energy Economics*. Spring. 3 Hours. Analysis of the energy sector and its relationship to the rest of the economy; energy security, deregulation, full cost pricing, substitutability among energy sources, transmission, new technologies, environmental considerations.

450. *Agricultural, Environmental and Resource Policy*. Spring. 3 Hours. PR: ARE 150 or ECON 201. Economic analysis of agricultural, natural resource and environmental policies; problems of externalities and market failure, and alternative policies for addressing such problems; benefits and costs of alternative policies.

461. *Agribusiness Finance*. Spring. 3 Hours. An overview of financial analysis and the application of financial principles to small, rural and agricultural businesses. Includes applications of financial analysis computer software.

462. *Records and Analysis for Sustainable Agribusinesses*. Fall. 3 Hours. PR: ARE 110 or ACCT 201 or BUSA 202. Managerial and record-keeping concepts and tools needed to run a successful agribusiness. Course materials and lab activities focus on collection and use of information to assist in whole-farm, agribusiness planning, decision-making, performance evaluation, sensitivity analysis, and management. Course stresses the impact of record-keeping and performance evaluation on the ability of an agribusiness to achieve its strategic goals.

482. *Enterprise Operation Law*. Spring. 3 Hours. Course focusing on laws applicable to businesses and the management of risks associated with operating a business. Students will learn to read and interpret laws and apply them to real-life business scenarios.

484. *Agribusiness Strategic Management*. Spring. 3 Hours. PR: Senior standing. This course is designed to enhance understanding of business strategy formulation and implementation. The course provides a balance between theoretical concepts, principles, and practice of agribusiness management. Case studies are used to illustrate the crafting, implementation, and execution of optimal strategies.

485. *Economics of Water Resources and Energy*. Fall. 3 Hours. PR: Calculus with a grade of B- or better or consent, introductory microeconomics with a C- or consent. Allocation under scarcity, water institutions and management, risk, pricing, marketing, demand and supply estimation, interdependence between energy and water resources (Credit cannot be received for both ARE 485 and ARE 585).

488. *Career Development*. Fall Online. 1 Hour. PR: For REM majors only. Development of career goals and job search skills. Investigation of topics that advance students in their career goals.

490. *Teaching Practicum*. 1-3 Hours. PR: Consent. Teaching practice as a tutor or assistant.

491. *Professional Field Experience: Capstone*. 3-6 Hours. PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

493A-Z. *Special Topics*. 1-6 Hours. Investigation of topics not covered in regularly scheduled courses.

495. *Independent Study*. 1-6 Hours. PR: Consent. Faculty supervised study of topics not available through regular course offerings.

496. *Senior Thesis: Capstone*. 1-3 Hours. PR: Consent. Student research supervised by a faculty member that results in an academic paper.

\*This course is not taught on a regular basis.

## **Resource Management (RESM)**

140. *Sustainable Living*. Fall. 3 Hours. Explores the personal, social, economic, and environmental aspects of making sustainable choices. Sustainability principles and practices are discussed along with assessments of consumption and lifestyle decisions. Also listed as DSGN 140 and PLSC 140.

293A-Z. *Special Topics*. 1-6 Hours. Investigation of topics not covered in regularly scheduled courses.

390. *Teaching Practicum*. 1-3 Hours. PR: Consent. Teaching practice as a tutor or assistant.

440. *Foundations of Applied Geographic Information Systems*. Fall and Summer online only; Spring in classroom. 3 Hours. An introductory course designed to provide the necessary background and techniques to use GIS technology to analyze and solve spatial problems. An emphasis is placed on acquisition, management, and manipulation of spatial data.

444. *Advanced GIS for Natural Resource Management*. Fall. 3 Hours. PR or CONC: RESM 440 with minimum grade of C- or consent. Provides advanced training using Geographic Information Systems (GIS) to address the spatial issues of managing natural resources.

450. *Land Use Planning Law*. Spring. 3 Hours. Focus is on identification and understanding of legal issues related to planning and land use. This involves understanding rights, regulations, and responsibilities associated with land use, planning and related activities.

455. *Practice of Land Use Planning*. Fall. 3 Hours. Examines comprehensive land use planning including planning's origin and evolution plus the processes used to create and implement a plan. Focus is on land use and how it relates to other issues.

460. *Energy Project and Program Management*. Online only. Spring. 3 hours. PR: Junior or Senior Standing. The concepts and best practices of modern project management as applied to manage activities that meet the requirements of energy and environmental resource industry related programs and projects.

480. *Environmental Regulation*. Spring. 3 Hours. This course covers the legal aspects of environmental protection including laws and regulations dealing with water, air, hazardous waste, and land use.

491. *Professional Field Experience: Capstone*. 1-18 Hours. PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

493A-Z. *Special Topics*. 1-6 Hours. Investigation of topics not covered in regularly scheduled courses.

494\*. Seminar. 1-3 Hours. PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

495. *Independent Study*. 1-6 Hours. PR: Consent. Faculty supervised study of topics not available through regular course offerings.

## **Resource Economics and Management Faculty Members**

**Cheryl Brown, Ph.D. University of California, Berkeley**      [Cheryl.Brown@mail.wvu.edu](mailto:Cheryl.Brown@mail.wvu.edu)  
Dr. Brown teaches agricultural, environmental and natural resource policy, marketing agricultural products, agribusiness strategic management, social enterprise development, sustainable living, and career development at the undergraduate level. She advises undergraduates in the Agribusiness Management major. Her research interests focus on multiple aspects of agricultural sustainability, including organic and direct marketing, land use and pesticide policies, local and regional food system development, and the impacts of the food system on health. Dr. Brown is retiring January 2021.

**Elizabeth Byrd, Ph.D. Purdue University, J.D. West Virginia University**      [Elizabeth.Byrd@mail.wvu.edu](mailto:Elizabeth.Byrd@mail.wvu.edu)

Dr. Byrd is Undergraduate Coordinator and a Teaching Assistant Professor. She teaches courses in agribusiness management, sales, agricultural and natural resources law, environmental regulation, and enterprise law. Her research interests include legal issues facing agricultural producers and consumer perceptions of animal agriculture. She advises undergraduates in the Agribusiness Management and Environmental and Energy Resources Management majors and mentors students interested in law school.

**Alan R. Collins, Ph.D. Oregon State University**

[Alan.Collins@mail.wvu.edu](mailto:Alan.Collins@mail.wvu.edu)

Dr. Collins is the Division Director of Resource Economics and Management. He oversees the Professional Field Experience course (RESM 491) for undergraduates majoring in Environmental and Energy Resources Management. He teaches sustainable living and classes in environmental and natural resource economics at both the undergraduate and graduate levels. His research interests include economic incentives of water quality improvement (including water quality trading), agricultural waste management, and energy economics.

**Levan Elbakidze, Ph.D. Texas A&M University**

[Levan.Elbakidze@mail.wvu.edu](mailto:Levan.Elbakidze@mail.wvu.edu)

Dr. Elbakidze is Graduate Coordinator and teaches graduate courses in environmental economics, quantitative methods, and water resource economics. His research interests revolve around management of natural resources including water, shale gas, land, invasive species, and energy. His research projects primarily rely on advanced empirical tools including mathematical and econometric models often times in interdisciplinary contexts.

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