

AGRICULTURAL FACULTY MEETING

Wednesday, November 30, 2022

3:00 p.m. – 4:30 p.m.

PFEN 241 or Zoom:

<https://purdue-edu.zoom.us/j/97105744480?pwd=NUtjcUV6MjJBVXJsa25QNmdYbXZGQT09>

Meeting ID: 971 0574 4480

Passcode: 113883

1. Call to Order – Dean Karen Plaut
2. Approval of Agenda
3. IUPUI Liaisons - with Indianapolis – Provost Jay Akridge or Executive Director for Academic Affairs Carrie Berger
4. Consent Agenda – Action Items

Approval of Minutes of March 24, 2022 Agricultural Faculty Meeting

Document I – Agricultural & Biological Engineering

Document II – Agriculture

Document III – Agronomy

Document IV – Botany and Plant Pathology

Document V – Entomology

Document VI – Food Science

Document VII – Natural Resources and Environmental Sciences

Document VIII – Curriculum and Student Relations Committee

Part I – International Understanding – Course for Consideration

Part II – Update to Core Curriculum Lists

Part III – Deletion of courses

Part IV – Modification of courses

Approval of 2022 December Degree Candidates

5. Memorial Resolutions
6. Report Items

University Senate Report – Neil Knobloch

Dean's Comments – Karen Plaut

7. Other Business

Department of Agricultural and Biological Engineering
Proposed Course and Curricular Changes

A. COURSES TO BE ADDED

Proposed Prefix and Course Number: ABE 53500
Long Title: Design and Modeling of Fluid Power Systems
Note: Supporting Documents/Syllabus attached

Proposed Prefix and Course Number: ABE 54700
Long Title: Models and Microbiomes
Note: Supporting Documents/Syllabus attached

B. CURRICULAR CHANGES (If new major, concentration or minor, need plan of study, description, proposed head count, UEAC justification [See CSRC Box for example])

Modification to Agricultural Systems Management Plans of Study

Proposed Changes: 1. Require AGECE 20300 or ECON 25100 for Agricultural Systems Management majors and associated concentrations (AgriSecurity, Data and Information Systems, and Leadership and Management). 2. Update relevant plans with newly approved course numbers (ASM 51100/51200 -recently cross-listed with CNIT 51100/51200). 3. Adjust course sequencing within Agricultural Systems Management plan of study based on faculty recommendations.

Justification/Rationale: 1. Future ASM degree elective options require either AGECE 20300 or ECON 25100 as a pre-requisite. Advisors currently advise enrollment in one of these two courses when reviewing the COA Economics selective list. Requiring one of these course options assists in ensuring students take coursework that keeps them on track toward degree completion. 2. ASM 51100/51200 have been recently approved. 3. Recommended changes are based on issues with course conflicts and better preparation in future terms.

Expected Impact to other Programs: 1. Limited enrollment in AGECE 20300 or ECON 25100, could lead to space issues in AGECE 20300 and/or ECON 25100, however, these courses are part of the College of Agriculture's core requirements and advisors have been advising that students only take these two options for many years, the impact is expected to be minimal to none. 2. None. 3. We do not expect impacts on other programs as courses are remaining in the same academic term, just shifting to different years.

Modifications to Biological Engineering - BioEnvironmental (BENV) Concentration Selective List and Plan of Study

Proposed Changes: 1. The proposed change will move ABE 31400 and ABE 58000 from required courses to a list of BioEnvironmental Selectives, making the concentration more consistent with other concentrations in BE. The credit requirements will be replaced with 6 credits of BioEnvironmental Selectives. The selective list will contain, ABE 31400, ABE 42500, ABE 42600, and ABE 58000.

Justification/Rationale: Expansion of the selectives list is requested by students and employers to offer more flexibility to the degree program and allow graduates to be better prepared to enter the rapidly growing field of ecological engineering.

Expected Impact to other Programs: None

Supporting Documents for ABE 53500

- A. Short Title:** Fluids Power Systems
- B. Semester(s) Offered:** Spring
- C. Schedule Type and Hours (List as Instructional Type/Weekly Class Hours/# of meetings per week/# of weeks:** LEC/75/2/16
- D. Credits:** 3.0
- E. Justification for the course:** ME 53500 (previously ME 59700) has been offered every year for more than ten years (currently by Dr. Andrea Vacca), and it has been a pillar class supporting the ongoing research at the Maha Fluid Power Research Center. The class is also taken by several engineering students outside the Maha Fluid Power Research Center, from departments outside ME, such as Aerospace, Agricultural and Biological Engineering. Students in ABE have been taking the course using a temporary course number (ABE 59100), an issue we hope to resolve by obtaining a permanent number and cross-listing the course number with ME. Attendance for last Spring 2022 was 12 students. The course has been taught for over a decade, with enrollment always between 6 and 15 students every year. This course provides knowledge of fluid power drive technology, which is a fundamental technology for applications in industrial, mobile, aerospace, and marine fields. United State industry is particularly strong in these fields and constantly demanding for R&D experts. Purdue has been leading the fluid power academic research in the US for more than a decade and this class will consolidate this tradition for cutting-edge education and research in fluid power. The class also provides modeling techniques that a graduate student can use in other research fields.
- F. Expected Impact to other Programs:** None
- G. Course Description for University Catalog:** Introduction to fluid power technology. Design of hydraulic systems for mobile and industrial application for functionality, cost and energy efficiency. Modeling strategies for fluid power systems. Demo labs and class projects are given to reinforce the design and modeling learning projects.
- H. Requisites (Pre-Reqs/Co-Reqs/concurrent pre-req):** ME 30800 and ME 30801, or CE 34000 and CE 34300, or equivalent class passed with a minimum grade of D-
- I. Restrictions:** N/A
- J. Learning Outcomes:** 1. Describe the principle of operation of hydraulic components such as pumps, motors, hydraulic control valves, pipes, linear actuators (cylinders) and recognize the technologies available for each component. 2. Model the operation of hydraulic systems through lumped or distributed numerical approaches. 3. Discuss the features of the hydraulic control technologies commonly available for mobile machinery and industrial applications, particularly in terms of cost, functionality and energy consumption. 4. Design tests and prepare technical reports related to the modeling and the experimentation of fluid power systems. 5. Formulate, design,

simulate and present the most energy-efficient solution for the hydraulic control system of a given fluid power application, given its functional requirements.

K. If Applicable to College of Agriculture Core

This course will X will not be nominated for inclusion on College of Agriculture Core.

L. Instructor Information: Dr. Andrea Vacca

M. Link to curriculog (if applicable): [Click here to enter text.](#)

Supporting Documents for ABE 54700

A. **Short Title:** Models and Microbiomes

B. **Semester(s) Offered:** Fall

C. **Schedule Type and Hours (List as Instructional Type/Weekly Class Hours/# of meetings per week/# of weeks:** LEC/150 min per mtg/1 mtg per week/16 wks per term

D. **Credits:** 3.0

E. **Justification for the course:** This course provides an overview of computational, physical, and biological modeling tools available for studying and engineering microbiomes. This knowledge will help the learners apply such tools to their own work. It also develops oral and written communication skills. The target audience is graduate students and senior undergraduate students.

F. **Expected Impact to other Programs:** None

G. **Course Description for University Catalog:** Determine the use of computational, physical, and biological models for studying and engineering microbiomes. Study peer-reviewed literature and synthesize findings in the form of oral and written deliverables. Background in microbiology either from coursework or research and interest in microbiomes recommended.

H. **Requisites (Pre-Reqs/Co-Reqs/concurrent pre-req):** None

I. **Restrictions:** Must be Senior (undergrad) or Graduate student

J. **Learning Outcomes:** Successful completion of the course will enable the students to: 1. Review primary papers and books for state-of-the-art developments in the field of microbiome. 2. Analyze the relationships between multiple modeling approaches for the microbiome.

K. **If Applicable to College of Agriculture Core**

This course will will not be nominated for inclusion on College of Agriculture Core.

L. **Instructor Information:** Mohit Verma, ABE Assistant Professor, msverma@purdue.edu

M. **Link to curriculog (if applicable):** N/A

Departmental/Program Major Courses (49 credits)

Required Major courses (22 credits)

- _____ (3) ASM 10400 Introduction to Agricultural Systems
- _____ (3) ASM 10500 Computing Technology with Application
- _____ (3) ASM 21100 Technical Graphics Communications
- _____ (1) ASM 22100 Career Opportunities Seminar
- _____ (3) ASM 22200 Crop Production Equipment
- _____ (3) ASM 33300 Facilities Planning and Management
- _____ (1) ASM 35000 Safety in Agriculture
- _____ (1) ASM 42100 Senior Seminar
- _____ (1) ASM 49400 Project Planning and Management
- _____ (3) ASM 49500 Agricultural Systems Management Capstone Project

Required Major courses – No concentration (9 credits)

- _____ (3) ASM 23600 Environmental Systems Management ([satisfies a UCC Science, Technology & Society requirement](#))
OR _____ (3) ASM 24500 Material Handling and Processing
- _____ (3) ASM 34500 Power Units and Power Trains
- _____ (3) ASM 42000 Electric Power and Controls

Major Course Selectives (3)

- _____ (3) ASM Major Selective (any ASM course 40000+ level)

Agriculture Selectives (15 credits)

- _____ (3) AGECE 31000 Farm Organization
OR _____ (3) AGECE 33000 Management Methods for Agriculture Business
- _____ (12) [Agricultural Selectives](#) (four or more courses)

Other Department/Program Course Requirements (67-70 credits)

- _____ (0.5) AGR 10100 Introduction to the College of Agriculture and Purdue University
- _____ (0.5) AGR 11100 Introduction to Agricultural and Biological Engineering Academic Programs
- _____ (3) AGECE 20300 ([satisfies UCC Human Cultures: Behavioral/Social Sci requirement & COA Economics selective](#))
OR (3) ECON 25100 ([satisfies UCC Human Cultures: Behavioral/Social Sci requirement & COA Economics selective](#))
- _____ (3) AGECE 33100 Principles of Industrial Selling
- _____ (3) AGECE 35200 Quantitative Techniques for Firm Decision Making
- _____ (3) AGRY 25500 Soil Science
- _____ (3) CHM 11100 General Chemistry I ([satisfies a UCC Science requirement](#))
- _____ (3) CHM 11200 General Chemistry II ([satisfies a UCC Science requirement](#))
- _____ (3) MA 16010 Applied Calculus I ([satisfies UCC Quantitative Reasoning requirement](#))
- _____ (3) MGMT 20000 Introductory Accounting
OR _____ (3) MGMT 21200 Business Accounting
- _____ (3) MGMT 45500 Legal Background for Business
OR _____ (3) AGECE 45500 Agriculture Law
- _____ (3) PHYS 21400 The Nature of Physics
- _____ (3) STAT 30100 Elementary Statistical Methods ([satisfies a UCC Information Literacy requirement](#))
- _____ (~~(3) Economics Selective ([satisfies UCC Human Cultures: Behavioral/Social Sci requirement](#))~~)
- _____ (3) [Marketing Selective](#)
- _____ (8) [Biological Science Selective](#) (two or more courses)
- _____ (3) [Human Cultures: Humanities Selective](#) ([satisfies UCC Human Cultures: Humanities requirement](#))
- _____ (6) [Humanities or Social Science Selective](#) (two or more courses)
- _____ (3) [Humanities or Social Science Selective](#) (30000+ level)
- _____ (3) [Oral Communication Selective](#) ([satisfies UCC Oral Communication requirement](#))
- _____ (1-3) [Science, Technology & Society Selective](#) ([satisfies UCC Science, Technology & Society Selective requirement](#))
- _____ (3-4) [Written Communication Selective](#) ([satisfies UCC Written Communication requirement](#))
- _____ (3) [Written or Oral Communication Selective](#) (20000+ level)
- _____ [International Understanding](#) (9 credits - may be met with UCC or COA Core Requirements)
- _____ [Multicultural Awareness](#) (3 credits - may be met with UCC or COA Core Requirement)

Electives (1-4 credits)

_____ (1-4) _____

University Core Requirements (<http://www.purdue.edu/provost/students/s-initiatives/curriculum/coreCurriculum.html>)

<i>Human Cultures Humanities</i>	<input type="checkbox"/>	_____	<i>Science, Technology & Society Selective</i>	<input type="checkbox"/>	_____
<i>Human Cultures Behavioral/Social Sciences</i>	<input type="checkbox"/>	_____	<i>Written Communication</i>	<input type="checkbox"/>	_____
<i>Information Literacy</i>	<input type="checkbox"/>	_____	<i>Oral Communication</i>	<input type="checkbox"/>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Quantitative Reasoning</i>	<input type="checkbox"/>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Purdue Civics Literacy</i>	<input type="checkbox"/>	_____

College of Agriculture & University Level Requirements (https://ag.purdue.edu/oap/Pages/core_requirements.aspx)

<i>3 credits - Multicultural Awareness</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>9 credits - International Understanding</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>9 credits - Humanities and/or Social Sciences outside the College of Agriculture</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>3 credits - Humanities and/or Social Sciences at 30000+ level or higher</i>	<input type="checkbox"/>	_____				

The student is ultimately responsible for knowing and completing all degree requirements. The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion. 128 semester credits required for degree completion. 2.0 Graduation GPA required for Bachelor of Science degree. The student is ultimately responsible for knowing and completing all degree requirements. The myPurduePlan powered by Degree Works is the knowledge source for specific requirements and completion.

Suggested Arrangement of Courses

Note that course placement is dependent upon both pre-requisite requirements as well as limited offering terms (i.e. course may only be offered in Fall or Spring terms – not both)

Please see your academic advisor for other options creating your personalized plan of study

Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
0.5	AGR 10100 [†]		3	ASM 10500 [‡]	MA 15800
0.5	AGR 11100 [†]	co: AGR 10100	3	CHM 11200*	CHM 11100
3	ASM 10400		3	PHYS 21400	
3	CHM 11100*		3-4	<u>Written Communication Selective*</u>	
3	MA 16010*	ALEKS score ≥ 75	3	Economics Selective AGEC 20300 or ECON 25100	
3	<u>UCC Human Cultures: Humanities Selective*</u>				
3	<u>Oral Communication Selective*</u>				
16			15-16		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
3	ASM 21100 [†]	ASM 10500	3	AGEC 35200 AGEC 31000[‡] or AGEC 33000	STAT 30100
1	ASM 22100 [†]	ASM 10400	3	AGRY 25500	
3	ASM 22200 [†]	ASM 10500, PHYS 21400	3	ASM 23600 [†] or ASM 24500 [‡]	ASM 10500
3	STAT 30100*		3	MGMT 20000 or MGMT 21200 ASM 33300[‡]	ASM 10500, ASM 21100
4	<u>Biological Science Selective</u>		4	<u>Biological Science Selective</u>	
14			16		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	AGEC 33100		3	AGEC 31000[‡] or AGEC 33000 AGEC 35200	STAT 30100
3	<u>Agricultural Selective</u>		3	ASM 34500 [‡]	ASM 22200
3	<u>Marketing Selective</u>		1	ASM 35000 [‡]	
1-3	<u>Science, Technology & Society Selective*</u>		3	ASM 42000 [‡]	PHYS 21400
3	<u>Written or Oral Communication Selective (20000+ level)</u>		3	ASM 33300[‡] MGMT 20000 or MGMT 21200	ASM 10500, ASM 21100
			3	<u>Humanities or Social Science Selective</u>	
13-15			16		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
1	ASM 42100 [†]	ASM 22100	3	ASM 49500 [‡]	ASM 49400
1	ASM 49400 [†]	ASM 22100	3	<u>Agricultural Selective</u>	
3	AGEC 45500 [†] or MGMT 45500 [†]		3	Agricultural Selective ASM Major Selective (40000+)	
3	ASM Major Selective (40000+) Agricultural Selective		3	<u>Humanities or Social Science Selective (30000+)</u>	
3	<u>Agricultural Selective</u>		1-4	Elective	
3	<u>Humanities or Social Science Selective</u>				
14			13-16		

* Fulfills University [Undergraduate Core Curriculum \(UCC\) Requirement](#).

† Indicates Fall only course

‡ Indicates Spring only course

[International Understanding](#) (9 credits - may be met with UCC or COA Core Requirements)

[Multicultural Awareness](#) (3 credits - may be met with UCC or COA Core Requirement)

120 semester credits required for degree completion.

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Departmental/Program Major Courses (49 credits)

Required Major courses (22 credits)

- _____ (3) ASM 10400 Introduction to Agricultural Systems
- _____ (3) ASM 10500 Computing Technology with Application
- _____ (3) ASM 21100 Technical Graphics Communications
- _____ (1) ASM 22100 Career Opportunities Seminar
- _____ (3) ASM 22200 Crop Production Equipment
- _____ (3) ASM 33300 Facilities Planning and Management
- _____ (1) ASM 35000 Safety in Agriculture
- _____ (1) ASM 42100 Senior Seminar
- _____ (1) ASM 49400 Project Planning and Management
- _____ (3) ASM 49500 Agricultural Systems Management Capstone Project

Required Major courses – AgroSecurity (27 credits)

- _____ (3) ASM 23600 Environmental Systems Management (satisfies a UCC Science, Technology & Society requirement)
OR ASM 34500 Power Units And Power Trains
- _____ (3) ASM 24500 Material Handling and Processing
- _____ (3) ASM 42000 Electric Power and Controls
- _____ (3) ASM 51000 Agrosecurity-Emergency Management For Agricultural Production Operations
- _____ (3) AGECEC 33000 Management Methods For Agricultural Business
- ~~_____ (3) CNIT 51100 Foundations In Homeland Security Studies~~
- _____ (3) ASM 51100 Foundations In Homeland Security Studies
- ~~_____ (3) CNIT 51200 Managing Resources And Applications For Homeland Security~~
- _____ (3) ASM 51200 Managing Resources And Applications For Homeland Security
- _____ (3) ASM Major Selective (any ASM course 40000+ level)

AgroSecurity Selective (3 credits)

- _____ (3) ASM 59000 Special Problems
OR NRES 28000 Hazardous Waste Handling
OR TLI 35520 Organization Development And Change

Other Department/Program Course Requirements (67-70 credits)

- _____ (0.5) AGR 10100 Introduction to the College of Agriculture and Purdue University
- _____ (0.5) AGR 11100 Introduction to Agricultural and Biological Engineering Academic Programs
- _____ (3) AGECEC 20300 (satisfies UCC Human Cultures: Behavioral/Social Sci requirement & COA Economics selective)
OR (3) ECON 25100 (satisfies UCC Human Cultures: Behavioral/Social Sci requirement & COA Economics selective)
- _____ (3) AGECEC 33100 Principles of Industrial Selling
- _____ (3) AGECEC 35200 Quantitative Techniques for Firm Decision Making
- _____ (3) AGRY 25500 Soil Science
- _____ (3) CHM 11100 General Chemistry I (satisfies a UCC Science requirement)
- _____ (3) CHM 11200 General Chemistry II (satisfies a UCC Science requirement)
- _____ (3) MA 16010 Applied Calculus I (satisfies UCC Quantitative Reasoning requirement)
- _____ (3) PHYS 21400 The Nature of Physics
- _____ (3) STAT 30100 Elementary Statistical Methods (satisfies a UCC Information Literacy requirement)
- _____ (3) AGECEC 45500 Agriculture Law OR MGMT 45500 Legal Background for Business
- _____ (3) MGMT 20000 Introductory Accounting OR MGMT 21200 Business Accounting
- ~~_____ (3) Economics Selective (satisfies UCC Human Cultures: Behavioral/Social Sci requirement)~~
- _____ (3) Marketing Selective
- _____ (8) Biological Science Selective (two or more courses)
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<i>Human Cultures Behavioral/Social Sciences</i>	<input type="checkbox"/>	_____	<i>Written Communication</i>	<input type="checkbox"/>	_____
<i>Information Literacy</i>	<input type="checkbox"/>	_____	<i>Oral Communication</i>	<input type="checkbox"/>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Quantitative Reasoning</i>	<input type="checkbox"/>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Purdue Civics Literacy</i>	<input type="checkbox"/>	_____

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<i>3 credits - Multicultural Awareness</i>	<input type="checkbox"/>	_____		<input type="checkbox"/>	_____	
<i>9 credits - International Understanding</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>9 credits - Humanities and/or Social Sciences outside the College of Agriculture</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>3 credits - Humanities and/or Social Sciences at 30000+level or higher</i>	<input type="checkbox"/>	_____				

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0.5	AGR 10100 [†]		3	ASM 10500 [‡]	MA 16010
0.5	AGR 11100 [†]	co: AGR 10100	3	CHM 11200 [*]	CHM 11100
3	ASM 10400		3	PHYS 21400	
3	CHM 11100 [*]		3	UCC Human Cultures: Humanities Selective [*]	
3	MA 16010 [*]	ALEKS score ≥ 75	3-4	Written Communication Selective [*]	
3	Oral Communication Selective [*]				
3	Economics Selective AGEC 20300 or ECON 25100				
16			15-16		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
3	ASM 21100 [†]	ASM 10500	3	AGEC 35200 AGEC 33000	STAT 30100
1	ASM 22100 [†]	ASM 10400	3	AGRY 25500	
3	ASM 22200 [†]	ASM 10500, PHYS 21400	3	ASM 24500 [‡]	ASM 10500
3	STAT 30100 [*]		3	MGMT 20000 or MGMT 21200 ASM 33300 [‡]	ASM 10500, ASM 21100
4	Biological Science Selective		4	Biological Science Selective	
14			16		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	AGEC 33100		3	AGEC 33000 AGEC 35200 ASM 33300 [‡]	STAT 30100
	ASM 23600 [†] or ASM 34500 [‡]	ASM 22200 (ASM 34500)	3	MGMT 20000 or MGMT 21200	ASM 10500, ASM 21100
3	AgroSecurity Selective		1	ASM 35000 [‡]	PHYS 21400
1-3	Science, Technology & Society Selective [*]		3	ASM 42000 [‡]	PHYS 21400
3	Written or Oral Communication Selective (20000+ level)		3	Humanities or Social Science Selective	
			3	Humanities or Social Science Selective	
13-15			16		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
1	ASM 42100 [†]	ASM 22100	3	ASM 49500 [‡]	ASM 49400
1	ASM 49400 [†]	ASM 22100	3	CNIT 51200 ASM 51200 [‡]	
3	CNIT 51100 ASM 51100 [†]		3	ASM Major Selective (40000+)	
3	AGEC 45500 [†] or MGMT 45500 [†]		3	Humanities or Social Science Selective (30000+)	
3	Marketing Selective		1-4	Elective	
14			13-16		

* Fulfills University Undergraduate Core Curriculum Requirement.

[†] Indicates Fall only course

[‡] Indicates Spring only course

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[Multicultural Awareness](#) (3 credits - may be met with UCC or COA Core Requirement)

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Required Major courses (22 credits)

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- _____ (3) ASM 33300 Facilities Planning and Management
- _____ (1) ASM 35000 Safety in Agriculture
- _____ (1) ASM 42100 Senior Seminar
- _____ (1) ASM 49400 Project Planning and Management
- _____ (3) ASM 49500 Agricultural Systems Management Capstone Project

Required Major courses – Leadership and Management Concentration (27 credits)

- _____ (3) AGECE 33000 Management Methods for Agriculture Business
- _____ (3) TLI 11200 Foundations Of Organizational Leadership
- _____ (3) TLI 15200 Business Principles For Organizational Leadership
- _____ (3) [Leadership and Management Selective](#)
- _____ (12) ASM Major Selective (any ASM course)
- _____ (3) ASM Selective (any ASM course 40000+ level)

Other Department/Program Course Requirements (67-70 credits)

- _____ (0.5) AGR 10100 Introduction to the College of Agriculture and Purdue University
- _____ (0.5) AGR 11100 Introduction to Agricultural and Biological Engineering Academic Programs
- _____ (3) AGECE 20300 *(satisfies [UCC Human Cultures: Behavioral/Social Sci requirement](#) & [COA Economics selective](#))*
- _____ OR (3) ECON 25100 *(satisfies [UCC Human Cultures: Behavioral/Social Sci requirement](#) & [COA Economics selective](#))*
- _____ (3) AGECE 33100 Principles of Industrial Selling
- _____ (3) AGECE 35200 Quantitative Techniques for Firm Decision Making
- _____ (3) AGRY 25500 Soil Science
- _____ (3) CHM 11100 General Chemistry I *(satisfies a [UCC Science requirement](#))*
- _____ (3) CHM 11200 General Chemistry II *(satisfies a [UCC Science requirement](#))*
- _____ (3) MA 16010 Applied Calculus I *(satisfies [UCC Quantitative Reasoning requirement](#))*
- _____ (3) PHYS 21400 The Nature of Physics
- _____ (3) STAT 30100 Elementary Statistical Methods *(satisfies a [UCC Information Literacy requirement](#))*
- _____ (3) AGECE 45500 Agriculture Law
- _____ OR _____ (3) MGMT 45500 Legal Background for Business
- _____ (3) MGMT 20000 Introductory Accounting
- _____ OR _____ (3) MGMT 21200 Business Accounting
- _____ ~~(3) [Economics Selective \(satisfies \[UCC Human Cultures: Behavioral/Social Sci requirement\]\(#\)\)](#)~~
- _____ (3) [Marketing Selective](#)
- _____ (8) [Biological Science Selective](#) (two or more courses)
- _____ (3) [Human Cultures: Humanities Selective \(satisfies \[UCC Human Cultures: Humanities requirement\]\(#\)\)](#)
- _____ (6) [Humanities or Social Science Selective](#) (two or more courses)
- _____ (3) [Humanities or Social Science Selective](#) (30000+ level)
- _____ (3) [Oral Communication Selective \(satisfies \[UCC Oral Communication requirement\]\(#\)\)](#)
- _____ (1-3) [Science, Technology & Society Selective \(satisfies \[UCC Science, Technology & Society Selective requirement\]\(#\)\)](#)
- _____ (3-4) [Written Communication Selective \(satisfies \[UCC Written Communication requirement\]\(#\)\)](#)
- _____ (3) [Written or Oral Communication Selective](#) (20000+ level)
- _____ [International Understanding](#) (9 credits - may be met with UCC or COA Core Requirements)
- _____ [Multicultural Awareness](#) (3 credits - may be met with UCC or COA Core Requirement)

Electives (1-4 credits)

_____ (1-4) _____

University Core Requirements (<http://www.purdue.edu/provost/students/s-initiatives/curriculum/coreCurriculum.html>)

<i>Human Cultures Humanities</i>	<input type="checkbox"/>	_____	<i>Science, Technology & Society Selective</i>	<input type="checkbox"/>	_____
<i>Human Cultures Behavioral/Social Sciences</i>	<input type="checkbox"/>	_____	<i>Written Communication</i>	<input type="checkbox"/>	_____
<i>Information Literacy</i>	<input type="checkbox"/>	_____	<i>Oral Communication</i>	<input type="checkbox"/>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Quantitative Reasoning</i>	<input type="checkbox"/>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Purdue Civics Literacy</i>	<input type="checkbox"/>	_____

College of Agriculture & University Level Requirements (https://ag.purdue.edu/oap/Pages/core_requirements.aspx)

<i>3 credits - Multicultural Awareness</i>	<input type="checkbox"/>	_____		<input type="checkbox"/>	_____	
<i>9 credits - International Understanding</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>9 credits - Humanities and/or Social Sciences outside the College of Agriculture</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>3 credits - Humanities and/or Social Sciences at 30000+ level or higher</i>	<input type="checkbox"/>	_____				

The student is ultimately responsible for knowing and completing all degree requirements. The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements and completion. 128 semester credits required for degree completion. 2.0 Graduation GPA required for Bachelor of Science degree. The student is ultimately responsible for knowing and completing all degree requirements. The myPurduePlan powered by Degree Works is the knowledge source for specific requirements and completion.

Suggested Arrangement of Courses

Note that course placement is dependent upon both pre-requisite requirements as well as limited offering terms (i.e. course may only be offered in Fall or Spring terms – not both)

Please see your academic advisor for other options creating your personalized plan of study

Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
0.5	AGR 10100 [†]		3	ASM 10500 [‡]	MA 16010
0.5	AGR 11100 [†]	co: AGR 10100	3	CHM 11200*	CHM 11100
3	ASM 10400		3	PHYS 21400	
3	CHM 11100*		3	UCC Human Cultures: Humanities Selective*	
3	MA 16010*	ALEKS score ≥ 75	3-4	Written Communication Selective*	
3	Economics Selective AGEC 20300 or ECON 25100				
3	Oral Communication Selective*				
16			15-16		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
3	ASM 21100 [†]	ASM 10500	3	AGEC 35200 AGEC 33000	STAT 30100
1	ASM 22100 [†]	ASM 10400	3	AGRY 25500	
3	ASM 22200 [†]	ASM 10500, PHYS 21400	3	MGMT 20000 or MGMT 21200 ASM 33300 [‡]	ASM 10500, ASM 21100
3	STAT 30100*		3	ASM Selective (any ASM course)	
4	Biological Science Selective		4	Biological Science Selective	
14			16		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	AGEC 33100		3	AGEC 33000 AGEC 35200	STAT 30100
3	Marketing Selective		3	ASM 33300[‡] MGMT 20000 or MGMT 21200	ASM 10500, ASM 21100
3	ASM Selective (any ASM course)		1	ASM 35000 [‡]	
3	Written or Oral Communication Selective (20000+ level)		3	TLI 11200	
1-3	Science, Technology & Society Selective*		3	Humanities or Social Science Selective	
			3	Humanities or Social Science Selective	
13-15			16		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
1	ASM 42100 [†]	ASM 22100	3	Leadership and Management Selective	
1	ASM 49400 [†]	ASM 22100	3	ASM 49500 [‡]	ASM 49400
3	TLI 15200		3	ASM Selective (any ASM course 40000+ level)	
3	ASM Selective (any ASM course)		3	Humanities or Social Science Selective (30000+)	
3	ASM Selective (any ASM course)		2-4	Elective	
3	AGEC 45500 [†] or MGMT 45500 [†]				
14			14-16		

* Fulfills University Undergraduate Core Curriculum Requirement.

† Indicates Fall only course

‡ Indicates Spring only course

[International Understanding](#) (9 credits - may be met with UCC or COA Core Requirements)

[Multicultural Awareness](#) (3 credits - may be met with UCC or COA Core Requirement)

120 semester credits required for degree completion.

2.0 Graduation GPA required for Bachelor of Science degree.

**The student is ultimately responsible for knowing and completing all degree requirements.
The myPurduePlan powered by DegreeWorks is the knowledge source for specific requirements**

Departmental/Program Major Courses (49 credits)

Required Major courses (22 credits)

- _____ (3) ASM 10400 Introduction to Agricultural Systems
- _____ (3) ASM 10500 Computing Technology with Application
- _____ (3) ASM 21100 Technical Graphics Communications
- _____ (1) ASM 22100 Career Opportunities Seminar
- _____ (3) ASM 22200 Crop Production Equipment
- _____ (3) ASM 33300 Facilities Planning and Management
- _____ (1) ASM 35000 Safety in Agriculture
- _____ (1) ASM 42100 Senior Seminar
- _____ (1) ASM 49400 Project Planning and Management
- _____ (3) ASM 49500 Agricultural Systems Management Capstone Project

Required Major courses – Data and Information Systems Concentration (27 credits)

- _____ (3) AGECE 33000 Management Methods for Agriculture Business
- _____ (3) ASM 54000 Geographic Information System Application
- _____ (3) CNIT 15501 Introduction To Software Development Concepts
- _____ (3) CNIT 18000 Introduction To Systems Development
- _____ (3) CNIT 25501 Object-Oriented Programming Introduction
- _____ (3) [CNIT Selective](#)
- _____ (9) ASM Major Selective (any ASM course)

Other Department/Program Course Requirements (67-70 credits)

- _____ (0.5) AGR 10100 Introduction to the College of Agriculture and Purdue University
- _____ (0.5) AGR 11100 Introduction to Agricultural and Biological Engineering Academic Programs
- _____ (3) AGECE 20300 *(satisfies UCC Human Cultures: Behavioral/Social Sci requirement & COA Economics selective)*
- _____ OR (3) ECON 25100 *(satisfies UCC Human Cultures: Behavioral/Social Sci requirement & COA Economics selective)*
- _____ (3) AGECE 33100 Principles of Industrial Selling
- _____ (3) AGECE 35200 Quantitative Techniques for Firm Decision Making
- _____ (3) AGRY 25500 Soil Science
- _____ (3) CHM 11100 General Chemistry I *(satisfies a UCC Science requirement)*
- _____ (3) CHM 11200 General Chemistry II *(satisfies a UCC Science requirement)*
- _____ (3) MA 16010 Applied Calculus I *(satisfies UCC Quantitative Reasoning requirement)*
- _____ (3) PHYS 21400 The Nature of Physics
- _____ (3) STAT 30100 Elementary Statistical Methods *(satisfies a UCC Information Literacy requirement)*
- _____ (3) MGMT 20000 Introductory Accounting
- _____ OR _____ (3) MGMT 21200 Business Accounting
- _____ (3) AGECE 45500 Agriculture Law
- _____ OR _____ (3) MGMT 45500 Legal Background for Business
- _____ ~~(3) Economics Selective *(satisfies UCC Human Cultures: Behavioral/Social Sci requirement)*~~
- _____ (3) [Marketing Selective](#)
- _____ (8) [Biological Science Selective](#) (two or more courses)
- _____ (3) [Human Cultures: Humanities Selective](#) *(satisfies UCC Human Cultures: Humanities requirement)*
- _____ (6) [Humanities or Social Science Selective](#) (two or more courses)
- _____ (3) [Humanities or Social Science Selective](#) (30000+ level)
- _____ (1-3) [Science, Technology & Society Selective](#) *(satisfies UCC Science, Technology & Society Selective requirement)*
- _____ (3) [Oral Communication Selective](#) *(satisfies UCC Oral Communication requirement)*
- _____ (3-4) [Written Communication Selective](#) *(satisfies UCC Written Communication requirement)*
- _____ (3) [Written or Oral Communication Selective](#) (20000+ level)
- _____ [International Understanding](#) (9 credits - may be met with UCC or COA Core Requirements)
- _____ [Multicultural Awareness](#) (3 credits - may be met with UCC or COA Core Requirement)

Electives (1-4 credits)

_____ (1-4) _____

University Core Requirements (<http://www.purdue.edu/provost/students/s-initiatives/curriculum/coreCurriculum.html>)

<i>Human Cultures Humanities</i>	<input type="checkbox"/>	_____	<i>Science, Technology & Society Selective</i>	<input type="checkbox"/>	_____
<i>Human Cultures Behavioral/Social Sciences</i>	<input type="checkbox"/>	_____	<i>Written Communication</i>	<input type="checkbox"/>	_____
<i>Information Literacy</i>	<input type="checkbox"/>	_____	<i>Oral Communication</i>	<input type="checkbox"/>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Quantitative Reasoning</i>	<input type="checkbox"/>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Purdue Civics Literacy</i>	<input type="checkbox"/>	_____

College of Agriculture & University Level Requirements (https://ag.purdue.edu/oap/Pages/core_requirements.aspx)

<i>3 credits - Multicultural Awareness</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>9 credits - International Understanding</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>9 credits - Humanities and/or Social Sciences outside the College of Agriculture</i>	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
<i>3 credits - Humanities and/or Social Sciences at 30000+ level or higher</i>	<input type="checkbox"/>	_____				

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Suggested Arrangement of Courses

Note that course placement is dependent upon both pre-requisite requirements as well as limited offering terms (i.e. course may only be offered in Fall or Spring terms – not both)

Please see your academic advisor for other options creating your personalized plan of study

Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
0.5	AGR 10100 [†]		3	ASM 10500 [‡]	MA 16010
0.5	AGR 11100 [†]	co: AGR 10100	3	CHM 11200 [*]	CHM 11100
3	ASM 10400		3	PHYS 21400	
3	CHM 11100 [*]		3	UCC Human Cultures: Humanities Selective [*]	
3	MA 16010 [*]	ALEKS score ≥ 75	3-4	Written Communication Selective [*]	
3	Oral Communication Selective [*]				
3	Economics Selective AGEC 20300 or ECON 25100				
16			15-16		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
3	ASM 21100 [†]	ASM 10500	3	AGRY 25500	
1	ASM 22100 [†]	ASM 10400	3	CNIT 15501	
3	ASM 22200 [†]	ASM 10500, PHYS 21400	3	STAT 30100 [*]	
3	CNIT 18000		4	Biological Science Selective	
4	Biological Science Selective		3	ASM Major Selective (any ASM course)	
14			16		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	AGEC 33100		3	AGEC 33000	
3	AGEC 35200		3	ASM 33300 [‡]	ASM 10500, ASM 21100
3	MGMT 20000 or MGMT 21200		1	ASM 35000 [‡]	
3	Marketing Selective		3	CNIT 25501	
3	ASM Major Selective (any ASM course)		3	Humanities or Social Science Selective	
			3	Written or Oral Communication Selective (20000+ level)	
15			16		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
1	ASM 42100 [†]	ASM 22100	3	ASM 49500 [‡]	ASM 49400
1	ASM 49400 [†]	ASM 22100	3	ASM Major Selective (any ASM course)	
3	ASM 54000		3	Humanities or Social Science Selective	
3	AGEC 45500 [†] or MGMT 45500 [†]		3	Humanities or Social Science Selective (30000+)	
3	CNIT Selective		2-4	Elective	
1-3	Science, Technology & Society Selective [*]				
12-14			14-16		

* Fulfills University Undergraduate Core Curriculum Requirement.

[†] Indicates Fall only course

[‡] Indicates Spring only course

[International Understanding](#) (9 credits - may be met with UCC or COA Core Requirements)

[Multicultural Awareness](#) (3 credits - may be met with UCC or COA Core Requirement)

120 semester credits required for degree completion.
1.0 Graduation GPA required for Bachelor of Science degree.

Departmental/Program Major Courses (60 credits)

Required Major courses (39 credits)

- _____ (4) ABE 20100 Thermodynamics in Biological Systems I
- _____ (3) ABE 20200 Thermodynamics in Biological Systems II
- _____ (1) ABE 29000 Sophomore Seminar (*satisfies UCC Science, Technology & Society requirement*)
- _____ (3) ABE 30100 Numerical and Computational Modeling in Biological Engineering
- _____ (3) ABE 30300 Applications of Physical Chemistry to Biological Processing
- _____ (3) ABE 30400 Bioprocess Engineering Laboratory
- _____ (3) ABE 30700 Momentum Transfer in Food and Biological Systems
- _____ (3) ABE 30800 Heat and Mass Transfer in Food and Biological Systems
- _____ (3) ABE 37000 Biological/Microbial Kinetics and Reaction Engineering
- _____ (3) ABE 45700 Transport Operations in Food and Biological Engineering I
- _____ (3) ABE 46000 Sensors and Process Control
- _____ (1) ABE 49000 Professional Practice in Agricultural and Biological Engineering
- _____ (3) ABE 55700 Transport Operations in Food and Biological Systems
- _____ (3) ABE 55800 Process Design for Food and Biological Systems

Bio Environmental Engineering Major Concentration Courses (21 credits)

- ~~_____ (3) ABE 31400 Design Of Electronic Systems~~
- _____ (4) ABE 32500 Soil and Water Resource Engineering
- ~~_____ (3) ABE 58000 Process Engineering Of Renewable Resources~~
- _____ (3) AGRY 25500 Soil Science
- _____ **(6) BioEnvironmental Selectives**
- _____ (8) College of Agriculture: Biological Science Selectives (*satisfies COA Biological Sciences Selectives*)

Other Department/Program Course Requirements (69-70 credits)

- _____ (2) ENGR 13100 Transforming Ideas to Innovation I (*satisfies UCC Information Literacy requirement*)
- _____ (2) ENGR 13200 Transforming Ideas to Innovation II
- _____ (3) CHE 32000 Statistical Modeling and Quality Enhancement
- _____ (4) CHM 11500 General Chemistry I (*satisfies a UCC Science requirement*)
- _____ (4) CHM 11600 General Chemistry II (*satisfies a UCC Science requirement*)
- _____ (4) CHM 25700 Organic Chemistry (or (3) CHM 25500 Organic Chem + (1) CHM 25501 Organic Chem I Lab)
- _____ (3) CS 15900 C Programming (Pre-ABE may use (4) CS 177 Programming with Multiple Options)
- _____ (4) MA 16500 Analytic Geometry & Calculus I (or (5) MA 16100) (*satisfies UCC Quantitative Reasoning requirement*)
- _____ (4) MA 16600 Analytic Geometry & Calculus II (or (5) MA 16200)
- _____ (4) MA 26100 Multivariate Calculus
- _____ (4) MA 26200 Linear Algebra and Differential Equations
- _____ (3) MA 30300 Differential Equations and Partial Differential Equations for Engineering and the Sciences
- _____ (4) PHYS 17200 Modern Mechanics
- _____ (3) Economics Selective (*satisfies UCC Human Cultures: Behavioral/Social Sciences requirement*)
- _____ (3) Human Cultures: Humanities Selective (*satisfies UCC Human Cultures: Humanities requirement*)
- _____ (3) Humanities or Social Science Selective (*satisfies COA humanities/social science requirement*)
- _____ (3) Humanities or Social Science Selective (*satisfies COA humanities/social science requirement*)
- _____ (3) Humanities or Social Science Selective (30000+ level)
- _____ (3) Oral Communication Selective (*satisfies UCC Oral Communication requirement*)
- _____ (3-4) Written Communication Selective (*Written Communication requirement*)
- _____ (3) Written or Oral Communication Selective (20000+ level)
- _____ International Understanding (6 credits - may be met with UCC or COA Core Requirements)
- _____ Multicultural Awareness (3 credits - may be met with UCC or COA Core Requirement)

Electives (0-4 credits)

- _____ (0-4) _____

University Core Requirements (<http://www.purdue.edu/provost/students/s-initiatives/curriculum/coreCurriculum.html>)

<i>Human Cultures Humanities</i>	<input type="checkbox"/>	_____	<i>Science, Technology & Society Selective</i>	_____
<i>Human Cultures Behavioral/Social Sciences</i>	<input type="checkbox"/>	_____	<i>Written Communication</i>	_____
<i>Information Literacy</i>	<input type="checkbox"/>	_____	<i>Oral Communication</i>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Quantitative Reasoning</i>	_____
<i>Science Selective</i>	<input type="checkbox"/>	_____	<i>Purdue Civics Literacy</i>	_____

College of Agriculture & University Level Requirements (https://ag.purdue.edu/oap/Pages/core_requirements.aspx)

<i>3 credits - Multicultural Awareness</i>	_____	_____	_____
<i>9 credits - International Understanding</i>	_____	_____	_____
<i>9 credits - Humanities and/or Social Sciences outside the College of Agriculture</i>	_____	_____	_____
<i>3 credits - Humanities and/or Social Sciences at 30000+ level or higher</i>	_____	_____	_____

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Suggested Arrangement of Courses

Note that course placement is dependent upon both pre-requisite requirements as well as limited offering terms

(ABE courses only offered in Fall or Spring terms – not both)

Please see your academic advisor for other options creating your personalized plan of study

PRE-ABE Curriculum – must earn C- or higher in all Pre-ABE courses					
Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
4	CHM 11500*	pre/co: MA 16100/16500	4	CHM 11600*	CHM 11500
2	ENGR 13100*		2	ENGR 13200	ENGR 13100
4 or 5	MA 16500* or MA 16100	min. ALEKS score=85% >	4 or 5	MA 16600 or MA 16200	MA 16100/16500 (≥ C-)
3	Human Cultures: Humanities Selective		4	PHYS 17200*	pre/co: MA 16100/16500
3-4	Written Communication Selective* or Oral Communication Selective*		3-4	Written Communication Selective* or Oral Communication Selective*	
16-18			17-18		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
4	ABE 20100 [†]	CHM 11600	3	ABE 20200 [‡]	ABE 20100, MA 26100 (≥ C-)
1	ABE 29000 [†]		3	AGRY 25500	
4	MA 26100	MA 16200/16600 (≥ C-)	3	CHE 32000 [‡]	ABE 20100, CHM 25700, pre/co: MA 26100 (≥ C-)
4	CHM 25700 or CHM 25500+25501	CHM 11600	3-4	CS 15900 or CS 17700	
4	College of Agriculture: Biological Science Selective		4	MA 26200	MA 26100 (≥ C-)
17			16-17		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	ABE 30300 [†]	ABE 20200, CHM 25700, or CHM 25500/25501 pre/co: ABE 30700	3	ABE 30100 [‡]	ABE 37000, CS 15900 or CS 17700 MA 30300
3	ABE 30700 [†]	ABE 20200, pre/co: MA 30300	3	ABE 30400 [‡]	co: ABE 30800
4	ABE 32500	AGRY 25500, MA 26200	3	ABE 30800 [‡]	ABE 30700
3	ABE 37000 [†]	CHM 25700, MA 26200, (≥ C-) BIOL 22100 or 23000 or 23100	3	ABE 31400 Bioenvironmental Selective	MA 26200 (≥ C-)
3	MA 30300	MA 26200 (≥ C-)	3	ABE 45700 [‡]	co: ABE 30800
			3	Economics Selective	
16			18		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
1	ABE 49000 [†]	ABE 29000	3	ABE 46000	MA 26200 (≥ C-)
3	ABE 55700 [†]	ABE 45700	3	ABE 55800 [‡]	ABE 55700
4	College of Agriculture: Biological Science Selective		3	ABE 58000 Bioenvironmental Selective	ABE 37000 or CHE 34800
3	Humanities or Social Science Selective		3	Humanities or Social Science Selective	
3	Written or Oral Communication Selective (20000+)		3	Humanities or Social Science Selective (30000+)	
			0-4	Elective	
14			15-19		

* Fulfills University Undergraduate Core Curriculum Requirement.

[†] Indicates Fall only course

[‡] Indicates Spring only course

International Understanding (6 credits) and Multicultural Awareness (3 credits) may be met with UCC or COA Core Requirements. 128 semester credits required for degree completion. 2.0 Graduation GPA required for Bachelor of Science degree. The student is ultimately responsible for knowing and completing all degree requirements. The myPurduePlan powered by Degree Works is the knowledge source for specific requirements and completion.

Page Break

BioEnvironmental Engineering Concentration Supplemental Information

BioEnvironmental Selective (6 credits)

ABE 31400 Design of Electronic Systems

ABE 42500 Water Quality Engineering

ABE 42600 Ecological Restoration Engineering

ABE 58000 Process Engineering of Renewable Resources

College of Agriculture: Biological Science Selective (8 credits)

To fulfill the biological sciences core requirement, all students must complete at least two hours of laboratory credit in biological sciences each week for 32 weeks, or equivalent. Completion of course sequences is recommended. Courses with an () have a laboratory component.*

- BIOL 11000 - Fundamentals Of Biology I*
- BIOL 11100 - Fundamentals Of Biology II *
- BIOL 12100 - Biology I: Diversity, Ecology, And Behavior
- BIOL 13100 - Biology II: Development, Structure, And Function Of Organisms
- BIOL 13500 - First Year Biology Laboratory *
- BIOL 20300 - Human Anatomy And Physiology *
- BIOL 20400 - Human Anatomy And Physiology *
- BIOL 22100 - Introduction To Microbiology *
- BIOL 23000 - Biology Of The Living Cell
- BIOL 23100 - Biology III: Cell Structure And Function
- BIOL 23200 - Laboratory In Biology III: Cell Structure And Function *
- BIOL 24100 - Biology IV: Genetics And Molecular Biology
- BIOL 24200 - Laboratory In Biology IV: Genetics And Molecular Biology *
- BIOL 29500 - Special Assignments (Title: Quantitative Biology of the Living Cell)
- BTNY 11000 - Introduction To Plant Science *
- BTNY 12000 - Principles Of Plant Biology I
- BTNY 12100 - Principles Of Plant Biology II
- HORT 30100 - Plant Physiology *

Note: Plans of study should be marked in green for additions and red for deletions. If appropriate, this should be included with the submission.

Department of Agriculture
Proposed Course and Curricular Changes

A. COURSES TO BE ADDED

NA

B. CURRICULAR CHANGES (If new major, concentration or minor, need plan of study, description, proposed head count, UEAC justification)

Proposed changes to Interdisciplinary Agriculture Major (INAG):

FROM (3) MA 16010 (Applied Calculus I)

TO (3) MA 15800 (Precalculus) or MA 16010 (Applied Calculus)

Justification/Rationale: In Spring 2016, College of Agriculture Faculty approved the following change to the College's mathematics requirement: "College of Agriculture students must take a minimum of one semester of mathematics. The following courses are acceptable: MA 16010 (Applied Calculus I) (3 Cr.), 16100 (Plane Analytic Geometry and Calculus I) (5 cr.), or MA 16500 (Analytic Geometry and Calculus I) (4 cr.); or an approved mathematics course/sequence for a particular major. Departments wishing to use courses not listed above for their majors would need to obtain approval from the College of Agriculture Faculty." The Departments of Agronomy, Horticulture, and Youth Development & Agricultural Education (now Agricultural Sciences Education and Communication) then received approval from the Faculty to use MA 15800 as the minimum mathematics course for that majority of their majors/concentrations. In 2016, CSRC decided that those who change to INAG must complete the math requirement for the major the student was enrolled in before they became INAG. Current students who have not completed MA 16010 when they switch their major to INAG first switch to one of the majors that allow the use of MA 15800, then at a later date switch to INAG. This change would streamline the process and students would no longer change into a major that did NOT require MA 15800 before changing into INAG.

Expected Impact to other Programs: Depending on one's point of view, it will be another major that does not require calculus for degree completion. On a positive note, there will not be additional advising resources utilized when a student changes to AGRY, HLA, or ASEC with no intention of completing degree requirements.

Name: _____ PUID: _____ Date: _____

Required Courses (1 credits)

- _____ (0.5) AGR 10100 Introduction to the College of Agriculture and Purdue University
- _____ (0.5) AGR 1XXXX Introduction to Departmental Academic Programs

Other Departmental/Program Course Requirements (93 credits) (See Advising Resources)

- _____ (4) BIOL 11000 Fundamentals of Biology I
- _____ (4) BIOL 11100 Fundamentals of Biology II
- _____ (3) CHM 11100 General Chemistry (*satisfies Science #1 for core*)
- _____ (3) CHM 11200 General Chemistry (*satisfies Science #2 for core*)
- _____ (3) MA16010CC Applied Calculus I or MA 15800 (Precalculus) (*satisfies Quantitative Reasoning for core*)
- _____ (3) STAT 30100 Elementary Statistical Methods (*satisfies Information Literacy for core*)
- _____ (3) ----- Mathematics or Science Selective
- _____ (3) ----- Mathematics or Science Selective
- _____ (3) ----- Mathematics or Science Selective
- _____ (3-4) ----- Written Communication Selective (*satisfies Written Communication for core*)
- _____ (3) ----- Oral Communication Selective (*satisfies Oral Communication for core*)
- _____ (3) ----- Written or Oral Communication Selective (2000+ level)
- _____ (3) AGECE 21700 Economics
- _____ (3) ----- UCC Humanities Selective (*satisfies Human Cultures Humanities for core*)
- _____ (3) ----- UCC STS Selective (*satisfies Science, Technology, & Society Selective for core*)
- _____ (3) ----- Humanities or Social Science Selective
- _____ (3) ----- Humanities or Social Science Selective
- _____ (3) ----- Humanities or Social Science Selective (30000+ level)
- _____ (15) ----- Agriculture Selective
- _____ (21) ----- Agriculture Selective (30000+ level)

Electives (26-27 credits)

_____ (26-27) Electives

University Core Requirements (<http://www.purdue.edu/provost/initiatives/curriculum/course.html>)

Human Cultures Humanities	<input type="checkbox"/> _____	Science, Technology & Society Selective	<input type="checkbox"/> _____
Human Cultures Behavioral/Social Science	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> _____	Written Communication	<input type="checkbox"/> _____
Information Literacy	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> _____	Oral Communication	<input type="checkbox"/> _____
Science Selective	<input type="checkbox"/> _____	Quantitative Reasoning	<input type="checkbox"/> _____
Science Selective	<input type="checkbox"/> _____		

College of Agriculture & University Level Requirements:

2.0 GPA required for Bachelor of Science degree.

32 Upper division credits taken from Purdue

9 credits International Understanding: _____

3 credits Multicultural Awareness: _____

3 credits of Humanities or Social Science Selective (30000+ level): _____

9 credits of Hum and/or Social Sciences outside the College of Agriculture: _____

Capstone Requirement: _____

Completion of Purdue Minor Requirement: _____

Suggested Arrangement of Courses:

Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
0.5	AGR 10100 Introduction to the College of Agriculture and Purdue University		4	BIOL 11100 Fundamentals of Biology II	BIOL 11000
0.5	AGR 1XXXX Introduction to Departmental Academic Programs		3	CHM 11200 General Chemistry	CHM 11100
4	BIOL 11000 Fundamentals of Biology I		3	MA 16010 Applied Calculus I or MA 15800 (Precalculus)	
3	CHM 11100 General Chemistry		3	Agricultural Selective	
3-4	ENGL 10600 First Year Composition or ENGL 10800 Accelerated First-Year Composition or HONR 19903 Interdisciplinary Approaches in		3	Elective	
3	Agricultural Selective				
14-15			16		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
3	AGEC 21700 Economics		3	STAT 30100 Elementary Statistical Methods	
3	COM 11400 Fundamentals of Speech or COM 21700 Science Writing and Presentation or EDPS 31500 Collaborative Leadership: Interpersonal Skills		6	Agricultural Selective	
3	Agricultural Selective		3	UCC Science, Technology, & Society Selective	
3	Mathematics or Science Selective		3	Elective	
3	UCC Humanities Selective				
15			15		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	Agricultural Selective (30000+ level)		6	Agricultural Selective (30000+ level)	
3	Humanities or Social Science Selective		3	Humanities or Social Science Selective	
6	Mathematics or Science Selective		6	Elective	
3	Written or Oral Communication Selective				
15			15		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
6	Agricultural Selective (30000+ level)		6	Agricultural Selective (30000+ level)	
9	Electives		3	Humanities or Social Science Selective (30000+ level)	AGEC 42400
			5-6	Electives	
15			14-15		

- 1) 120 credits listed above are required for the INAG Bachelor of Science degree.
- 2) 2.0 Graduation GPA required for Bachelor of Science degree.
- 3) 32 credits of upper division courses (30000 level or higher) must be taken at Purdue University, West Lafayette.
- 4) ANY COURSE TAKEN AT PURDUE CAN BE ATTEMPTED NO MORE THAN THREE TIMES (INCLUSIVE OF W, WF, I AND IF).
- 5) CC = is considered a critical course

See next page for all supplemental information

The student is ultimately responsible for knowing and completing all degree requirements.

**Department of Agronomy
Proposed Course and Curricular Changes**

A. COURSES TO BE ADDED

Prefix and Course Number: AGRY 42000

Long Title: Computing for the Natural Sciences

B. CURRICULAR CHANGES (If new major, concentration or minor, need plan of study, description, proposed head count, UEAC justification [See CSRC Box for example])

None

Supporting Document

A. Short Title: Computing for Nat Sci

B. Semester(s) Offered: Fall

C. Schedule Type and Hours: LEC/75 min per mtg/2 mtgs per wk/16 wks

D. Credits: 3.0

E. Justification for the course: There is increasing need for students in the College of Agriculture to enhance their computing skillsets, whether to meet evolving industry demand or to develop competitive applications for graduate school. However, taking a full-semester introductory computer science course can be intimidating for undergraduates in the natural sciences or for new graduate students in these fields without previous exposure to programming. To meet this demand and complement offerings that are already part of the [‘Data Driven Agriculture’ minor](#) in the college and university-wide [‘Applications in Data Science’ certificate](#), a new course is proposed here, entitled “Computing for the natural sciences”. This course was developed by Dr. Diane Wang in the Agronomy Dept. and was offered as a full-semester Special Topics class (originally entitled “Plants, data, and computational thinking”) in Fall 2021 and Fall 2022. After seeing its impact on students from majors beyond the plant sciences (e.g., meteorology and soil sciences), the proposed course title has been updated to reflect this broader student participation. **The course aims to develop a fundamental skillset of logical thinking and basic programming concepts generally covered in introductory Computer Science courses (e.g., functions, iteration, conditionals), but in the context of analyzing datasets found in agriculture and natural sciences.** It differs from courses on other courses on Data Science (e.g., ENTM 24200) in that its focus is on developing skills generic to computing rather than on data analysis per se. The full syllabus for the course is attached to this proposal, but briefly: the first half of the course is designed to build a foundational skill base while the second half is focused on working towards completion of a final course project. The course project (made up of source-code and its rendered report) represents a product that each student can take with them beyond the course. AGRY42000 is targeted to junior and senior undergraduates, especially those interested in graduate school. Additionally, early graduate students who wish to develop a fundamental programming skillset would also be able to apply this towards their Plan of Study. Feedback in the form of end-of-semester student evaluations from Fall 2021 corroborated that this course helps to develop a computational foundation for scholars of the natural sciences in the College of Agriculture. **Supporting document:** course syllabus.

F. Expected Impact to other Programs: Increased enrollment in other related courses in the College such as those that focus on Data Science or programming and enhanced interest in computing among students in the College.

G. Course Description for University Catalog: Basic programming, problem solving, data visualization and communication in the context of agriculture and natural science research using R. Topics include iteration, functions, vectors, strings, algorithms, graphics and reproducible reports in R. This course is appropriate for undergraduates with a curiosity in computing fundamentals and interest in working with research data, especially those potentially applying to graduate school. Also appropriate for graduate students, researchers or other professionals who desire an introduction to programming with R. NO programming experience is necessary. This is not a statistics course; having had introductory statistics and some background coursework in agricultural or other natural sciences is expected.

H. Requisites (Pre-Reqs/Co-Reqs/concurrent pre-req): Pre-requisite: STAT22500 or STAT30100 or permission by instructor.

I. Restrictions: None.

J. Learning Outcomes: Students completing this course will be able to: (1) Design, code, and test small R programs; (2) Use programming to solve problems; (3) Communicate results with clean, reproducible reports.

K. If Applicable to College of Agriculture Core

This course will will not be nominated for inclusion on College of Agriculture Core.

L. Instructor Information: Dr. Diane Wang (drwang@purdue.edu), Assistant Professor in the Dept. of Agronomy

M. Link to curriculog (if applicable): Not applicable.

Department of Botany and Plant Pathology
Proposed Course and Curricular Changes

A. COURSES TO BE ADDED

None.

B. CURRICULAR CHANGES (If new major, concentration or minor, need plan of study, description, proposed head count, UEAC justification.)

Proposed Changes: 1) PHYS 22000 will replace PHYS 21400, 2) Move BTNY 208 from third to second semester, 3) PHYS 22000 in fifth semester (replaces PHYS 21400 previously in fourth semester), and 4) elective credits adjusted to accommodate extra credit associated with PHYS 22000.

Justification/Rationale: 1) PHYS move: The department approved the replacement of PHYS 21400, a physics course for non-science majors, with PHYS 22000, an algebra-based course for science majors, and this was approved by departmental faculty. The department will encourage students who are planning to go graduate school to take PHYS 22100 in addition to 22000, so the fifth and sixth semester placement works better for this. The undergraduate committee also felt this move balances the number of science courses across semesters. 2)BTNY 20800 move: This class is taken ONLY by Plant Science majors in the department of Botany & Plant Sciences. The undergraduate committee and then the faculty agreed that moving this to the second semester is a better fit for our students, rather than having them take this in their first semester when they are just learning about their curriculum and research requirements in the department.

Expected Impact to other Programs: None. This should impact only plant science majors in the BTNY department.

Name: _____ PUID: _____ Date: _____

Required Major Courses (28 credits)

- _____ (4) BTNY 12000 Principles of Plant Biology I
- _____ (4) BTNY 12100 Principles of Plant Biology
- _____ (3) BTNY 20700 The Microbial World
- _____ (1) BTNY 20800 Introduction to Plant Science Research
- _____ (3) BTNY 26200 Plant Structure and Tissue Biology
- _____ (3) BTNY 30200 Plant Ecology
- _____ (3) BTNY 30500 Fundamentals of Plant Classification
- _____ (3) BTNY 42000 Plant Cellular and Developmental Biology
- _____ (1) BTNY 49700 Research Seminar (Capstone)
- _____ (3) BTNY 49800 Research in Plant Science (Capstone)

Other Departmental/ Program Course Requirements (78.5 – 79.5 credits) (See Advising Resources)

- _____ (0.5) AGR 10100 Introduction to the College of Agriculture and Purdue University
- _____ (1) AGR 12500 Introduction to Plant Science
- _____ (3) AGRY 32000 Genetics
- _____ (1) AGRY 32100 Genetics Laboratory
- _____ (3) BCHM 30700 Biochemistry
- _____ (3) CHM 11100 General Chemistry (satisfies Science #1 for core)
- _____ (3) CHM 11200 General Chemistry (satisfies Science #2 for core)
- _____ (4) CHM 25700 Organic Chemistry
- _____ (1) CHM 25701 Organic Chemistry Laboratory
- _____ (4) HORT 30100 Plant Physiology
- _____ (3) MA 16010 Applied Calculus I (satisfies Quantitative Reasoning for core)
- _____ (3-4) ~~PHYS 21400 The Nature of Physics~~ ~~PHYS 22000 General Physics~~
- _____ (3) STAT 30100 Elementary Statistical Methods (satisfies Information Literacy for core)
- _____ (15) Focus Selective⁶
- _____ (3) Focus Selective (30000+ level)⁶
- _____ (3) Economics Selective (satisfies Human Culture Behavioral/Social Science for core)³
- _____ (3) UCC Humanities Selective (satisfies Human Cultures Humanities for core)¹
- _____ (3) UCC STS Selective (satisfies Science, Technology & Society Selective for core)⁵
- _____ (3) Humanities or Social Science Selective²
- _____ (3) Humanities or Social Science Selective²
- _____ (3) Humanities or Social Science Selective (30000+ level)²
- _____ (3-4) First Year Composition Selective (satisfies Written Communication for core)
- _____ (3) Oral Communication Selective (satisfies Oral Communication for core)
- _____ (3) Written or Oral Communications Selective⁴

Electives (13.5-14.5-12.5-13.5 credits)

(12.5 - 13.5) Elective

University Core Requirements (<http://www.purdue.edu/provost/initiatives/curriculum/course.html>)

Human Cultures Humanities	<input type="checkbox"/>	_____	Science, Technology & Society Selective	<input type="checkbox"/>	_____
Human Cultures Behavioral/Social Science	<input type="checkbox"/>	_____	Written Communication	<input type="checkbox"/>	_____
Information Literacy	<input type="checkbox"/>	_____	Oral Communication	<input type="checkbox"/>	_____
Science Selective	<input type="checkbox"/>	_____	Quantitative Reasoning	<input type="checkbox"/>	_____
Science Selective	<input type="checkbox"/>	_____			

College of Agriculture & University Level Requirements (https://ag.purdue.edu/oap/Pages/core_requirements.aspx)

3 credits Multicultural Awareness	<input type="checkbox"/>	_____				
9 credits International Understanding	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
9 credits of Hum. And/or Social Sciences outside the College of Agriculture	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
3 credits of Hum. And/or Social Science at 30000 or higher	<input type="checkbox"/>	_____				

Plant Science

Suggested Arrangement of Courses:

Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
0.5	AGR 10100 Introduction to the College of Agriculture and Purdue University		4	BTNY 12100 Principles of Plant Biology	BTNY 11000
1.0	AGR 12500 Introduction to Plant Science		3	BTNY 20700 The Microbial World	
4	BTNY 12000 Principles of Plant Biology I		3	CHM 11200 General Chemistry	CHM 11100
3	CHM 11100 General Chemistry		3	Oral Communication Selective	
3-4	Written Communication Selective		1	BTNY 20800 Introduction to Plant Science Research	
3	MA 16010 Applied Calculus I	ALEKS 75+	3 1.5	Elective	
14.5-15.5			15.5		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
3	BNTY 26200 Plant Structure and Tissue Biology		3	AGRY 32000 Genetics	BTNY 11000, HORT 30100
4	CHM 25700 Organic Chemistry	CHM 11200	1	AGRY 32100 Genetics Lab	
1	CHM 25701 Organic Chemistry Lab		3	BTNY 30200 Plant Ecology	BTNY 11000
3	Focus Selective		3	Economics Selective	
3	UCC Humanities selective		3	UCC Science, Technology, & Society Selective	
			3	Focus Selective	
14			16		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3	BCHM 30700 Biochemistry		4	BTNY 42000 Plant Cellular and Developmental Biology	
3	BTNY 30500 Fundamentals of Plant Classification		3	HORT 30100 Plant Physiology	
3	BTNY 49800 Research in Plant Science		3	STAT 30100 Elementary Statistical Methods	
3-4	PHYS 21400 The Nature of Physics General Physics	PHYS 22000	3	Humanities or Social Science Selective	
3	Focus Selective		3	Elective	
16			16		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
1	BTNY 49700 Research Seminar		3	Focus Selective	BTNY 49800
3	Focus Selective		3	Focus Selective (300+Level)	
3	Humanities or Social Science Selective (30000+ level)		3	Humanities or Social Science Selective	
5	Electives		3	Written or Oral Communication Selective	
			3	Electives	
13			14.5		

- 1) 120 credits listed above are required for Bachelor of Science degree.
- 2) 2.0 Graduation GPA required for Bachelor of Science degree.
- 3) 32 credits of upper division courses (30000 level or higher) must be taken at Purdue University, West Lafayette.
- 4) ANY COURSE TAKEN AT PURDUE CAN BE ATTEMPTED NO MORE THAN THREE TIMES (INCLUSIVE OF W, WF, I AND IF).
- 5) CC = is considered a critical course

See next page for all supplemental information

The student is ultimately responsible for knowing and completing all degree requirements.
myPurdue Plan is knowledge source for specific requirements and completion

Department of Entomology
Proposed Course and Curricular Changes

A. COURSES TO BE ADDED

None

B. CURRICULAR CHANGES (If new major, concentration or minor, need plan of study, description, proposed head count, UEAC justification [See CSRC Box for example])

Proposed Changes: Expiration of Forensic Entomology Area of Concentration (AoC) within the Insect Biology Major; Deletion of ENTM 22840 Forensic Entomology Principles, ENTM 22841 Forensic Entomology Principles Lab, ENTM 42820 Carrion Ecology

Justification/Rationale: The AoC in Forensic Entomology has had very low enrollment since its introduction in Fall 2019. There are a very small number of students in the AoC program (less than 4 per year). The enrollment for the course's ranges between 1-5 students per course. In addition, the courses offered are redundant with other courses offered by the Department of Entomology for Insect Biology Majors. Neither will deletion of the AoC impact the Insect Biology majors, as students currently enrolled reside inside the Insect Biology major. Students may still minor in Forensic Science, which affords the same opportunities to learn about forensic entomology in all three forensic science core courses (ENTM 22810, ENTM 22820, ENTM 22830) as well as an elective course in Medicolegal Entomology (ENTM 32820). This provides interested students access to forensic entomology education and information, but eliminates the AoC. The two courses that will be deleted (ENTM 22840/41 and ENTM 42820) are not required for any other program or major, and are not listed in the Plan of Study as a required or selective course for Insect Biology majors.

Expected Impact to other Programs: We do not anticipate any impacts on students in other programs, across the CoA or University, since only Insect Biology Majors have previously enrolled in the specific courses offered within the AoC.

Department of Food Science
Proposed Course and Curricular Changes

A. COURSES TO BE ADDED

Prefix and Course Number: FS 58100

Long Title: Emerging Food Technologies

Supporting Document (FS 58100)

- A. Short Title:** Emerging Food Technologies
- B. Semester(s) Offered:** Spring
- C. Schedule Type (e.g. Lecture/Lab) and Hours:** 50-min LEC per week/16 weeks per term
- D. Credits:** 1.0
- E. Justification for the course:** COVID-19 pandemic brought significant barriers to learning, but it also created new opportunities and receptiveness to innovate what and how to teach. This course, initiated by the USDA multi-state project NC-1023-Engineering for food safety and quality, attempts to break these barriers and provide opportunities for students to interact with researchers from across the county through a new, online multi-institutional course. The diversity of speakers and topics of this course is envisioned to expand research horizons of students and improve their engagement. The online platform has given unique opportunities for students to meet their peers and faculty from across the county, create a peer network of researchers and mentors to learn from their experiences and build a sense of community. Twelve universities concurrently offer this course in the spring semester with > 100 students enrolled in the past two years, and new institutions will join each year. Another strength of this approach is that it has removed geographical and capacity limitations to learning, as there had been several students who join from abroad. While starting small, the modularity of this approach will enable expansion of this course on a global scale.
- F. Course Description for University Catalog:** This online multi-institutional course provides a broad perspective of innovation as applied to food engineering. The course constitutes weekly presentations from 12 speakers on topics in three thematic areas selected using a student survey (from 18 institutions), aiming to develop a student-centered course. This course (1) provides a broad perspective of innovation as applied to food engineering; (2) provides a general overview and case studies of current and emerging research areas in food and agricultural engineering and processing by different research groups in the nation; and (3) demonstrates the efforts among food engineers and scientists in the nation to advance engineering knowledge and technologies for the purpose of improving food safety, quality and security, and enhance health benefits of food products through extensive research in focused areas.
- G. Requisites (Pre-Reqs/Co-Reqs/concurrent pre-req):** none
- H. Restrictions:** Graduate students. Anyone that is not a senior classification would need an override to enroll.
- I. Learning Outcomes:** 1. Understand the advances in the thermal processing of food and biomaterials. 2. Understand the advances in the nonthermal processing of food and biomaterials. 3. Learn recent developments in understanding and sensing food quality and

safety. 4. Apply the insights gained from observing faculty presentations to improve writing and presentation skills.

J. Applicable to College of Agriculture Core

This course will **will not** be nominated for inclusion on College of Agriculture Core.

K. Instructor Information: Jen-Yi Huang, Department of Food Science,
huang874@purdue.edu, 765-496-6034

L. Link to curriculog (if applicable): [Click here to enter text.](#)

Impact on other CoA programs: This course is expected to have no impact on other programs in CoA.

Natural Resources and Environmental Science Program
Proposed Course and Curricular Changes

A. COURSES TO BE ADDED

None

B. CURRICULAR CHANGES (If new major, concentration or minor, need plan of study, description, proposed head count, UEAC justification)

Proposed Changes: Climate and Energy Solutions Concentration from EAPS 32000 Physics of Climate to EAPS 22500 Science of the Atmosphere, removing Math or Statistics Selective and replacing with MA 16020. Removing PHYS 15200 or 17200 and replacing it with 1-3 credits of Broadening Science Selective and increasing selective by 2 credits.

Justification/Rationale: The Climate and Energy Solutions concentration requires EAPS 32000 Physics of Climate. As part of their curriculum review, EAPS has redesigned this course (and assigned a new course number) as an advanced course on the physics of climate for only the EAPS Major curriculum. They have suggested that EAPS 22500 (Science of the Atmosphere) is a quantitative introduction to how we apply physical concepts and equations to understand our atmosphere that is appropriate for students in this concentration. Univariate calculus is required at least concurrently. Students can still take the required EAPS 22100 Survey of Atmospheric Sciences without repeating information. With this change the number of 30000+ courses specifically required on this plan of study decreases from 22 to 19. There are multiple combinations of courses from the selectives list (Concentration Selectives (12 credits)), Math and Statistics Selectives (3 credits), Broadening Science Selective (1-3 credits), Data Science Selective (3 credits) and Science Communication Selective (3 credits) that can accommodate the remaining 13 credit hours needed at 30000+, but students will have to choose an appropriate combination.

Expected Impact to other Programs: This change will have a minor impact on EAPS itself, at their request. Students in the Climate and Energy Solutions Concentration were already taking EAPS 32000, the same number of students will now take EAPS 22500. The enrollment cap has been increased in EAPS 22500 to allow for students who may have been affected by the change in EAPS 32000. In addition, EAPS has agreed to amend their pre-requisites to accept MA 16010/MA16020, consistent with the pre-requisites for PHYS 17200. With this change, Climate and Energy Solutions students will no longer be required to take PHYS 17200, as that was a pre-requisite to EAPS 32000, but this will represent a negligible change in enrollment for this course.

Note: Plans of study should be marked in green for additions and red for deletions. If appropriate, this should be included with the submission.

Name: _____ PUID: _____ Date: _____

Required Major Courses (10 credits)

- _____ (3) NRES 12500 Environmental Science & Conservation (*UCC STS Selective*)
- _____ (1) NRES 20000 Introduction to Environmental Careers
- _____ (3) NRES 25500/AGRY 27000 Soil Science*
- _____ (1) NRES 42000 Internship Reporting (*Part of Capstone Requirement*)
- _____ (2) NRES 49700 Current Topics in Environmental Science (*Part of Capstone Requirement*)

Required Concentration Courses (19-21 credits)

- _____ (3) EAPS 22500 Science of the Atmosphere ~~32000 Physics of Climate*~~
- _____ (3) POL 32700 Global Green Politics*
- _____ (3) NRES 23000 Survey of Meteorology Or AGRY 33500 Weather and Climate*
- _____ (12) Climate and Energy Selective
- _____ (1-3) Broadening Science Selective

Other Departmental/ Program Course Requirements (75-77 credits) (See Advising Resources)

- _____ (3) AGECE 40600 Natural Resource and Environmental Economics*
- _____ (0.5) AGR 10100 Introduction to the College of Agriculture and Purdue University
- _____ (0.5) AGR 12200 Introduction to Natural Resources and Environmental Science
- _____ (1) AGRY 33800 Environmental Hydrology Laboratory Or NRES 33800 Environmental Field Skills
- _____ (4) BIOL 11000 Fundamentals of Biology I Or BTNY 12000 Principles of Plant Biology I*
- _____ (4) BIOL 11100 Fundamentals of Biology II Or BTNY 12100 Principles of Plant Biology II*
- _____ (3) CHM 11100 General Chemistry*
- _____ (3) CHM 11200 General Chemistry*
- _____ (3-4) CHM 25700 Organic Chemistry* Or CHM 25500 Organic Chemistry*
- _____ (3) FNR 37500 Human Dimensions of Natural Resources* Or SOC 34400 Environmental Sociology*
- _____ (3) FNR NRES-21000 Natural Resource Information Management
- _____ (3) MA 16010 Applied Calculus I (*satisfies Quantitative Reasoning for core*)
- _____ (3) ~~Math or Statistics Selective~~ MA 16020 Applied Calculus II
- _____ (3) POL 22300 Introduction to Environmental Policy
- _____ (3) STAT 30100 Elementary Statistical Methods (*satisfies Information Literacy for core*)
- _____ (2) BIOL 28600 Introduction to Ecology and Evolution*
- _____ (3) Science Communication Selective
- _____ (3) Data Science Selective
- _____ (1-3) ~~PHY 15200 or 17200~~
- _____ (3) Microeconomics Selective (*satisfies Human Culture Behavioral/Social Science for core*)
- _____ (3) UCC Humanities Selective (*Human Cultures Humanities for core*)
- _____ (3) Social Science Selective
- _____ (3) Humanities or Social Science Selective
- _____ (3) Humanities or Social Science Selective (30000+ level)
- _____ (3-4) ENGL 10600* or ENGL 10800* or HONR 19903* (*satisfies Written Communication for core*)
- _____ (3) COM 11400* or COM 11700* or EDPS 31500* (*satisfies Oral Communication for core*)
- _____ (3) Written or Oral Communication Selective

Electives (12-1416 credits)

(12-1416) Elective

University Core Requirements (<http://www.purdue.edu/provost/initiatives/curriculum/course.html>)

Human Cultures Humanities	<input type="checkbox"/>	_____	Science, Technology & Society Selective	<input type="checkbox"/>	_____
Human Cultures Behavioral/Social Science	<input type="checkbox"/>	_____	Written Communication	<input type="checkbox"/>	_____
Information Literacy	<input type="checkbox"/>	_____	Oral Communication	<input type="checkbox"/>	_____
Science Selective	<input type="checkbox"/>	_____	Quantitative Reasoning	<input type="checkbox"/>	_____
Science Selective	<input type="checkbox"/>	_____			

College of Agriculture & University Level Requirements (https://ag.purdue.edu/oap/Pages/core_requirements.aspx)

3 credits Multicultural Awareness	<input type="checkbox"/>	_____				
9 credits International Understanding	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
9 credits of Hum. And/or Social Sciences outside the College of Agriculture	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____	<input type="checkbox"/>	_____
3 credits of Hum. And/or Social Science at 30000 or higher	<input type="checkbox"/>	_____				

Suggested Arrangement of Courses:

Credits	Fall 1st Year	Prerequisite	Credits	Spring 1st Year	Prerequisite
0.5	AGR 10100 Introduction to the College of Agriculture and Purdue University		3	CHM 11200 General Chemistry II	CHM 11100
0.5	AGR 12200 Introduction to Natural Resources and Environmental Science Academic Programs		3-4	ENGL 10600 or ENGL 10800 or HONR 19903	
3	CHM 11100 General Chemistry		3	Math or Statistic Selective MA 16020 Applied Calculus II	
3	COM 11400 or COM 11700 or EDPS 31500		3	Social Science Selective	
3	MA 16010 Applied Calculus I	ALEKS 75+	3	Elective	
3	NRES 12500 Environmental Science & Conservation				
3	Elective				
16			15-16		

Credits	Fall 2nd Year	Prerequisite	Credits	Spring 2nd Year	Prerequisite
4	BIOL 11000 Fundamentals of Biology I or BTNY 12000 Introduction to Plant Science I		1	AGRY 33800 Environmental Hydrology Laboratory	
3	NRES 25500/AGRY 27000 ^{cc} Soil Science	CHM 11100	4	BIOL 11100 Fundamentals of Biology II or BTNY 12100 Introduction to Plant Science II	
3	POL 22300/FNR 22310 Introduction to Environmental Policy		2	BIOL 28600 Intro. To Ecology and Evolution	
3	STAT 30100 Elementary Statistical Methods		1	NRES 20000 Introduction to Environmental Careers	
1-3	PHY 15200 or 17200 Broadening Science Selective		3	NRES 23000 Survey of Meteorology or AGRY 33500 Weather and Climate	
			3-4	Elective	
14-16			14-15		

Credits	Fall 3rd Year	Prerequisite	Credits	Spring 3rd Year	Prerequisite
3-4	CHM 25700 or 25500 Organic Chemistry	CHM 11200	3	EAPS 32000 Physics of Climate	
1	NRES 42000 Internship Reporting		3	FNR 21000 Natural Resource Information Management	
3	POL 32700 Global Green Politics		3	FNR 37500 Human Dimensions of Nat Res or SOC 34400 Env. Sociology	
3	Data Science Selective		3	Climate and Energy Concentration Selective	
3	Microeconomics Selective		3	Written or Oral Communication Selective	
3	UCC Humanities Selective				
16-17			15		

Credits	Fall 4th Year	Prerequisite	Credits	Spring 4th Year	Prerequisite
3	AGEC 40600 Natural Resource and Environmental Economics	AGEC 20300	6	Climate and Energy Concentration Selectives	
2	NRES 49700 Current Topics in Env. Science		3	Humanities or Social Science Selective (30000+ level)	
3	Climate and Energy Concentration Selective		3-4 2-6	Electives	
3	Humanities or Social Science Selective				
3	Science Communication-Selective				
14			12-13 11-15		

- 1) 120 credits listed above are required for the AGBS Bachelor of Science degree.
- 2) 2.0 Graduation GPA required for Bachelor of Science degree.
- 3) 32 credits of upper division courses (30000 level or higher) must be taken at Purdue University, West Lafayette.
- 4) ANY COURSE TAKEN AT PURDUE CAN BE ATTEMPTED NO MORE THAN THREE TIMES (INCLUSIVE OF W, WF, I AND IF).
- 5) * is considered a critical course

See next page for all supplemental information

The student is ultimately responsible for knowing and completing all degree requirements.
 myPurdue Plan is knowledge source for specific requirements and completion

Natural Resources & Environmental Science: Climate and Energy Solutions

Supplemental Information

All prerequisites must be met

¹University Core Curriculum Humanities Selective (3 credits)

See approved Humanities list at: <http://www.purdue.edu/provost/initiatives/curriculum/course.html>

²University Core Science, Technology & Society Selective (3 credits)

See approved Humanities list at: <http://www.purdue.edu/provost/initiatives/curriculum/course.html>

³Climate and Energy Selective (12 credits)

ANTH 21000 Technology and Culture

AD 39700 Sustainability in the Built Environment

ASEC 35500 Controversial Science and Media in the Public Sphere

~~ASEC 58500 Science Communication~~

EAPS 102900 The Dynamic Earth ~~System Dynamics~~

~~EAPS 22500 Science of the Atmosphere~~

EAPS 31500 Biogeochemistry

~~EAPS 32000 Physics of Climate~~

EAPS 32700 Climate, Science, and Society

EAPS 37500 Great Issues – Fossil Fuels, Energy, and Society

EAPS 42000 Global Change Modeling

EAPS 53000 Extreme Weather and Climate: Science and Risk

~~ECET 12000 Gateway to Electric Engineering Technology~~

ECET 22400 Electronic Systems

~~ECET 27300 Modern Energy Systems~~

~~ECET 53500 Energy Sustainability~~

~~EE/CE~~ 35500 Engineering Environmental Sustainability

EPCS 40100 or 40200 Senior Participation in EPICS

MET 53000 Facilities Engineering Technology

NRES ~~28000~~ 38010 Hazardous Waste Handling

PHIL 40300 Moral Psychology and Climate Change

POL 42800 Politics of Regulation

****For additional selectives: see approved list at: https://ag.purdue.edu/oap/Pages/core_math-science.aspx#add**

**CoA Curriculum and Student Relations Committee
Approved Curricular Changes**

Part I. International Understanding -- Course for Consideration (The following course was brought to CSRC for consideration of being added to the International Understanding requirement. The vote to add the course was not unanimous at CSRC, thus it comes to the All College Faculty Meeting for consideration.)

International Understanding

HIST 38700 – History of the Space Age (syllabus is included at end of CSRC document)

Part II. Update to Core Curriculum Lists (For Information Only)

The Agricultural Faculty authorized the Curriculum and Student Relations Committee to adjust the lists of courses that may fulfill core curriculum requirements in undergraduate plans of study and to report changes to the total faculty. The Curriculum and Student Relations Committee has approved the following additions to the core curriculum lists.

Mathematics/Science

BTNY 53500 – Plant Disease Epidemiology

HORT 10100 – Fundamentals of Horticulture

Part II. Expiration of a course (For Information Only)

The Agricultural Faculty authorized the Curriculum and Student Relations Committee to approve expiration of courses and to report these to the total faculty. The Curriculum and Student Relations Committee has approved expiration of the following courses:

FNR 33900 Principles of Silviculture. Sem 1. 3 cr.

Justification: This course has been replaced by two courses, FNR 33800 – Introduction to Silviculture and FNR 43900 – Silviculture, that are specific to non-majors and majors in forestry, respectively.

FNR 35900 Spatial Ecology. Sem 2. 3 cr.

Justification: This course has been replaced by two courses, FNR 35910 – Spatial Ecology and FNR 35950 – Spatial Ecology Laboratory, that split the previous course into lecture and lab components to facilitate enrollment by both graduate students and students outside of FNR.

FNR 55100 Advanced Ichthyology. Sem 1. 3 cr.

Justification: This course has not been taught in over 5 years, and there are no plans to teach it again.

Part III. Modifications of a course (For Information Only)

AGEC 33300 - Food Distribution: A Retailing Perspective

Proposed Change: Change course pre-requisites to AGEC 20300 or AGEC 20400 or ECON 25100; drop MGMT 20000 or MGMT 20010 or MGMT 21200.

Justification: In the re-design of this course, students now need a foundation in microeconomics; management pre-reqs are no longer needed to be successful in the course.

Expected Impact to other Programs: Microeconomics and MGMT 20000/20010 are already required courses for all AGEC majors. Thus, this change is unlikely to have a significant impact on AGEC students, other than it may impact decisions on course sequencing. Proposed changes have been reviewed and approved by KRAN Assoc. Dean of Undergraduate Programs.

AGEC 34000 - International Economic Development

Proposed Change: Add ECON 21000 to the list of pre-requisite options. New full list of pre-reqs would be: AGEC 20300 or AGEC 20400 or AGEC 21700 or ECON 21000 or ECON 25100 or ECON 25200.

Justification: Students are currently granted exceptions for ECON 21000 to enroll in this course; however, it is not officially listed in the catalog. This change will improve transparency.

Expected Impact to other Programs: Since students can already receive an exception for ECON 21000 to enroll in this course, there should be minimal impact on other programs. Proposed changes have been reviewed and approved by KRAN Assoc. Dean of Undergraduate Programs.

AGEC 41000 - Agricultural Policy

Proposed Change: Add ECON 21000 to the list of macroeconomics pre-requisite options. New full list of pre-reqs would be: AGEC 22000 and AGEC 21700 or ECON 21000 or ECON 25200.

Justification: Students are currently granted exceptions for ECON 21000 to enroll in this course; however, it is not officially listed in the catalog. This change will improve transparency.

Expected Impact to other Programs: Since students can already receive an exception for ECON 21000 to enroll in this course, there should be minimal impact on other programs. Proposed changes have been reviewed and approved by KRAN Assoc. Dean of Undergraduate Programs.

AGEC 45000 - International Agricultural Trade

Proposed Change: Add ECON 21000 to the list of macroeconomics pre-requisite options. New full list of pre-reqs would be: AGEC 21700 or ECON 21000 or ECON 25200 and AGEC 20300 or AGEC 20400 or ECON 25100.

Justification: Students are currently granted exceptions for ECON 21000 to enroll in this course; however, it is not officially listed in the catalog. This change will improve transparency.

Expected Impact to other Programs: Since students can already receive an exception for ECON 21000 to enroll in this course, there should be minimal impact on other programs. Proposed changes have been reviewed and approved by KRAN Assoc. Dean of Undergraduate Programs.

AGEC 42700 - Advanced Agribusiness Marketing

Proposed Change: Add MGMT 32400 to the list of introductory marketing pre-requisite options. New full list of pre-reqs would be: AGEC 32700 or MGMT 32300 or MGMT 32400.

Justification: Students are currently granted exceptions for MGMT 32400 to enroll in this course; however, it is not officially listed in the catalog. This change will improve transparency.

Expected Impact to other Programs: Since students can already receive an exception for MGMT 32400 to enroll in this course, there should be minimal impact on other programs. Proposed changes have been reviewed and approved by KRAN Assoc. Dean of Undergraduate Programs.

AGEC 43000 - Agricultural and Food Business Strategy

Proposed Change: Add MGMT 32400 to the list of introductory marketing pre-requisite options. Add MGMT 30400 to the list of finance pre-requisite options. New full list of pre-reqs would be: AGEC 42400 or MGMT 30400 or MGMT 31000 and AGEC 32700 or MGMT 32300 or MGMT 32400.

Justification: Students are currently granted exceptions for MGMT 32400 and MGMT 30400 to enroll in this course; however, it is not officially listed in the catalog. This change will improve transparency.

Expected Impact to other Programs: Since students can already receive exceptions for MGMT 32400 and MGMT 30400 to enroll in this course, there should be minimal impact on other programs. Proposed changes have been reviewed and approved by KRAN Assoc. Dean of Undergraduate Programs.

AGEC 52400 - Agricultural Finance

Proposed Change: Add MGMT 30400 and MGMT 31000 to the list of finance pre-requisite options. New full list of pre-reqs would be: AGEC 42400 or MGMT 30400 or MGMT 31000 and Classification JR 60 or higher.

Justification: Students are currently granted exceptions for MGMT 30400 and MGMT 31000 to enroll in this course; however, it is not officially listed in the catalog. This change will improve transparency.

Expected Impact to other Programs: Since students can already receive exceptions for MGMT 30400 and MGMT 31000 to enroll in this course, there should be minimal impact on other programs. Proposed changes have been reviewed and approved by KRAN Assoc. Dean of Undergraduate Programs.

AGRY 32100 – Genetics Laboratory

Proposed Change: Update catalog description to: AGRY 32100 is a hands-on laboratory course that uses plants and microorganisms to demonstrate basic concepts of classical, molecular, and modern genetics. This course is designed to provide students with fundamental knowledge and skills for conducting genetics and molecular biology laboratory experiments. Students will gain experience with methods including but not limited to gel electrophoresis, DNA extraction, PCR, cloning, restriction digest analysis, phenotypic analysis, DNA sequencing, bioinformatics, SNP genotyping, qualitative gene expression analysis, and quantitative gene expression analysis. Students will learn how to plan and validate their laboratory experiments. The goal of this course is to prepare students to confidently perform and interpret experimental results in future laboratory courses or careers.

Justification: The current course description does not provide enough information to potential students about the class.

Expected Impact to other Programs: This change will not impact other programs

ANSC 31100 – Animal Breeding and Genetics

Proposed Change: Deletion of BIOL 24100 and BIOL 28000 as prerequisites for the course.

Justification: These courses were requested to be removed as pre-requisites during the Curricula Review Process. However, for some reason they were not removed from the Catalogue.

Expected Impact to other Programs: We do not expect any major impacts in other programs because the majority of ANSC students used to take AGRY 3200 to fulfill the prerequisites and a very limited number take BIOL 241 or BIOL 280”.

ASEC 30100 – Building Intercultural Partnerships

Proposed Change: Removal of all existing prerequisites

Justification: Course success is not based on pre-requisite completion. This will allow the course to be used to fulfill the University UCC Humanities elective. Updated syllabus follows.

Expected Impact to other Programs: As a University UCC Humanities elective, other programs would have an additional option for plans of study

BTNY 53500 – Plant Disease Management

Proposed Change: Change title to Plant Disease Epidemiology and course description to: Plant disease epidemics occur due to the suitable combination of various elements of the agroecosystem. Many plant pathogens and diseases have increased their geographic distribution and intensity in the U.S. and the world. A lack of epidemiological understanding can exacerbate problems and significantly challenge the management of diseases at the field level. This course is an introduction to the epidemiological basis of disease management strategies. The course includes concepts in botanical epidemiology, disease assessment and measurement, disease modeling, epidemics comparison, and a revision of the traditional plant disease control principles. Plant Disease Epidemiology is an upper-level course for students interested in plant pathology, agronomy, data-driven Ag, national or international agriculture, or closely related areas. Although some pathosystems are used as model systems, Plant Disease Epidemiology is not a “how-to” course on controlling specific plant diseases.

Justification: BTNY53500(Plant Disease Management) was initially developed by Dr. Cruz’s predecessor, Dr. Raymond Martyn. The original course covered an examination of principles, strategies, and technologies used in plant disease control. However, to develop adequate disease management strategies, students need to understand epidemiological concepts. Therefore, Dr. Cruz incorporated specific sections to help students understand key concepts of botanical epidemiology. It is therefore important to incorporate the words ‘Epidemiology’ into the course name. Because other faculty members are interested in teaching a course on disease management in the future, the decision on our last BTNY faculty meeting was to change the name of this course to Plant Disease Epidemiology.

Expected impacts to other programs: Dr. Cruz completely revamped a course that fills a gap in plant pathology courses at Purdue. This course builds upon concepts taught in BTNY 20800, BTNY 30100, BTNY 60500, and BTNY 52500, and adds more advanced practical and quantitative concepts based on a learn-by-doing approach. Emphasis on concepts prepares students

for adequate data analysis and gives them a foundation for real-life scenarios associated with plant disease epidemiology.

FNR 44400 – Arboricultural Practices

Proposed Change: Add Prerequisites: (Undergraduate Level BIOL 11100 Minimum Grade of D- or Undergraduate BTNY 11000 Minimum Grade of D- or Undergraduate BTNY 12000 Minimum Grade of D-) and Undergraduate Level FNR 22500 Minimum Grade of D-.

Justification: FNR has hired a new instructor for this course after the departure of Lindsay Purcell. The new instructor prefers that students have an understanding of native trees prior to taking the class (thus the prerequisite of FNR 22500 Dendrology) and also basic biological concepts.

Expected impacts to other programs: This course is not used by any other program (major or minor) so impacts should be minimal. Some students from outside of FNR who want to take Urban Forestry minor may need to take an additional course due to these prerequisites, but FNR 22500 can be used as a selective in that minor.

FNR 44500 – Urban Forest Issues

Proposed Change: Add Prerequisites: (Undergraduate Level BIOL 11100 Minimum Grade of D- or Undergraduate BTNY 11000 Minimum Grade of D- or Undergraduate BTNY 12000 Minimum Grade of D-).

Justification: FNR has hired a new instructor for this course after the departure of Lindsay Purcell. The new instructor prefers that students have an understanding of basic biological concepts. Understanding of native trees is more important for FNR 44400, so the prerequisite of FNR 22500 Dendrology is deleted from this course and added to FNR 44400.

Expected impacts to other programs: This course is not used by any other program (major or minor) so impacts should be minimal. Some students from outside of FNR who want to take the Urban Forestry minor may need to take an additional course due to these prerequisites.

FNR 55800 – Remote Sensing and Applications

Proposed Change: Change Schedule Types: Distance Learning, Laboratory, Lecture
May be offered at any of the following campuses:

West Lafayette Continuing Ed

West Lafayette

Justification: Instructor has developed an online-only version of this class.

Expected impacts to other programs: This course is not used by any other program (major or minor) so impacts should be minimal.

History of the Space Age

History 387, Spring of 2022, Monday/Wednesday/Friday, 9:30 to 10:20 am, UC 114
Michael G. Smith, Department of History, mgsmith@purdue.edu, office hours on email, or in-person before class or at an agreeable time (just let me know in advance). Our Teaching Assistants are Zachary Logsdon, Samantha Powell, and Jonathan Soucek.

This course surveys the history of the Space Age over the last century, including the development of rockets and ballistic missiles, the origins and challenges of space exploration, and the revolutionary applications of orbital technologies. We examine the history and legacies of the Cold War in space between the United States of America and its two major rivals: the Soviet Union and Communist China. We study how their different cultural values, political institutions, and military imperatives have determined the character of the first human ventures into outer space. We also explore such topics as: the Nazi rocket program, the Sputnik event, astronauts and cosmonauts, the moon missions, space disasters, the Strategic Defense Initiative (“Star Wars”), space stations, the Shuttle, the appearance of “New Space” entrepreneurship and innovation, and the prospects of human environments and “enhancements” in space. The course fulfills Purdue University’s core curriculum category in Science, Technology, and Society.

Readings

Smith, Michael G. *The Spacefaring Earth: A History of the Space Age* (Purdue University, 2022); this is a free, pre-publication, electronic version of our textbook, only for student use.
Zamyatin, Yevgeny. *We*, translated by Clarence Brown (Penguin, 1993).
Mindell, David. Selections, *Digital Apollo: Human and Machine in Spaceflight* (MIT Press, 2008).
We will also be reading several scholarly articles (listed below for the Third Essay).

Grading

The final grade is the average of two parts: the three essays are 50%, and the three examinations are 50%. Details about the essays and examinations are included below. These assignments require listening comprehension and note-taking in class; analytical and critical reading skills; and with the power of written and spoken expression. We do not assign mechanical points. Rather, we grade by the quality of your work according to the grading scale and your creative, interpretive synthesis of the course lectures and readings. Grading is based on a standard scale. Excellent: A+ (97-100), A (94-96), A- (90-93). Above Average: B+ (87-89), B (84-86), B- (80-83). Average: C+ (77-79), C (74-76), C- (70-73). Below average: D+ (67-69), D (64-66), D- (60-63). Below 60 is failing.

Several important policies apply. The classroom is device free. Please do not use your phone or laptop or any other electronic or recording devices during class, as this will be counted as an absence. Arrive at class on time. Extra credit is possible for those students who share substantive content in class sessions. According to [Purdue University’s Notes Policy](#), please do not record, sell, reproduce, or post the lecture notes without the professor’s permission. Late essays or examinations require the written prior agreement of the professor (email is fine). All students will take the final examination. With regard to academic honesty, we follow the high standards of the university’s [“Statement of Integrity.”](#)

Part I. The Rocket Pioneers

Week 1. Envisioning the Cosmos

10 January Introduction	12 January Plurality of Worlds	14 January Visions of Mars
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Read Smith Introduction and chapter 1

Week 2. Spaceflight Pioneers

17 January <i>Holiday</i>	19 January Russian Cosmism	21 January American Genesis
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Read Smith chapter 2

Week 3. Rocket States and War

24 January German-Soviet Advances	26 January The Nazi Regime	28 January The German V-2 Missile First Essay Due
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Read Smith chapter 3

Week 4. Strategic Power

31 January America's Rocket State	2 February Stalin's Missile Empire	4 February Allures of Space
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Read Smith chapter 4

Week 5. Sputnik's Challenge

7 February Satellite Pathways	9 February The Media Event	11 February First Examination
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Finish Smith chapter 4

The question for the First Essay is based on our reading of Evgeny Zamyatin's science-fiction novel, *We*. **How does the rocketry and spacefaring mission of the One State shape and conform humanity to its purposes? Who in the story is happy? Who is free?** This edition is available for purchase at the Purdue bookstore. Be sure to integrate the lectures and textbook readings in your own creative interpretation. Feel free to draw connections between the story and the history. As with all our writing, please do not use any outside sources without the professor's permission. Also see the Essay Instructions below.

Part II. The Space Race

Week 6. Orbits: Vostok and Mercury

14 February Vostok	16 February Mercury	18 February Space Capsules
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Read Smith chapter 5

Week 7. Terror: The Missile Race

21 February Mutual Assured Destruction	23 February Satellites and Planes	25 February Cuba's Missile Crisis
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Read Smith chapter 6

Week 8. Rendezvous: Voskhod and Gemini

28 February Voskhod	2 March Gemini	4 March Apollo
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Read Smith chapter 7

Week 9. Lunar Triumphs

7 March Initiatives	9 March Achievements	11 March Exploration Second Essay Due
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Read Smith chapter 8

Spring Break 14-18 March

Week 10. The Moon Race

21 March Soviet Moon Rockets	23 March Lunar Leaps and Lags	25 March Second Examination
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Finish Smith chapter 8

The question for the Second Essay is based on our reading of chapters 1, 5, and 9 in [David Mindell's Digital Apollo](#). **How did humans and machines interact in Project Apollo? Which was more essential to its success?** This e-book is free at the Purdue Libraries. I will also post the selections at Brightspace. Be sure to integrate the lectures and textbook readings in your own creative interpretation. As with all our writing, please do not use any outside sources without the professor's permission. Also see the Essay Instructions below.

Part III. The Fragile Species

Week 11. Our Biological Universe

28 March Extraterrestrials	30 March Planetary Probes	1 April The Conquest of Mars
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Read Smith chapter 9

Week 12. Stations: Living in Space

4 April Saliut's Stations	6 April Skylab and Apollo-Soiuz	8 April Human Body
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Read Smith chapter 10

Week 13. Earth and its Analogues

11 April The Biosphere	13 April Other Earths	15 April Existential Threats
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Read Smith chapter 11

Week 14. Star Wars and Space Shuttles

18 April Space Shuttle	20 April Strategic Defense	22 April The ISS Third Essay Due
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Read Smith chapter 12

Week 15. New Space

25 April Entrepreneurs	27 April Innovations	29 April Conclusions
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Read Smith Conclusion

Final Exam (to be announced for Finals Week, 2-7 May)

The question for the Third Essay is based on our reading of several scholarly articles on the future of spaceflight and “human enhancement.” **Will outer space become a realm of freedom or a realm of slavery for the human beings who venture there?** Please read: [“Transhumanism and Cosmic Travel;”](#) and [“In Pursuit of Perfection: The Misguided Transhumanist Vision.”](#) These articles are free from Purdue Libraries, and I will also post them at Brightspace. Be sure to integrate the lectures and textbook readings in your own creative interpretation. As with all our writing, please do not use any outside sources without the professor’s permission. Also see the Essay Instructions below.

Essay Instructions

The Essays are typed, double-spaced, properly cited, and 3 full pages of written text (avoid empty spacing). Please post a Word document at Brightspace by 5:00 pm on the due date. Use 12-point, New Time Roman font, page numbers, and 1-inch margins. Plagiarism results in automatic failure. Cite all sources using parenthesis-style “APA” notes (author and page number in a parenthesis at the end of a sentence), with a quick bibliography at the end (no need for an extra page).

The process of writing and revising is crucial. We grade the essays by content, form, and mechanics.

Content

The papers are analytical. Read your notes and all of the readings carefully. Assemble evidence. Balance the central reading (text) with the course lectures and readings (contexts). The essays are also interpretive. Craft your own argument around the research topic, supported by appropriate detailed evidence (facts about people, places, events, dates, ideas, or institutions). **Please ask the professor about using any outside source (beyond the course materials).**

Form

Begin with a short introduction and a well-defined thesis argument, one that includes several main ideas as support. These main ideas become introductory sentences for the unit paragraphs in the body of your argument. The paragraphs vary from half a page to a whole page. They follow one another in logical ways, building momentum towards a powerful synthesis. They offer factual evidence in the form of specific detail, vivid examples, anecdotes, and documentation.

Avoid short paragraphs back to back. Please avoid strings of quotations. Do not use any indented long quotes. **Do not write summary or repetitive conclusions.** End your essays with a final, captivating sentence that refers back to the main idea or thesis argument.

Mechanics

Sentences must maintain simplicity and clarity of expression, precision of meaning, and occasional creativity. Read your work carefully. If a sentence sounds even a bit awkward, rethink and revise it. **Essays with 3 or more spelling or major grammar mistakes lose half a letter grade.**

Do not use passive voice. Write with active subjects and verbs.

Do not write sentences that run-on too long. Alternate long and short sentences.

Do not use dangling participles: “on” or “up” or “with” at the end of a sentence.

Do not apply cliché or slang, anything that sounds too informal or awkward.

Do not use contractions: won't, don't; or words like however, hopefully, very, great, you.

Do not write “man” or “mankind.” Apply respectful terms: people, persons, they.

Do not use present, or misuse conditional tense (would, could). Write in past tense.

Do not misuse “their” and “there,” or “it” and “they” when referring back to your subject.

Examination Guidelines

The examinations are “take-home,” with open textbook and notes. Each student will work alone. Do not use the internet for information or ideas. The examinations are scheduled online at Brightspace for the 50 minutes of class time. I will also be at the classroom, just in case anyone needs a quiet and accessible space. The first midterms cover Part I and Part II of the course materials. **The final examination covers Part III with one extra cumulative question.**

Preparation

Build confidence and achieve success by preparing for it. It is far better to deal with the pressure of studying for an examination than with the pressure of trying to make up for a poor grade. The examinations test your ability to: confront and master the main issues and ideas and interpretations discussed in the course; and memorize factual material (people, places, events, dates, ideas, and institutions) from the class lectures, discussions, and all relevant readings.

Be sure to read the selections from our textbook, Michael G. Smith’s, *The Spacefaring Earth*, before each week’s Monday class time. That will help orient your knowledge. Return to it for select information and insights. The classroom lectures and discussions will also help us to organize knowledge and study for the examinations.

Structure

The three examinations ask students to answer two (2) essay questions. Each essay is worth fifty (50) points. Spend twenty (20) minutes writing each answer, using the extra time to think and prepare. **Do not repeat information.** Write clearly and precisely (trying not to misspell). Plagiarism of any kind will result in an automatic failure.

Advice

Take detailed notes of the lectures and discussions in class. These notes are an essential text.

Do not study “hard,” trying to memorize too many and different facts. Study “smart,” focusing on memorizing related sets of discrete facts (selected by you).

Read the questions carefully. If you have more than one choice, decide which one is easiest. Circle the most important words in the question in order to understand it better.

Think and plan. Time spent on planning is not lost. Rough outlines and idea maps allow you to use writing time more economically: you are not distracted; you generate new ideas before you write; you do not forget ideas already jotted down; you can concentrate on clear expression during the writing process; and you will recall new factual details as you write.

Write a complete answer. Begin with a sentence that clearly states your argument. Decide your main points. Then mobilize all the facts for support. Every sentence should be packed with details. Do not write general, unsupported statements. Do not write overly long, exhausting answers.

Budget your time. Spend an equal amount of time on each of your main points.

College of Agriculture
2022 December Graduation Candidate Roster
As of November 20, 2022

Subject to the approval of the Agricultural Faculty, the following graduation candidates who complete degree requirements during the current semester will be recommended to the Board of Trustees to receive their degrees as of December 17, 2022. Also the Dean of Agriculture, or her designee shall be authorized to act for the faculty regarding the certification of qualified candidates.

Name	Degree	Major	Conc 1	Minor 1	Minor 2
Abbey, Bian	BS	INAG		ANSC	
Acosta, Alexandria I.	BS	ASCI	PRMD	BIOS	
Adwell, Taylor J.	BS	AGBS	CMRK	ANSC	
Aguirre, Arianna G.	BS	ASCI	PRMD	BIOS	
Allen, Sabrina N.	BS	ASCI	PROD	FDAG	
Anderson, Wyatt E.	BS	AGEC	APAE		
Applegate, Rachel L.	BS	SUAS	AMGT		
Barnes, Jade N.	BS	AGBS	CMRK	ANSC	
Barrier, Savannah B.	BS	INAG		JPNS	WLFS
Beale, John M.	BS	FARM			
Berry, Lily G.	BS	PLSC		NREV	
Biggins, Cassidy M.	BS	AGBS	AGMG		
Biggins, Cassidy M.	BS	ASCI	ANAG		
Birch, Alexis N.	BS	ASCI	BEHV		
Blackwell, Robin M.	BS	HOSC	HPMK		
Boswell, Whitney L.	BS	AGBS	AGMG	FARM	
Brewington, Grace E.	BS	NREV	ENQR	ENPP	
Burnside, Kylee A.	BS	ASCI	PRMD		
Caldwell, Breawna E.	BS	AGBS	CMRK	FARM	
Caldwell, Breawna E.	BS	SUAS	AMGT		
Calhoun, Matthew J.	BS	HOSC	PUHT	LAND	PLBI
Caputo, Benjamin E.	BS	BCHM	PMED		
Carothers, Kaitlyn E.	BS	ASCI	PRMD	BIOS	
Chambon, Paul M.	BS	WLDL			
Champney, Parker W.	BS	ASCI	PRMD		
Chang, Tiffany	BS	ASCI	PRMD		
Chiang, Lee-En	BS	ASCI	PRMD		
Chris, Alexander T.	BS	INAG		SFS	
Clapp, Camryn J.	BS	SLMK		OLSV	
Coomes, Molly E.	BS	AGBS	AGMG		

Name	Degree	Major	Conc 1	Minor 1	Minor 2
Cord, Lily A.	BS	ASCI	PRMD		
Craig, Emily V.	BS	WLDL		AQSC	
Crowel, Evan M.	BS	FARM			
Cuellar, David	BS	ASCI	BISC	MGMT	
Ehmen, Noah D.	BS	WLDL		AQSC	
Escamilla, Isabella P.	BS	SUAS	AMGT	CRTV	ENGL
Freehill, Benjamin M.	BS	AGBS	AGMG		
Georgiefski-Rios, Sonja A.	BS	WLDL		FOEC	
Gossage, Brooke E.	BS	ASCI	BISC		
Guffey, Skylar J.	BS	BCHM		AQSC	
Hammock, Sydney M.	BS	SLMK		FARM	
Hamrick, Noah C.	BS	AGED			
Hankins, Kara A.	BS	ASCI	ANAG	FARM	
Hart, Natalie A.	BS	AGED			
Hayden, Bryce M.	BS	AGED			
Heinold, Jayson M.	BS	AGBS	AGFN		
Heinold, Jayson M.	BS	ASCI	ANAG		
Helfrich, Caden W.	BS	ASCI	PRMD		
Hinkle, Olivia R.	BS	INAG		CRPS	
Hurst, Victoria L.	BS	ASCI	BISC		
Johnson, Gabriella F.	BS	ASCI	PRDT		
Jones, Amanda H.	BS	INAG		ANSC	
King, Jaden R.	BS	PLSC			
Kramer, Emma E.	BS	NREV	WQTY	SOIL	EEE
Kutemeier, Anne E.	BS	ASCI	PRMD	BIOS	
Laux, Lauren M.	BS	WLDL			
Lengel, Ashley A.	BS	ASCI	ANAG	LAWS	
Lenzini, Abigail H.	BS	NREV	ENQR	ECON	
Lerma, Hannah M.	BS	PLSC			
Lohrey, Hayden C.	BS	AGBS	AGMG	NREV	
Lubeck, Valerie A.	BS	SLMK			
Martin, Taylor E.	BS	ASCI	PRMD		
Matthews, Cameron M.	BS	AGCM			
Matthews, Cameron M.	BS	BCHM			
McPheron, Tyler J.	BS	ASM			
Miller, Marlea B.	BS	AGBS	AGMG	HORT	
Moore, Grace E.	BS	SFS		HORT	
Morgan, Crystn M.	BS	ASCI	PRMD		
Morrison, Garrett S.	BS	AGEC	CMRK		
Murphy, Madeline D.	BS	AQSC	FISH		
Myrehn, William P.	BS	TMGT			

Name	Degree	Major	Conc 1	Minor 1	Minor 2
Nealy, Audree S.	BS	AQSC	MAFB		
Nelson, Brandon A.	BS	INAG		WLFS	
Nelson, Brook M.	BS	HOSC	PUHT		
Nelson, Shalyn K.	BS	SUAS	ABMK	FDAG	
Nierman, Ryland I.	BS	ASCI	ANAG		
O'Hara, Connor D.	BS	WLDL			
Oakes, Katherine K.	BS	AGBS	AGMG	FARM	
Overman, Calista L.	BS	AGED			
Owens, Cassidy M.	BS	ASCI	PRDT	PSY	
Parsons, Kaitlyn M.	BS	AGED			
Parsons, Kaitlyn M.	BS	SHSC			
Payton, Kendra A.	BS	WLDL			
Peas, Logan R.	BS	AGBS	AGFN		
Pigg, Ruby G.	BS	ASCI	PRMD		
Price, Jarrett K.	BS	TMGT			
Radtke, Timothy J.	BS	WLDL		FAQS	
Rasmussen, Bram A.	BS	BCHM		BTCH	
Redinger, Drew T.	BS	AGBS	AGMG		
Reed, David A.	BS	AGED			
Rehmel, Cassidy J.	BS	IBIO			
Renbarger, Ashlyn M.	BS	ASCI	PRMD		
Retzloff, Juan S.	BS	IBIO			
Richards, Kierra M.	BS	INAG		WLFS	
Risner, Eryn D.	BS	ASCI	PROD		
Rodgers, Hannah C.	BS	BCHM			
Rosen, Cole R.	BS	AGBS	AGMR		
Salas Camminati, Sebastian E.	BS	SUAS	AMGT		
Selm, Isaac J.	BS	SUAS	AMGT	FDAG	
Shafer, Colin L.	BS	ASCI	PRMD		
Sickle, Zachary A.	BS	SUAS	AMGT		
Smith, Sydney N.	BS	AGED			
Soonthornsima, Kyle S.	BS	ASM	DAIS	CNIT	FDAG
Spaw, Chase	BS	AQSC	FISH	WLFS	
Spiros, Evan J.	BS	AGBS	AGMG	POL	
Spurgeon, Emma R.	BS	SUAS	ABMK	FARM	
Spurgeon, Levi T.	BS	AGED		HORT	CRPS
Stafford, Justin D.	BS	AGBS	AGMG		
Stagg, Jessica N.	BS	ASCI	PROD		
Standeford, Krista A.	BS	ASCI	BISC		
Stanley, Colin J.	BS	ASM		FDAG	
Sullivan, Hannah L.	BS	ASCI	PROD		

Name	Degree	Major	Conc 1	Minor 1	Minor 2
Surman, Maria I.	BS	INAG		AQSC	
Swank, Shelby J.	BS	AGBS	AGMG	FARM	
Switzer, Jonah T.	BS	AQSC	FISH		
Thatcher, Luke R.	BS	NREV	ENQR		
Thomas, Megan D.	BS	ASCI	PRMD		
Trebley, Aaron R.	BS	SUAS	ABMK	FDAG	
Tribbett, Jaiden J.	BS	AGBS	AGMG	ANSC	
Tuinstra, Caden R.	BS	BCHM	PMED		
Van Eekeren, Christopher A.	BS	AGBS	AGMG		
Wagner, Ryan C.	BS	AGBS	AGMR		
Walker, Kaseton M.	BS	AGBS	AGMG		
Warren, Chase M.	BS	AGBS	AGMG		
Waterman, Jonathan T.	BS	WLDL			
Weaver, Kylie A.	BS	ASCI	PRMD		
Westmoreland, Chloe R.	BS	WLDL			
Wilson, Connor R.	BS	AGBS	AGMG		
Woods, Camille R.	BS	ASCI	BEHV		
Worley-Peterson, Amy K.	BS	NREV	ENPE		
Wu, Jamie Yu-Che	BS	SUAS	AMGT	PLBI	
Young, Kaitlyn E.	BS	WLDL			

Bachelor of Science in Agricultural Engineering

Law, Wyatt A.	BSAGE	XEAG			
Sall, Sokhna R.	BSAGE	ENRE		NAVL	

Bachelor of Science in Biological Engineering

Abraham, Natasha	BSBE	BIEN	PHPE	PSY	
Dervishian, Sonya A.	BSBE	BIEN	CBOE	BTCH	PSY
Enweonwu, Samuel U.	BSBE	BIEN	CBOE	BTCH	
Gin, Aaron J.	BSBE	BIEN	CBOE	ECON	BTCH
Hegarty, Anthony P.	BSBE	BIEN	CBOE	BTCH	
Jaganmohan, Shrishti	BSBE	BIEN	PHPE		
Reddy, Tara S.	BSBE	BIEN		PSY	

Bachelor of Science in Forestry

Flatt, Cole M.	BSFOR	FORS	SUBO		
Laux, Lauren M.	BSFOR	FORS			
O'Connor, Andrew M.	BSFOR	FORS	FRMG	SPNS	
Waterman, Jonathan T.	BSFOR	FORS			