Date Submitted: 11/17/23 1:33 pm

Viewing: 10KP5163BS : Agricultural & Biological Engineering, BS

Last approved: 04/05/22 2:03 pm

Last edit: 03/28/24 9:04 am

Changes proposed by: Kent Rausch

Catalog Pages Using this Program	Agricultural & Biological Engineering: Agricultural Engineering, BS Agricultural & Biological Engineering: Biological Engineering, BS

Proposal Type:

In Workflow

1. **U Program Review**
2. **1741 Committee Chair**
3. **1741 Head**
4. **1227 Head**
5. **KL Committee Chair**
6. **KP Committee Chair**
7. **KL Dean**
8. **KP Dean**
9. **University Librarian**
10. **COTE Programs**
11. **Provost**
12. **Senate EPC**
13. Senate
14. U Senate Conf
15. Board of Trustees
16. IBHE
17. HLC
18. DMI

Approval Path

1. 11/28/23 2:18 pm
   Donna Butler (dbutler):
   Approved for U Program Review
2. 12/12/23 11:13 am
   Kent Rausch (krausch):
   Approved for 1741 Committee Chair
3. 12/12/23 8:27 pm
   Ronaldo Maghirang (ronaldom):
   Approved for 1741 Head

4. 12/13/23 3:21 pm
   Ashley Hallock (ahallock):
   Approved for 1227 Head
5. 12/13/23 3:29 pm
   Brianna Gregg (bjgray2):
   Approved for KL Committee Chair
6. 03/08/24 8:57 am
   Ashley Hallock (ahallock):
   Approved for KP Committee Chair
7. 03/08/24 12:22 pm
   Anna Ball (aball):
   Approved for KL Dean
8. 03/08/24 12:31 pm
   Michael Stoller (stoller4):
   Approved for KP Dean
9. 03/18/24 10:23 am
   Claire Stewart (clairest):
   Approved for University Librarian
10. 03/18/24 10:41 am
    Suzanne Lee (suzannel):
    Approved for COTE Programs
11. 03/21/24 10:38 am
    Brooke Newell (bsnewell):
    Approved for Provost

History

1. Dec 11, 2018 by Deb Forgacs (dforgacs)
2. Dec 15, 2018 by Deb Forgacs (dforgacs)
3. Jul 31, 2019 by Deb Forgacs (dforgacs)
4. Feb 26, 2020 by Brooke Newell (bsnewell)
5. Mar 31, 2020 by Deb Forgacs (dforgacs)
6. Apr 14, 2020 by Deb Forgacs (dforgacs)
7. May 13, 2020 by Deb Forgacs (dforgacs)
8. Oct 11, 2021 by Brooke Newell (bsnewell)
9. Apr 5, 2022 by Kent Rausch (krausch)

Major (ex. Special Education)

This proposal is for a:
Revision

Administration Details

Official Program Name	Agricultural & Biological Engineering, BS	
Diploma Title	Bachelor of Science in Agricultural and Biological Engineering	
Sponsor College	Grainger College of Engineering ~~Agr, Consumer & Env Sciences~~	
Sponsor Department	Engineering Administration ~~Agricultural & Biological Engr~~	
Sponsor Name	Ronaldo Maghirang, Kent Rausch	
Sponsor Email	ronaldom@illinois.edu, krausch@illinois.edu	
College Contact	Ashley Hallock ~~Jonathan Makela~~	College Contact

Email	ahallock@illinois.edu ~~jmakela@illinois.edu~~
College Budget Officer	Tessa Hile
College Budget Officer Email	tmhile@illinois.edu

List the role for rollbacks (which role will edit the proposal on questions from EPC, e.g., Dept Head or Initiator) and/or any additional stakeholders. Purpose: List here who will do the editing work if proposal needs rolled back. And any other stakeholders.

Ashley Hallock, ahallock@illinois.edu; Brianna Gregg, bjgray2@illinois.edu; ~~Brooke Newell, bsnewell@illinois.edu;~~ Ronaldo Maghirang, ronaldom@illinois.edu (ABE head); Kent Rausch, krausch@illinois.edu (ABE CnC editing)

Does this program have inter-departmental administration?

Yes

Interdisciplinary Colleges and Departments (list other colleges/departments which are involved other than the sponsor chose above)

Please describe the oversight/governance for this program, e.g., traditional departmental/college governance. Inclusion of/roles of elected faculty committees? Inclusion of/roles of any advisory committees.

Agricultural & Biological Engineering (ABE) programs are governed through a Courses and Curricula committee consisting of ABE faculty and ex officio officers. ~~Faculty are housed in the College of Agricultural, Consumer and Environmental Sciences (ACES), while~~ ABE students graduate through the Grainger College of Engineering. Curricula changes are reviewed by the Grainger College of Engineering as well as the College of ACES. As an engineering curriculum, the ABE degree programs are reviewed and accredited by the Accreditation Board for Engineering and Technology (ABET).

College	Agr, Consumer & Env Sciences ~~Grainger College of Engineering~~
Department	Agricultural & Biological Engr ~~Engineering Administration~~

Is there an additional department involved in governance?

No

Proposal Title

Effective Catalog Term	Fall 2024

Proposal Title (either Establish/Revise/Eliminate the Degree Name in Program Name in the College of XXXX, i.e., Establish the Bachelor of Science in Entomology in the College of Liberals Art and Sciences, include the Graduate College for Grad Programs)

Revise the Bachelor of Science in Agricultural and Biological Engineering in the Grainger College of Engineering

Does this proposal have any related proposals that will also be revised during the next 6 weeks? Consider Majors, Minors, Concentrations & Joint Programs in your department. Please know that this information is used administratively to move related proposals through workflow efficiently. Example: If you are revising the BS proposal and one related concentration within the next 6 weeks, "This BS proposal (key 567) is related to the Concentration A proposal (key 145)."

As part of the revision to the ABE BS (key 507) six concentrations are proposed, replacing the two existing concentrations (Agricultural, Biological):
1. Bioprocess Engineering and Industrial Biotechnology (BEIB), key 1176
2. Off-Highway Vehicle and Equipment Engineering (OHVEE), key 1174
3. Renewable Energy Systems Engineering (RESE), key 1178
4. Soil and Water Resources Engineering (SWRE), key 1175
5. Sustainable Ecological and Environmental Systems Engineering (SEESE), key 1177
6. Synthetic Biological Engineering (SBE), key 1179

The Agricultural Engineering and Biological Engineering concentrations within the ABE BS (keys 732 and 733, respectively) are being phased down.

Program Justification

Provide a brief description of what changes are being made to the program.

1. Orientation and Professional Development section - increased from 2 to 3 hours. Removed ABE 100 (1 hour) and added ABE 127 (2 hours).

2. ABE Technical Core is increased from 31 to 36 hours. Removed 5 courses: ABE 141, ABE 223, ABE 224, ABE 225, and ABE 226 (10 hours total). Added 6 courses: ABE 128, ABE 227, ABE 228, ABE 340, IE 300 or STAT 400 (15 hours total).

3. Additional course options were added as part of the introductory economics requirement. The economics course list was revised from ECON 102, ECON 103, or ACE 100 to now include ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255. Thus, we removed ECON 103 and added ACE 210, ACE 251, and ACE 255 as additional course options.

4. Six new concentrations are proposed; each new concentration is 30 hours. Two existing concentrations within ABE (Agricultural, Biological) are being phased down; previous concentrations were 35 to 36 hours.

Total overall hours for the program are unchanged (128 hours).

Did the program content change 25% or more in relation to the total credit hours, since the 2020-2021 catalog. (http://catalog.illinois.edu/archivedacademiccatalogs/2020-2021/)

Yes

Why are these changes necessary?

Revisions to the Agricultural and Biological Engineering (ABE) major will provide a clearer progression of introductory fundamental ABE courses during years 1 and 2, followed by distinctive concentrations in focused career fields in years 3 and 4. New concentrations will communicate to potential students and employers the capabilities of students graduating from the ABE major with one of the concentrations. Feedback from the Academic Program Review and from the Accreditation Board for Engineering and Technology (ABET) both noted that the ABE curriculum had not been updated for several years.

1. Orientation and Development course ABE 127 (2 hours) was created to cover orientation topics in more depth than the previous ABE 100 (1 hour). This will aid forming community within the first year cohort. The previous 8 week format did not connect immediately with students nor did it offer enough orientation content to prepare students for success in subsequent semesters.

2. Revisions to Technical Core courses (from 31 to 36 hours). New courses (ABE 128, 227, 228, 340) are added to show interconnectedness of the agricultural and biological engineering discipline, and to strengthen computational aids for solving problems in ABE. Previous courses (ABE 141, 223, 224, 225, 226) were arranged in compartmentalized silos and are now eliminated. New courses provide a holistic view of the diverse opportunities and capabilities within the ABE discipline while assisting recruitment and retention. We are also updating course content to integrate computational and communication skills, laboratory and field experiences, teamwork and ethics. These courses will have a more cohesive flow while providing a holistic approach to this field of engineering, allow first year and sophomore students to make a well-informed decision on the choice of concentration, and provide appreciation for commonalities across the discipline.

ABE 128 (3 hours) will be focused on applied biology for ABE majors; ABE 227 and 228 will introduce students to broad aspects of the ABE discipline using computer aided problem solving (6 hours total). ABE 340 (3 hours) is thermodynamics specific to the ABE discipline and is now required for all majors. A statistics course is now required for all ABE majors whereas previously it was required only for students in the Agricultural Engineering concentration. All students will select from IE 300 (Analysis of Data) or STAT 400 (Statistics and Probability I).

3. There is a minor revision to the list of economics course options. The introductory economics requirement has been broadened and can now be fulfilled by choosing one of the following: ACE 100 (Introduction to Applied Microeconomics); ECON 102 (Microeconomic Principles); ACE 210 (Environmental Economics); ACE 251 (The World Food Economy); and ACE 255 (Economics of Food and Environmental Justice). ECON 103 (Macroeconomic Principles) was removed as it was determined to be not as essential as other introductory economics courses and is not a prerequisite for any courses in the ABE-BS program.

4. Each of the six new concentrations require 30 credit hours and more clearly convey student capabilities upon graduation. Concentrations are:
Bioprocess Engineering and Industrial Biotechnology (BEIB),

Off-Highway Vehicle and Equipment Engineering (OHVEE),
Renewable Energy Systems Engineering (RESE),
Soil and Water Resources Engineering (SWRE),
Sustainable Ecological and Environmental Systems Engineering (SEESE), and
Synthetic Biological Engineering (SBE).

Concentration names are aimed to eliminate recurring confusion by more clearly articulating unique capabilities desired by employers and students alike within the ABE discipline. The programs balance broad engineering fundamentals with specialized courses that will serve students long term in their chosen career paths. New concentrations are more descriptive and focused than previously, aiding student recruitment, retention and employment. While introductory courses have been revised to improve the student experience, the rest of the curriculum in terms of faculty workload is not changed. New concentrations arrange current upper level courses within the department and across campus to clearly demonstrate unique focus areas.

Existing Agricultural Engineering and Biological Engineering concentrations are being phased down. Students and potential employers alike were not able to understand capabilities based on the concentration names, resulting in confusion as students communicated with potential employers.

The minimum 40 hours of upper-division classes for IBHE requirement are met by:
• 12 hours of 300- and 400-level core coursework
o ABE 340 (3 hours)
o ABE 430 (2 hours)
o ABE 469 (4 hours)
o IE 300 or STAT 400 (3 hours)
• 18 hours 200 level coursework with 2 or more prerequisites within the core coursework:
o ECE 205 (3 hours) - prerequisite of PHYS 212 and MATH 241 and PHYS 211
o MATH 241 (4 hours) - prerequisites of MATH 231 and MATH 220 or 221
o PHYS 211 (4 hours) - prerequisites of MATH 231 and MATH 220 or 221
o PHYS 212 (4 hours) - prerequisites of MATH 241 and PHYS 211
o TAM 211 (3 hours) - PHYS 211, MATH 241 or 257
• 19-26 hours of 300- and 400-level classes individually specified, including concentration elective courses

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

No

Does this new program/proposed change result in the replacement of another program?

No

Does the program include other courses/subjects outside of the sponsoring

department impacted by the creation/revision of this program?	Yes
Courses outside of the sponsoring department/interdisciplinary departments	~~MATH 257~~ - ~~Linear Algebra w Computat Appl~~ ~~MATH 225~~ - ~~Introductory Matrix Theory~~ ~~PHYS 213~~ - ~~Univ Physics:Thermal Physics~~ ~~TAM 210~~ - ~~Introduction to Statics~~ ~~TAM 211~~ - ~~Statics~~ ACE 210 - Environmental Economics ACE 251 - The World Food Economy ACE 255 - Econ of Food & Enviro Justice IE 300 - Analysis of Data STAT 400 - Statistics and Probability I ECE 205 - Electrical & Electronic Ckts ECON 103 - Macroeconomic Principles
Please attach any letters of support/acknowledgement for any Instructional Resources consider faculty, students, and/or other impacted units as appropriate.	STAT.pdf ACE.pdf ~~IE.pdf~~ ECON 103 Acknowledgement.pdf

Program Regulation and Assessment

Plan to Assess and Improve Student Learning

Illinois Administrative Code: 1050.30(b)(1)(D) Provision is made for guidance and counseling of students, evaluations of student performance, continuous monitoring of progress of students toward their degree objectives and appropriate academic record keeping.

List the program's student learning outcomes. Each outcome should identify what students are expected to know and/or be able to do upon completing this program.

~~The department of Agricultural and Biological Engineering has undergraduate curriculum program education objectives (PEOs) that prepare our graduates to succeed in their career activities relating to the ABEdiscipline.These PEOsare:Objective1:Enter the agricultural and biological engineering profession as practicing engineers and consultants with prominent companies and organizations in diverse areas that include agricultural and off-road equipment manufacturing and automation, food and fiber processing, renewable energy production, environmental conservation and water quality engineering, indoor environmental control, systems informatics and analysis, or other relatedfields.Objective2:Pursue graduate education and research at major research universities in agricultural and biological engineering and relatedfields.Objective3:Advance in their chosen fields to supervisory and managementpositions.Objective4:Engage in continued learning through professionaldevelopment.Objective5:Participate in and contribute to professional societies and communityservices.These PEOs were developed and are regularly reviewed by our constituent groups to evaluate, revise and refocus issues relating to the ABE BSprogram.These constituent groupsare:Students – The purpose of the PEOs is to prepare undergraduate students for employment in agricultural and biological engineering and relatedfields.Students are served by all fivePEOs.Alumni – ABE alumni are considered a valuable asset to the development and evaluation of the ABE Program EducationalObjectives.They are served directly by PEOs 2, 3, 4 and 5 as they continue their professionalcareers.Employers – The overall expected student outcome of ABE PEOs is to prepare qualified professional engineers for agricultural and biological engineeringfields.Employers are served directly by objectives 1, 3, 4 and5.This process allows for continued assessment and improvement to our curricula and to maintain quality and vitality of ABEprograms.~~The Agricultural ~~ABE Courses~~ and Biological Engineering BS is accredited by ~~Curriculum Committee and~~ the Engineering Accreditation Commission ~~ABE Faculty Advisory Committee work with department administration to maintain and revise PEOs. The ABE Outcomes and Assessment Committee manages the processes~~ of ABET, Inc. ~~the development, collection and summarization of PEO review data collection.~~ (abet.org).

In accordance with the ABET educational criteria, the program has been developed so that graduates will have:

~~StudentOutcomes:The seven student outcomes for the agricultural and biological engineering programare:~~1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

3. an ability to communicate effectively with a range of audiences.

4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Students ~~Participation in the senior exit interviews and the completion of the written senior exit questionnaire~~ are assessed on these seven educational criteria in the required classes. ~~voluntary. Process for Review of the Program EducationalObjectives:The process of periodical reviews is an ongoing continuous improvementprocess.~~Data is collected in alternating years on student achievement, ~~The ABE Course~~ and reviewed by ~~Curriculum Committee and~~ the curriculum committee, ~~ABE Faculty Advisory Committee work~~ with feedback to the faculty in ~~department administration to maintain and revise~~ the required courses. ~~program educational objectives. The ABE Outcomes and Assessment Committee manages the processes of the development, collection and summarization of the program education objectives review datacollection.Student senior exit interviews are conducted by theHead.A written senior exit survey questionnaire is provided to each graduating senior at the end of the last semester ofenrollment.~~The faculty document changes made ~~All graduating seniors are asked~~ to their courses ~~participate~~ in response ~~a focus group~~ to ~~discuss~~ the review ~~nature~~ of assessment data. ~~their undergraduate experience. Participation in the senior exit interviews and the completion of the written senior exit questionnaire are voluntary.The information provided by the senior exit interview and questionnaires are compiled by the ABE Undergraduate Program Coordinator.The summary information is provided to the ABE Administration, the ABE Faculty Advisory Committee and the ABE Course and Curriculum Committee.The information is used to review the program educational objectives.Alumni surveys also are used.ABE alumni are surveyed after graduation at 2, 5 and 10 year intervals post graduation.A survey form is sent to each available alumnus via electronic media.Completed forms are compiled in a summary format.The information is available to the ABE faculty, administration and Courses and Curriculum Committee for reviewing the objectives.Feedback from employers is provided by the ABE External Advisory Committee and companies representatives that work with the senior design team projects.The ABE External Advisory Committee meets on an annual basis with ABE administration, students, faculty and staff.The Committee provides feedback relative to PEOs as part of a committee report.This report is provided to faculty, administration and staff as a written report and a discussion presentation.Companies sponsor the ABE senior industry linked design projects, and representatives from these companies provide feedback to students and faculty about students' preparedness upon completion of the projects.This information is considered very useful in assessing and reviewing the program educational objectives.Alumni surveys also are used to assess involvement of ABE graduates in the ABE profession.Participation in professional meetings and conferences is not formally assessed, but efforts are made on behalf of the ABE department to connect with graduates in professional activities through~~

~~the ABE department to connect with graduates in professional careers through departmental sponsored receptions at annual ASBAE International Meetings, local ASABE section meetings, the Grainger College of Engineering annual open house, College of ACES annual ExplorACES open house, an annual ABE@Illinois on-campus event for all alumni and annual homecoming activities in conjunction with university events.These activities are not formally assessed, but they are discussed by the ABE department relative to our program quality and program educational objectives.~~

Describe how, when, and where these learning outcomes will be assessed.

Describe here:

The process of periodical reviews is an ongoing continuous improvement process. The ABE Course and Curriculum Committee and the ABE FacultyAdvisory Committee work with the department administration to maintain and revise the program educational objectives. The ABE Outcomes andAssessment Committee manages the processes of the development, collection and summarization of the program education objectives review data collection.

Student senior exit interviews are conducted by the Head. A written senior exit survey questionnaire is provided to each graduating senior at the end of the last semester of enrollment. All graduating seniors are asked to participate in a focus group to discuss the nature of their undergraduate experience. Participation in the senior exit interviews and the completion of the written senior exit questionnaire are voluntary. The information provided by the senior exit interview and questionnaires are compiled by the ABE Undergraduate Program Coordinator. The summary information is provided to the ABE Administration, the ABE Faculty Advisory Committee and the ABE Course and Curriculum Committee. The information is used to review the program educational objectives.

Alumni surveys also are used. ABE alumni are surveyed after graduation at 2, 5 and 10 year intervals post-graduation. A survey form is sent to each available alumnus via electronic media. Completed forms are compiled in a summary format. The information is available to the ABE faculty, administration and Courses and Curriculum Committee for reviewing the objectives.

Feedback from employers is provided by the ABE External Advisory Committee and companies representatives that work with the senior design team projects. The ABE External Advisory Committee meets on an annual basis with ABE administration, students, faculty and staff. The Committee provides feedback relative to PEOs as part of a committee report. This report is provided to faculty, administration and staff as a written report and a discussion presentation. Companies sponsor the ABE senior industry linked design projects, and representatives from these companies provide feedback to students and faculty about students' preparedness upon completion of the projects. This information is considered very useful in assessing and reviewing the program educational objectives.

Alumni surveys also are used to assess involvement of ABE graduates in the ABE profession. Participation in professional meetings and conferences is not formally assessed, but efforts are made on behalf of the ABE department to connect with graduates in professional activities through departmental sponsored receptions at annual ASBAE International Meetings, local ASABE section meetings, the Grainger College of Engineering annual open house, College of ACES annual ExplorACES open house, an annual ABE@Illinois on-campus event for all alumni and annual homecoming activities in conjunction with university events. These activities are not formally assessed, but they are discussed by the ABE department relative to our program quality and program educational objectives.

Identify faculty expectations for students' achievement of each of the stated student learning outcomes. What score, rating, or level of expertise will signify that students have met each outcome? Provide rating rubrics as necessary.

Explain the process that will be implemented to ensure that assessment results are used to improve student learning.

Program Description and Requirements Attach Documents

Is the career/profession for graduates of this program regulated by the State of Illinois?

No

Program of Study

Baccalaureate degree requires at least 120 semester credit hours or 180 quarter credit hours and at least 40 semester credit hours (60 quarter credit hours) in upper division courses" (source: https://www.ibhe.org/assets/files/PublicAdminRules2017.pdf). For proposals for new bachelor's degrees, if this minimum is not explicitly met by specifically-required 300- and/or 400-level courses, please provide information on how the upper-division hours requirement will be satisfied.

Revised programs

ABE curriculum revisions side by side 20231117.xlsx

ABE Curriculum 2023 Sample Sequences 20231117.xlsx

Attach a revised Sample Sequence (for undergraduate program) or college-level forms.

Catalog Page Text - Overview Tab

Description of program for the catalog page. This is not official content, it is used to help build the new catalog page for the program. Can be edited in the catalog by the college or department.

Statement for Programs of Study Catalog

Graduation Requirements

Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours, to include a minimum of 40 hours of upper-division coursework generally at the 300 and/or 400 level. These hours can be drawn from all elements of the degree. ~~128 hours~~

General education: Students must complete the Campus General Education requirements including the campus general education language requirement. One of the Social and Behavioral Sciences (SBS) courses must include one of the following economics courses: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255. ~~ACE 251 and ACE 255 will also meet a Cultural Studies requirement in addition to the Social Behavioral Sciences requirement.~~ ~~One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103 orACE 100).~~ ABE 469 will satisfy a technical core course and the Campus General Education Advanced Composition requirement. ~~Orientation and Professional Development Foundational Mathematics and Science Agricultural and Biological Engineering Technical Core ConcentrationFree Electives~~

Orientation and Professional Development

Course List

Code	Title	Hours
~~ABE 100~~	~~Course ABE 100 Not Found~~	~~1~~
ABE 127	Introduction to Agricultural & Biological Engineering	2
ENG 100	Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)	1
Total Hours		3

Foundational Mathematics and Science

Course List

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational Applications	3
MATH 285	Intro Differential Equations	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
Total Hours		33

Agricultural and Biological Engineering Technical Core

Course List

Code	Title	Hours
~~For Both Concentrations:~~		
~~ABE 141~~	~~Course ABE 141 Not Found~~	~~2~~
~~ABE 223~~	~~Course ABE 223 Not Found~~	~~2~~
~~ABE 224~~	~~Course ABE 224 Not Found~~	~~2~~
~~ABE 225~~	~~Course ABE 225 Not Found~~	~~2~~
~~ABE 226~~	~~Course ABE 226 Not Found~~	~~2~~
ABE 128	Applied Biology for Agricultural and Biological Engineers	3
ABE 227	Computer-Aided Problem-Solving for ABE I	3
ABE 228	Computer-Aided Problem-Solving for ABE II	3
ABE 340	Thermodynamics for Agricultural and Biological Engineering	3
ABE 430	Project Management	2
ABE 469	Capstone Design Experience	4
CS 101	Intro Computing: Engrg & Sci	3
ECE 205	Electrical and Electronic Circuits	3
SE 101	Engineering Graphics & Design	3
IE 300	Analysis of Data	3
or STAT 400	Statistics and Probability I	
TAM 211	Statics	3
TAM 212	Introductory Dynamics	3
Total Hours		36

Course List

Code	Title	Hours

Code	Title	Hours
~~Student chooses 1 of 2 Concentrations listed below.~~		~~35-36~~
~~Agricultural Engineering~~		~~35-36~~
~~Biological Engineering~~		~~35~~
Concentration required. Choose one below.		30
Bioprocess Engineering and Industrial Biotechnology		
Off-Highway Vehicle and Equipment Engineering		
Renewable Energy Systems Engineering		
Soil and Water Resources Engineering		
Sustainable Ecological and Environmental Systems Engineering		
Synthetic Biological Engineering		

Course List

Code	Title	Hours
~~Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree.~~		~~10-11~~
Free Electives		10
Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree.		
Total Hours of Curriculum to Graduate		128

Corresponding Degree	BS Bachelor of Science

Program Features

Academic Level	Undergraduate
Does this major have transcripted concentrations?	Yes
Will you admit to the concentration directly?	No
Is a concentration required for graduation?	Yes

What is the typical time to completion of this program?
4 years

What are the minimum Total Credit Hours required for this program?
128

CIP Code	140301 - Agricultural Engineering.

Is This a Teacher Certification Program?
No

Will specialized accreditation be sought for this program?

No

Delivery Method

This program is available:

On Campus - Students are required to be on campus, they may take some online courses.

Admission Requirements

Desired Effective Admissions Term: Fall 2024

Is this revision a change to the admission status of the program?

No

Provide a brief narrative description of the admission requirements for this program. Where relevant, include information about licensure requirements, student background checks, GRE and TOEFL scores, and admission requirements for transfer students.

Describe how this revision or phase down/elimination will impact enrollment and degrees awarded. If this is an elimination/phase down proposal include the plans for the students left in the program.

We believe these revisions will increase enrollment and retention since students can more clearly envision their capabilities at the conclusion of their degree program and their resulting career path.

Estimated Annual Number of Degrees Awarded

Year One Estimate	5th Year Estimate (or when fully implemented)

What is the matriculation term for this program? Fall

Budget

Are there budgetary implications for this revision? No

Will the program or revision require staffing (faculty, advisors, etc.) beyond what is currently available?

No

Additional Budget Information

Attach File(s)

Financial Resources

How does the unit intend to financially support this proposal?

Will the unit need to seek campus or other external resources?

No

Attach letters of support

What tuition rate do you expect to charge for this program? e.g, Undergraduate Base Tuition, or Engineering Differential, or Social Work Online (no dollar amounts necessary)

Are you seeking a change in the tuition rate or differential for this program?

No

Faculty Resources

Please address the impact on faculty resources including any changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc.

No impact is anticipated on faculty resources. The revisions overall primarily reorganize the program content, but do not change teaching loads significantly.

Library Resources

Describe your proposal's impact on the University Library's resources, collections, and services. If necessary please consult with the appropriate disciplinary specialist within the University Library.

Revisions to the core courses of the proposed degree program draw upon existing courses. Therefore, new or increased Library resources will not be needed. Existing Library collections, resources and services are sufficient to support this program.

EP Documentation

EP Control Number	EP.24.098
Attach Rollback/Approval Notices	
This proposal requires HLC	No

inquiry

DMI Documentation

Attach Final Approval Notices	
Banner/Codebook Name	BS: Agr & Biol Engr -UIUC
Program Code:	10KP5163BS

Minor Code	Conc Code	Degree Code	BS	Major Code
5163				

Senate Approval Date	
Senate Conference Approval Date	
BOT Approval Date	
IBHE Approval Date	
HLC Approval Date	
DOE Approval Date	
Effective Date:	
Attached Document Justification for this request	
Program Reviewer Comments	**Brooke Newell (bsnewell) (03/10/23 11:21 am):** Rollback: Email sent to Kent, Ashley, Mike, and Ronaldo. **Brooke Newell (bsnewell) (04/24/23 9:21 am):** Rollback: Please revise the Program Justification, Instructional Resources is missing several LOS, and POS table. Email with details on rollback sent to Kent, Ronaldo, Brianna, and Ashley **Brooke Newell (bsnewell) (09/11/23 2:55 pm):** Rollback: email sent to Kent, Ashley and Ronaldo **Brooke Newell (bsnewell) (11/01/23 3:03 pm):** Rollback: Email sent to Kent, Ashley, Brianna, and Ronaldo

Key: 507

From: Li, Bo
To: Crump, Heather Michelle; Douglas, Jeffrey A
Subject: Re: ABE - New Concentrations
Date: Wednesday, April 26, 2023 3:34:56 PM
Attachments: image001.png

Dear Kent,

We approve.

Thanks,
Bo

From: "Crump, Heather Michelle" <hcrump@illinois.edu>
Date: Wednesday, April 26, 2023 at 3:25 PM
To: "Li, Bo" <libo@illinois.edu>, "Douglas, Jeffrey A" <jeffdoug@illinois.edu>
Subject: ABE - New Concentrations

Drs. Li & Douglas,

The Agricultural and Biological Engineering (ABE) Department is revising its BS program and creating six new concentrations.

BEIB	Bioprocess Engineering and Industrial Biotechnology
OHVEE	Off-Highway Vehicle and Equipment Engineering
RESE	Renewable Energy Systems Engineering
SWRE	Soil and Water Resources Engineering
SEESE	Sustainable Ecosystems and Environmental Systems Engineering
SBE	Synthetic Biological Engineering

As part of one or more of these concentrations, we are proposing to specify one or more of your courses as part of the Program of Study. We anticipate about 25 students in the ABE BS program to take this course each year. In some cases, our ABE students have been enrolling in your courses as part of a more general program of study. For your department, the courses listed are:

STAT 400	Statistics and Probability I

At your earliest convenience, please confirm your approval. Let me know if you have any questions. Thank you.

Dr. Kent Rausch
Chair, ABE Courses and Curriculum Committee

HEATHER CRUMP
Administrative Aide
Schedule for Spring 2023: Office (332K) – Monday, Tuesday, Wednesday; Remote – Thursday, Friday
Department of Agricultural and Biological Engineering
College of Agricultural, Consumer and Environmental Sciences Administration
University of Illinois at Urbana-Champaign
Agricultural & Biological Engineering
332K AESB | M/C 644
Urbana, IL 61801
217.333.2446 | hcrump@illinois.edu
abe.illinois.edu

Celebrating 100 years of excellence, innovation, and engagement

From: Low, Sarah
To: Crump, Heather Michelle
Cc: Helton, Caroline Alyse; Endres, Bryan; Paulson, Nicholas D
Subject: Re: ABE - New Concentrations
Date: Monday, April 24, 2023 11:46:01 AM
Attachments: image004.png

Hi, Heather -

Congratulations on the new concentrations. This should not be a problem. I have cc'd our leadership team.

Sarah

> On Apr 24, 2023, at 10:21 AM, Crump, Heather Michelle <hcrump@illinois.edu> wrote:
>
> Dr. Low,
>
> The Agricultural and Biological Engineering (ABE) department is revising its BS program and creating six new concentrations:
>
> | | |
> |---|---|
> | BEIB | Bioprocess Engineering and Industrial Biotechnology |
> | OHVEE | Off-Highway Vehicle and Equipment Engineering |
> | RESE | Renewable Energy Systems Engineering |
> | SWRE | Soil and Water Resources Engineering |
> | SEESE | Sustainable Ecosystems and Environmental Systems Engineering |
> | SBE | Synthetic Biological Engineering |
>
> As part of one or more of these concentrations, we are proposing to specify one or more of your courses as part of the Program of Study. We anticipate about 10-15 students in the ABE BS program to take these courses each year. In some cases, our ABE students have been enrolling in your courses as part of a more general program of study. For your department, the courses listed are:
>
> | | |
> |---|---|
> | ACE 100 | Introduction to Applied Microeconomics |
> | ACE 210 | Environmental Economics |
> | ACE 251 | The World Food Economy |
> | ACE 255 | Economics of Food and Environmental Justice |
>
> Please let me know if you have any questions. Thank you.
>
> Dr. Kent Rausch
> Chair, ABE Courses and Curriculum committee

HEATHER CRUMP
Administrative Aide
Schedule for Fall 2022: Office (332K) – Monday, Tuesday, Wednesday; Remote – Thursday, Friday
Department of Agricultural and Biological Engineering
College of Agricultural, Consumer and Environmental Sciences Administration
University of Illinois at Urbana-Champaign
Agricultural & Biological Engineering
332K AESB | M/C 644
Urbana, IL 61801
217.333.2446 | hcrump@illinois.edu
abe.illinois.edu

Celebrating 100 years of excellence, innovation, and engagement

From: Shamma, Jeff
To: Crump, Heather Michelle
Cc: Craddock, Heidi; Beck, Carolyn L
Subject: Re: ABE - New Concentrations
Date: Friday, April 28, 2023 8:04:59 AM
Attachments: image001.png

Dear Kent,

This proposal has ISE's support. Please don't hesitate to let us know whether anything further is required.

-Jeff

****
Jeff S. Shamma
Department Head, Industrial and Enterprise Systems Engineering
Professor and Jerry S. Dobrovolny Chair
University of Illinois at Urbana-Champaign
Editor-in-Chief, IEEE Transactions on Control of Network Systems
****

From: Crump, Heather Michelle <hcrump@illinois.edu>
Date: Wednesday, April 26, 2023 at 3:27 PM
To: Shamma, Jeff <jshamma@illinois.edu>, Craddock, Heidi <hcraddoc@illinois.edu>
Subject: ABE - New Concentrations

Drs. Shamma & Craddock,

The Agricultural and Biological Engineering (ABE) Department is revising its BS program and creating six new concentrations.

BEIB	Bioprocess Engineering and Industrial Biotechnology
OHVEE	Off-Highway Vehicle and Equipment Engineering
RESE	Renewable Energy Systems Engineering
SWRE	Soil and Water Resources Engineering
SEESE	Sustainable Ecosystems and Environmental Systems Engineering
SBE	Synthetic Biological Engineering

As part of one or more of these concentrations, we are proposing to specify one or more of your courses as part of the Program of Study. We anticipate about 25 students in the ABE BS program to take this course each year. In some cases, our ABE students have been enrolling in your courses as part of a more general program of study. For your department, the courses listed are:

IE 300 Analysis of Data

At your earliest convenience, please confirm your approval. Let me know if you have any questions. Thank you.

Dr. Kent Rausch
Chair, ABE Courses and Curriculum Committee

HEATHER CRUMP
Administrative Aide
Schedule for Spring 2023: Office (332K) – Monday, Tuesday, Wednesday; Remote – Thursday, Friday
Department of Agricultural and Biological Engineering
College of Agricultural, Consumer and Environmental Sciences Administration
University of Illinois at Urbana-Champaign
Agricultural & Biological Engineering
332K AESB | M/C 644
Urbana, IL 61801
217.333.2446 | hcrump@illinois.edu
abe.illinois.edu

Celebrating 100 years of excellence, innovation, and engagement

From: Deltas, George
To: Crump, Heather Michelle
Cc: Thomas-Ward, Jamie Michele; Powers, Elizabeth T
Subject: Re: Economics Acknowledgement - Confirmation Requested
Date: Tuesday, November 14, 2023 5:19:44 PM
Attachments: image001.png

Dear Heather,

The notification has been acknowledged.

Thanks,

George

From: Crump, Heather Michelle <hcrump@illinois.edu>
Sent: Tuesday, November 14, 2023 4:07 PM
To: Deltas, George <deltas@illinois.edu>
Subject: Economics Acknowledgement - Confirmation Requested

Dr. Deltas,

The Department of Agricultural and Biological Engineering is in the process of updating our curriculum and we will no longer be requiring ECON 103. We believe you can expect a decline in enrollment of approximately one student, or less, per semester.

Can you please respond to this message confirming your acknowledgement regarding this update?

Please do not hesitate to let me know if you have any questions.

Thank you in advance,

HEATHER CRUMP
Administrative Aide
Schedule for Spring 2023: Office (332K) – Monday, Tuesday, Wednesday; Remote – Thursday, Friday
Department of Agricultural and Biological Engineering
College of Agricultural, Consumer and Environmental Sciences Administration
University of Illinois at Urbana-Champaign
Agricultural & Biological Engineering
332K AESB | M/C 644
Urbana, IL 61801
217.333.2446 | hcrump@illinois.edu
abe.illinois.edu

Celebrating 100 years of excellence, innovation, and engagement

Fall 2022 Program of Study

Graduation Requirements
Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours

General education: Students must complete the Campus General Education requirements including the campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103 or ACE 100). ABE 469 will satisfy a technical core course and the Campus General Education Advanced Composition requirement.

Orientation and Professional Development

Code	Title	Hours
ABE 100	Intro Agric & Biological Engrg	1
ENG 100	Engineering Orientation (External transfer students take ENG 300)	1
	Total Hours:	2

Foundational Mathematics and Science

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational Applications	3
MATH 285	Intro Differential Equations	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
	Total Hours:	33

Agricultural and Biological Engineering Technical Core

Code	Title	Hours
For Both Concentrations:		
ABE 141	ABE Principles: Biological	2
ABE 223	ABE Principles: Machine Syst	2
ABE 224	ABE Principles: Soil & Water	2
ABE 225	ABE Principles: Bioenvironment	2
ABE 226	ABE Principles: Bioprocessing	2
ABE 430	Project Management	2
ABE 469	Industry-Linked Design Project	4
CS 101	Intro Computing: Engrg & Sci	3
ECE 205	Electrical and Electronic Circuits	3
SE 101	Engineering Graphics & Design	3
TAM 211	Statics	3
TAM 212	Introductory Dynamics	3
	Total Hours:	31

Concentration

Students choose one of two concentrations below	**35-36**
Agricultural Engineering	35
Biological Engineering	36

Free Electives

Code	Title	Hours

Proposed Program of Study

Deletion
Change
New course / insertion

Graduation Requirements
Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours

	Hours
General education: Students must complete the Campus General Education requirements including the campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102, ACE 100, ACE 210, ACE 251 or, ACE 255). ABE 469 will satisfy a technical core course and the Campus General Education Advanced Composition requirement.	12

Minimum of 40 hours of advanced credit (300 and 400 level) required

Orientation and Professional Development

Code	Title	Hours
ABE 127	Intro Agric & Biological Engrg	2
ENG 100	Engineering Orientation (External transfer students take ENG 300)	1
	Total Hours:	3

Foundational Mathematics and Science

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational Applications	3
MATH 285	Intro Differential Equations	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
	Total Hours:	33

Agricultural and Biological Engineering Technical Core

Code	Title	Hours
ABE 128	Applied Biology for ABEs	3
ABE 227	Computer Aided Problem Solving in ABE I	3
ABE 228	Computer Aided Problem Solving in ABE II	3
ABE 340	Thermodynamics for ABE	3
ABE 430	Project Management	2
ABE 469	Capstone Design Experience	4
CS 101	Intro Computing: Engrg & Sci	3
ECE 205	Electrical and Electronic Circuits	3
SE 101	Engineering Graphics & Design	3
IE 300 or STAT 400	Analysis of Data or Statistics and Probability I	3
TAM 211	Statics	3
TAM 212	Introductory Dynamics	3
	Total Hours:	36

Concentrations	Hours
Students are required to complete a <u>minimum</u> of 30 hr credit from one concentration listed below	
Bioprocess Engineering and Industrial Biotechnology	
Off-Highway Vehicle and Equipment Engineering	
Renewable Energy Systems Engineering	
Soil and Water Resources Engineering	
Sustainable Ecological and Environmental Systems Engineering	
Synthetic Biological Engineering	
Total Hours	30

Free Electives

Code	Title	Hours

Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree.	11-12
Total Hours of Curriculum to Graduate	**128**

Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree.	
Total Hours of Curriculum to Graduate	**128**

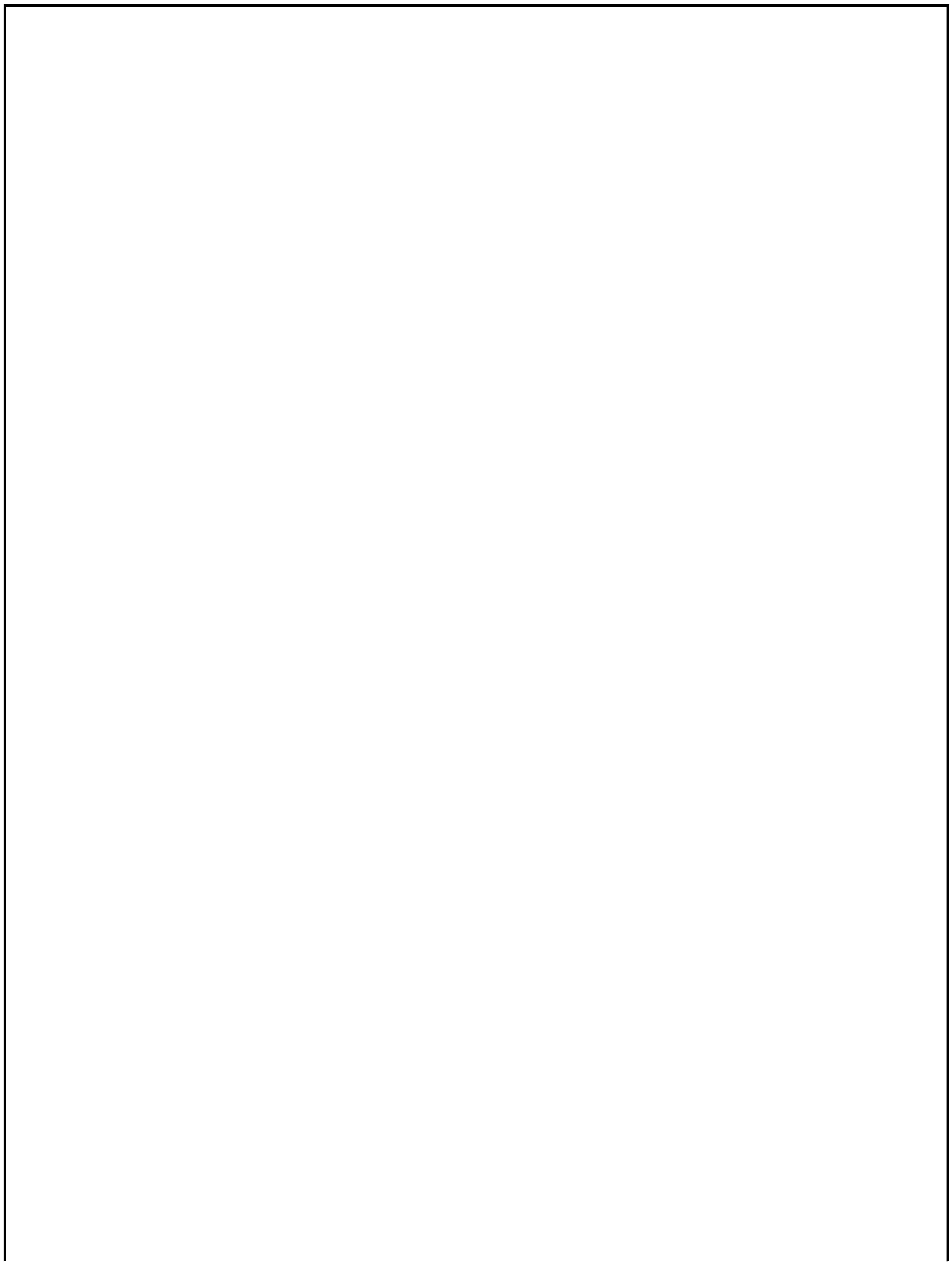
Bioprocess Engineering and Industrial Biotech

Course List

Code	Title	Hours
	Total Required:	**30**
Required courses		**21**
ABE 341	Transport Processes in ABE	3
ABE 425	Eng Measure Systems	4
ABE 483	Engineering Properties of Food Materials	3
ABE 488	Bioprocessing Biomass for Fuel	4
CHEM 232	Organic Chemistry	4
MCB 100	Introductory Microbiology	3

Select 3 hours from the following:		3
FSHN 471	Food and Industrial Microbiology	3
FSHN 481 & 482	Food Processing Unit Operations I (2); Food Proc Unit Op I Lab (1)	3

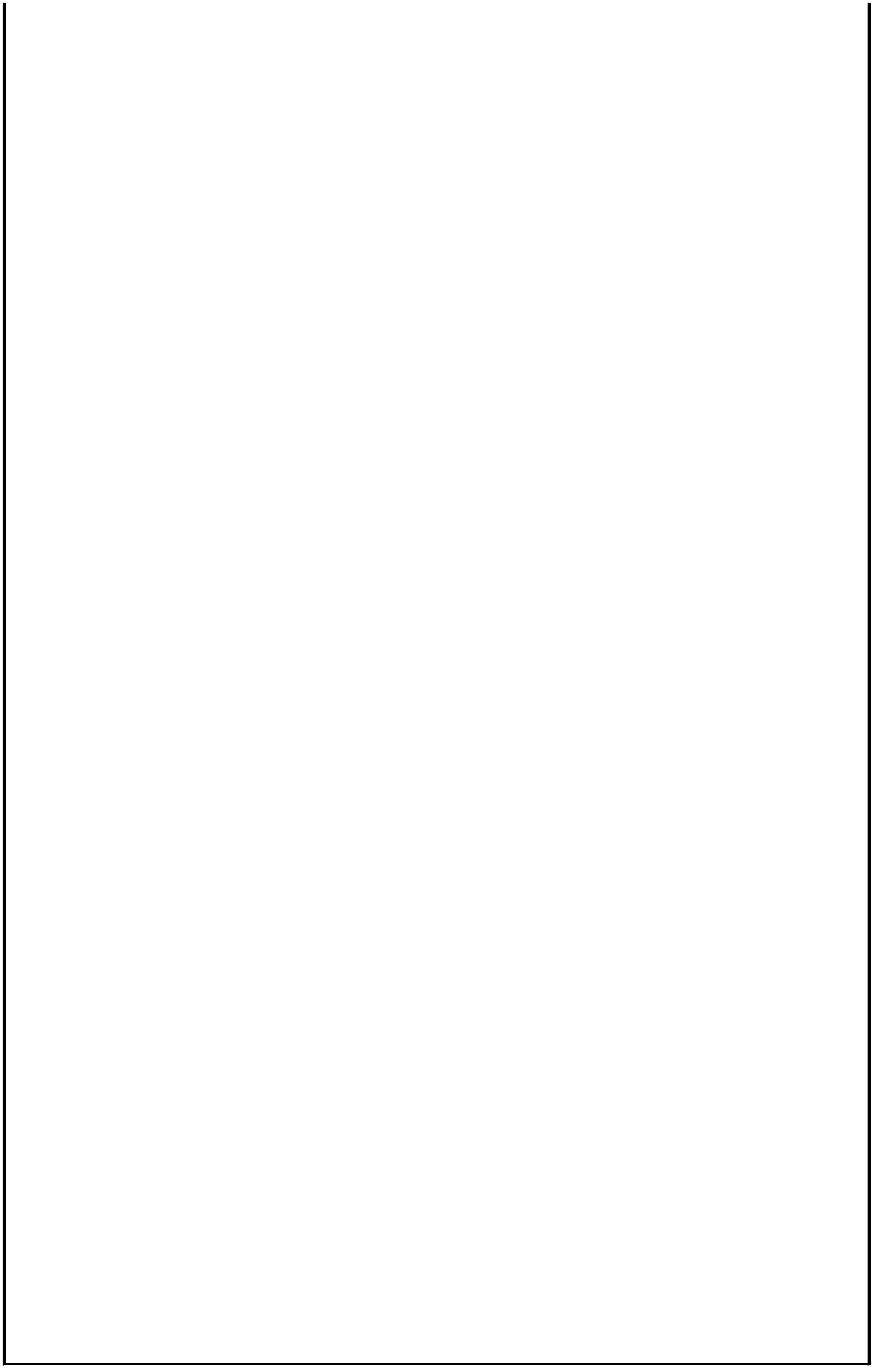
Select 6 hours from the following:		**6**
FSHN 414	Food Chemistry	3
FSHN 472	Applied Food Microbiology	3
FSHN 483 & 484	Food Processing Unit Operations II (2); Food Proc Unit Op II Lab (1)	3
CHBE 471	Biochemical Engineering	3
CHBE 478	Bioenergy Technology	3



Off-Highway Vehicle and Equipment Engineering

Course List

Code	Title	Hours
	Total Required:	**30**
Required courses		**20**
TAM 251	Introductory Solid Mechanics (or ME 330)	3
TAM 335	Introductory Fluid Mechanics	4
ABE 341	Transport Processes in ABE	3
ABE 361	Functional Analysis and Design of Agricultural Machine Syst	3
ABE 425	Eng Measure Systems	4
ABE 466	Engineering Off-Road Vehicles	3
Select one of the following:		**3 to 4**
ABE 426	Principles of Mobile Robotics	4
ABE 454	Soil Physics	3
MSE 280	Engineering Materials	3
Select one of the following sets:		**7**
NRES 201 (4) & NRES 488 (3)	Introductory Soils and Soil Fertility & Fertilizers	7
CPSC 112 (4) & CPSC 418 (3)	Introduction to Crop Sciences and Crop Growth & Management	7



Renewable Energy Systems Engineering

Course List

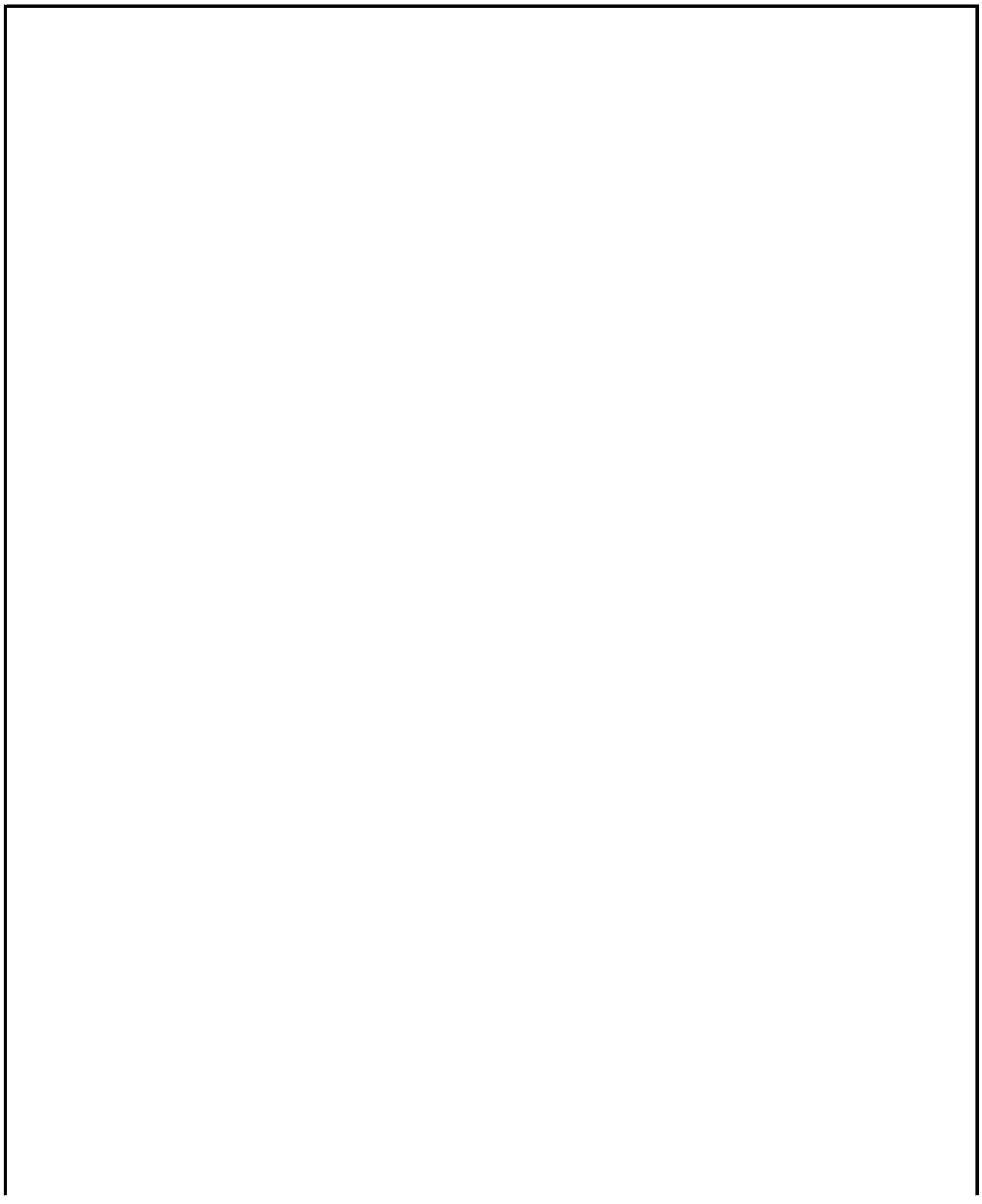
Code	Title	Hours
	Total Required:	**30**
Required courses:		**14**
ABE 341	Transport Processes in ABE	3
ABE 425	Eng Measure Systems	4
ABE 436	Renewable Energy Systems	3
ABE 488	Bioprocessing Biomass for Fuel	4

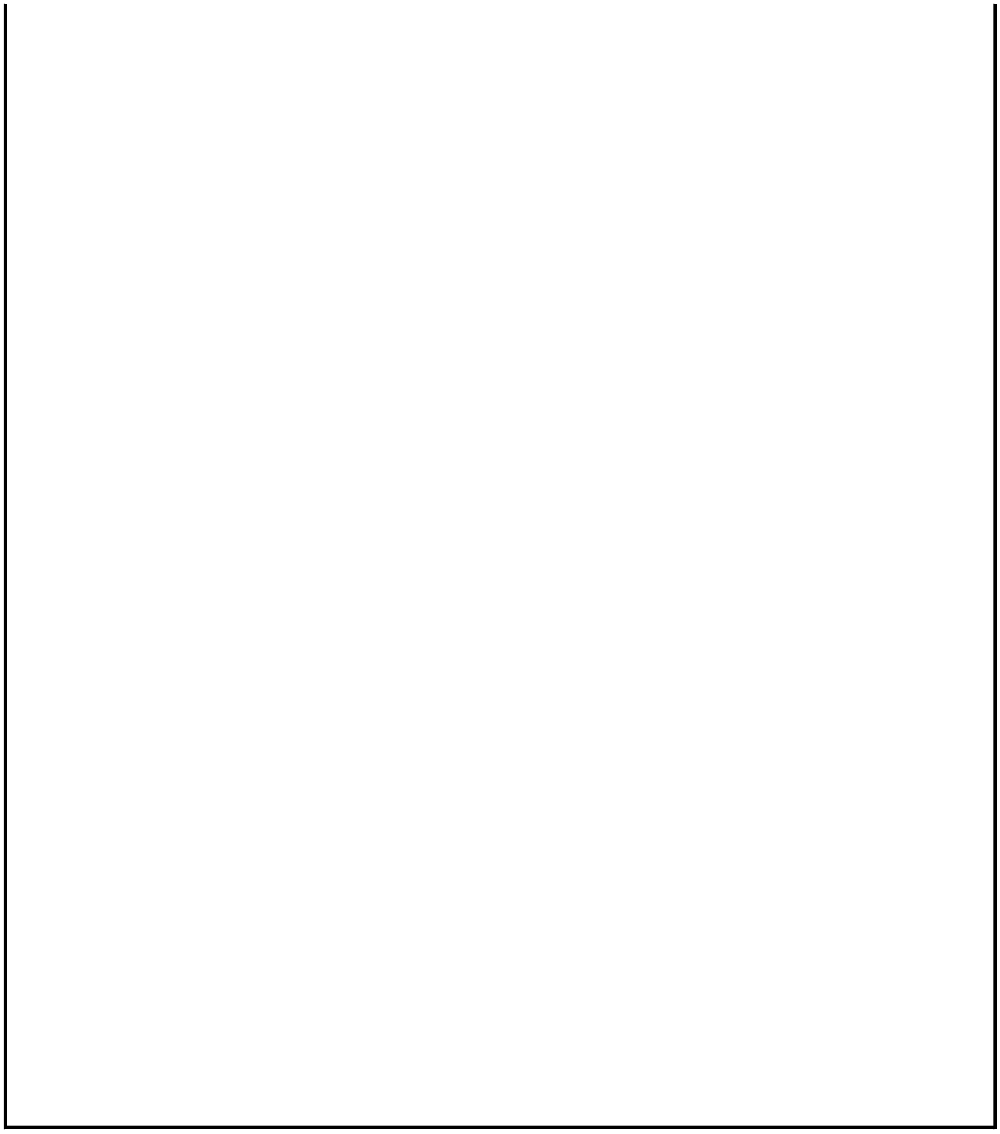
Select one of the following sets:		**6 to 8**
ATMS 201 (3) & ATMS 307 (3)	General Physical Meteorology; Climate Processes	6
CPSC 112 (4) & CPSC 415 (3)	Introduction to Crop Sciences; Bioenergy Crops	7
GEOL 107 (4) & GEOL 380 (4)	Physical Geology; Environmental Geology	8

Select one of the following sets:		**9 to 10**
Wind Energy		
TAM 251	Introductory Solid Mechanics (or ME 330)	3
CEE 300	Behavior of Materials	4
NPRE 475	Wind Power Systems	3

Solar Energy		
TAM 251	Introductory Solid Mechanics (or ME 330)	3
MSE 280	Engineering Materials	3
ECE 333	Green Electric Energy	3

Biofuels		
CHEM 232	Organic Chemistry I	3
CHBE 478	Bioenergy Technology	3
TAM 335	Introductory Fluid Mechanics	4

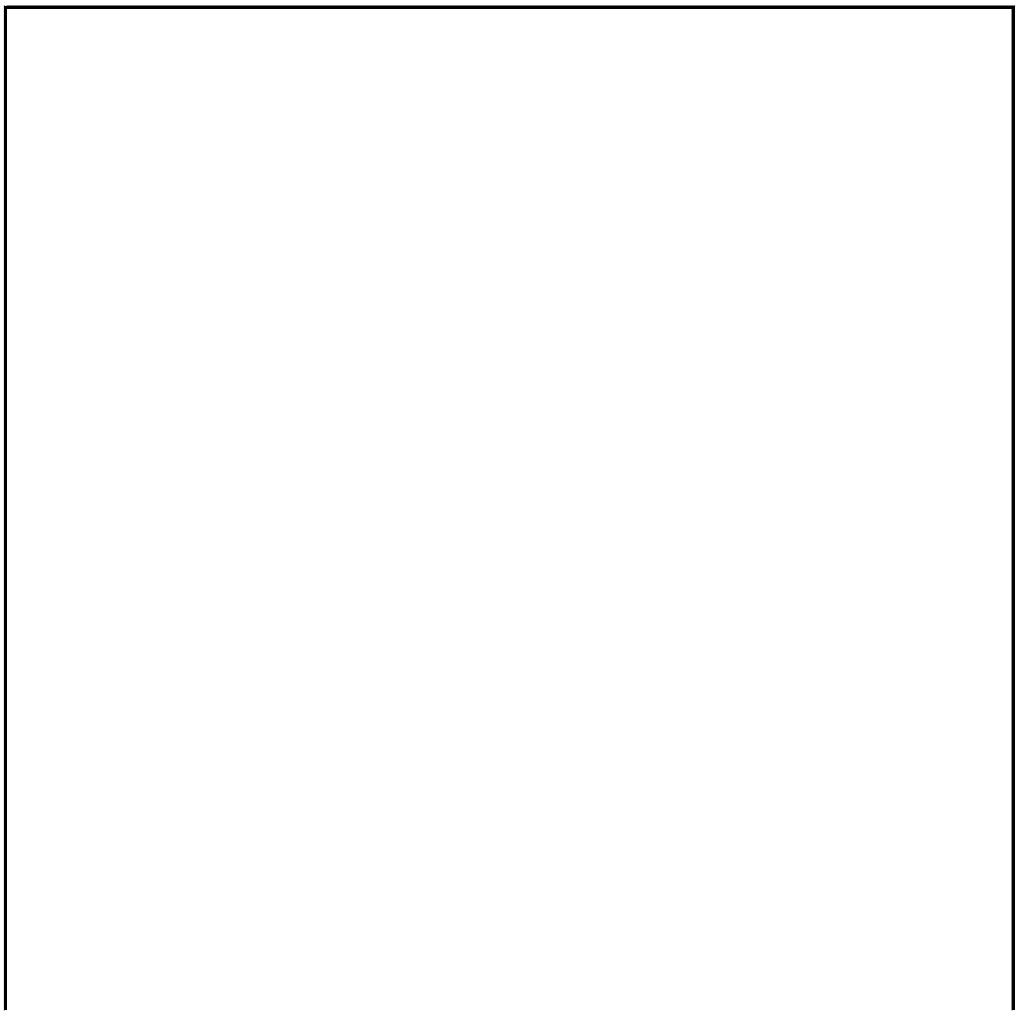


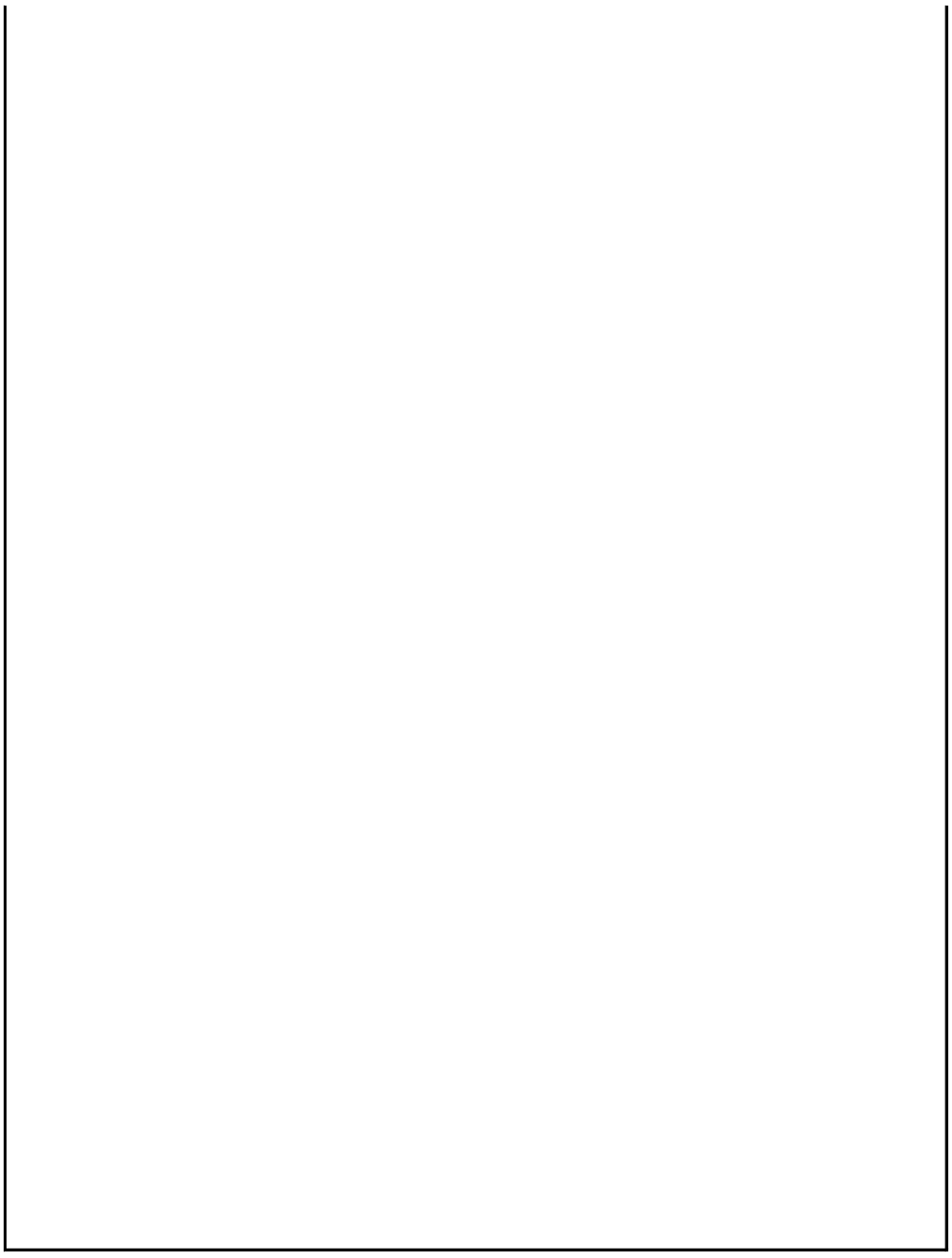


Soil and Water Resources Engineering

Course List

Code	Title	Hours
	Total Required:	**30**
Required courses		**10**
TAM 335	Introductory Fluid Mechanics	4
ABE 454	Environmental Soil Physics	3
ABE 456	Land & Water Resources Engineering	3
Select one from the following:		**4**
ABE 425	Eng Measure Systems	4
CEE 458	Water Resources Field Methods	4
Select one of the following:		**3**
ABE 458	NPS Pollution Modeling, Data Management and Analysis	2
ABE 459	Drainage and Water Management	3
Select one of the following sets:		**7**
CPSC 112 (4) & 437 (3)	Introduction to Crop Sciences and Principles of Agroecology	7
NRES 201 (4) & 475 (3) or 488 (3)	Introductory Soils and Environmental Microbiology or Soil Fertility & Fertilizers	7
Select six hours from the following:		**6**
ABE 450	International Water Project I	3
ABE 452	Engineering for Disaster Resilience	3
ABE 457	NPS Pollution Processes	2
ABE 458	NPS Pollution Modeling, Data Management and Analysis	3
ABE 459	Drainage and Water Management	3
CEE 330	Environmental Engineering	3
CEE 350	Water Resources Engineering	3
CEE 380	Geotechnical Engineering	3





Sustainable Ecological and Environmental Systems Engineering

Course List

Code	Title	Hours
	Total Required:	**30**
Required courses:		**18**
ABE 341	Transport Processes in ABE	3
ABE 425	Eng Measure Systems	4
TAM 335	Introductory Fluid Mechanics	4
CEE 330	Environmental Engineering	3
IB 150	Organismal & Evolutionary Biology	4

Select one of the following:		**3**
ABE 450	International Water Project I	3
ABE 451	International Water Project II	3
ABE 452	Engineering for Disaster Resilience	3
ABE 456	Land & Water Resources Engineering	3

Select one of the following:		**2 to 4**
ABE 436	Renewable Energy Systems	3
ABE 457	NPS Pollution Processes	2
ABE 458	NPS Pollution Modeling	3
ABE 459	Drainage & Water Management	3
ABE 476	Indoor Air Quality Engineering	4
CEE 434	Environmental Systems I	3
CEE 440	Fate Cleanup Environ Pollutant	4

Select two from one of the following sets:

Ecological Systems		**6 to 7**
IB 452	Ecosystem Ecology	3
NRES 219	Applied Ecology	3
NRES 348	Fish & Wildlife Ecology	3
NRES 362	Ecology of Invasive Species	3
NRES 418	Wetland Ecology & Management	3
NRES 419	Env & Plant Ecosystems	3
NRES 420	Restoration Ecology	3
NRES 429	Aquatic Ecosystem Conservation	3
NRES 439	Env & Sustainable Development	3
NRES 485	Stream Ecosystem Management	4

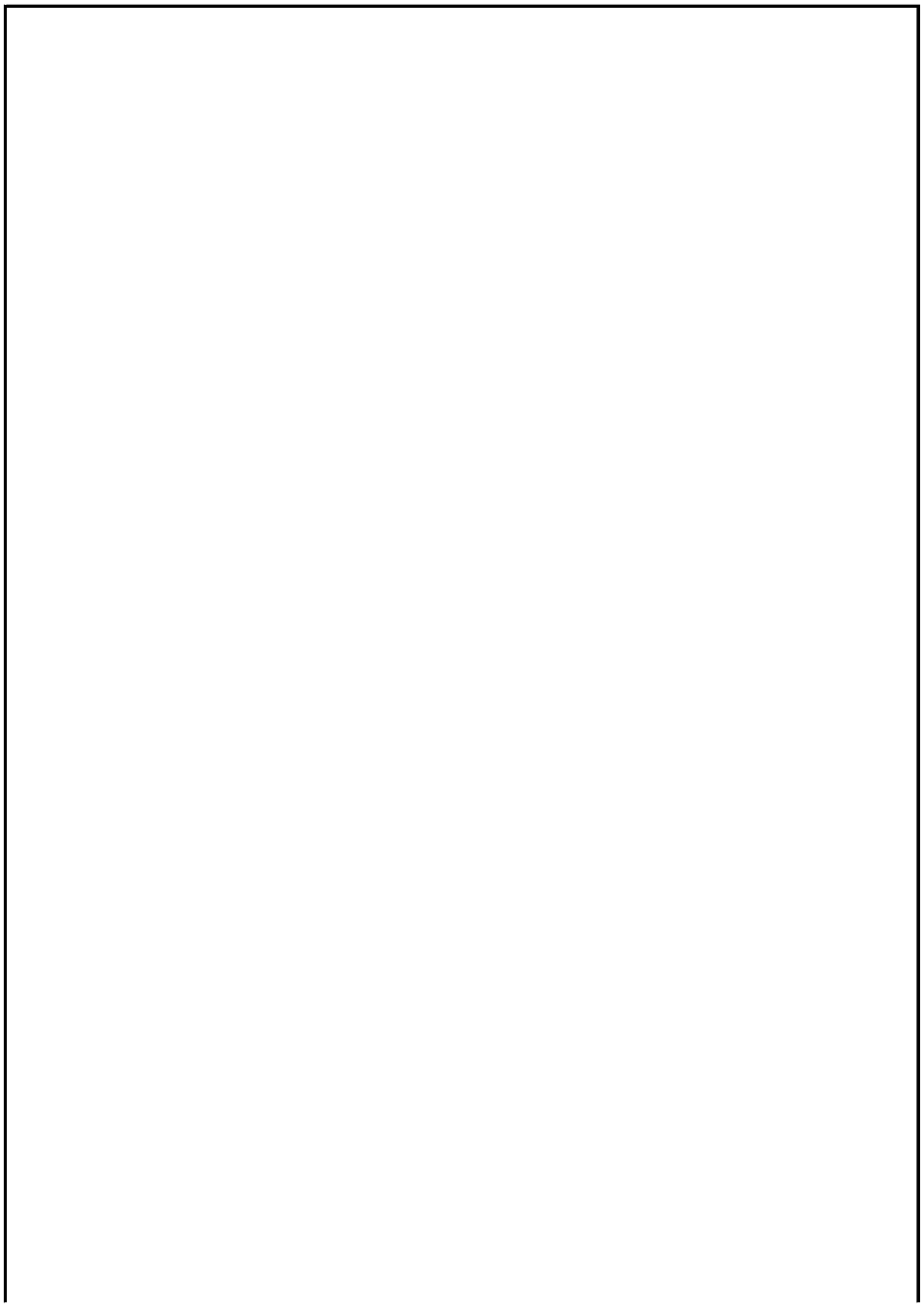
OR

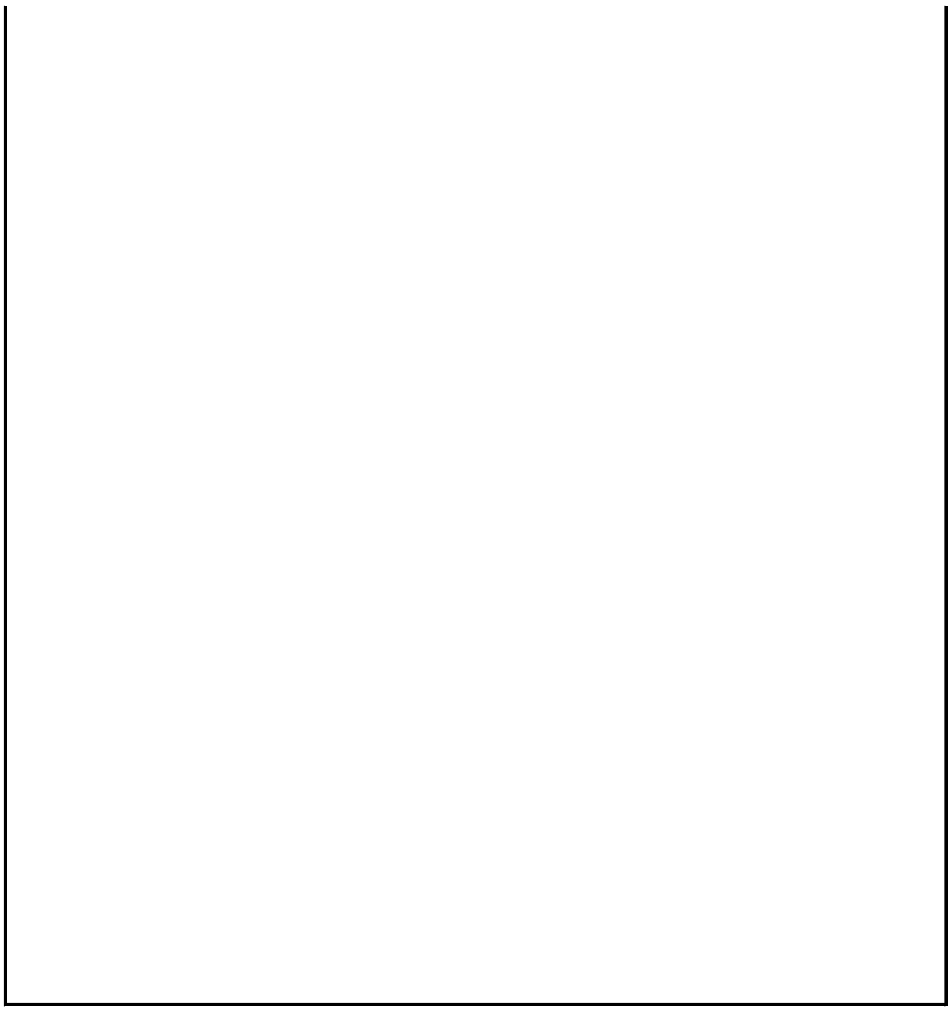
Horticultural Systems		**6 to 7**
HORT 100	Introduction to Horticulture	3

HORT 341	Green House Mgmt & Production	4
HORT 435	Urban Food Production	3

OR

Animal Systems		**7 to 8**
ANSC 100	Intro to Animal Sciences	4
ANSC 363	Behavior of Domestic Animals	4
IB 329	Animal Behavior	3





Synthetic Biological Engineering

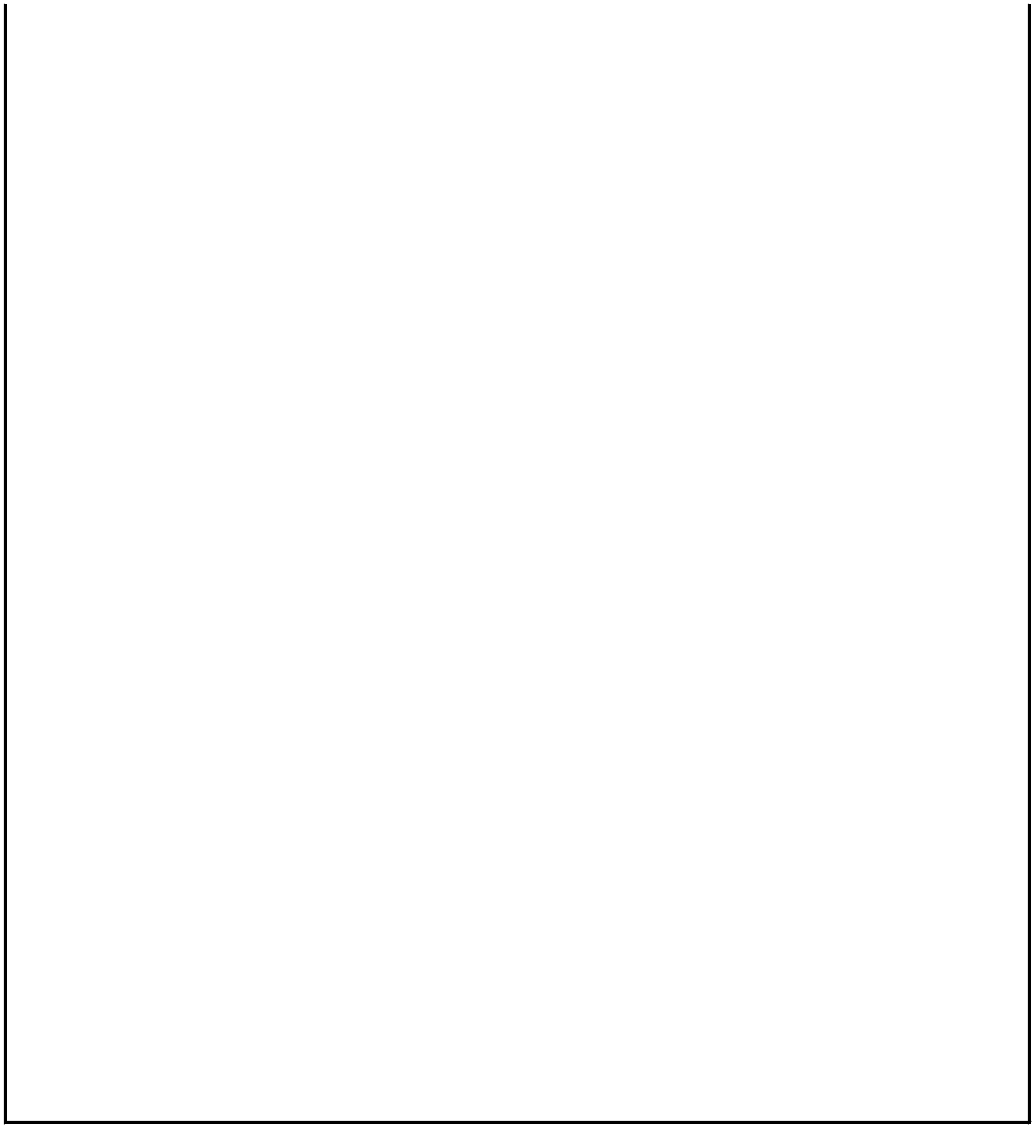
Course List

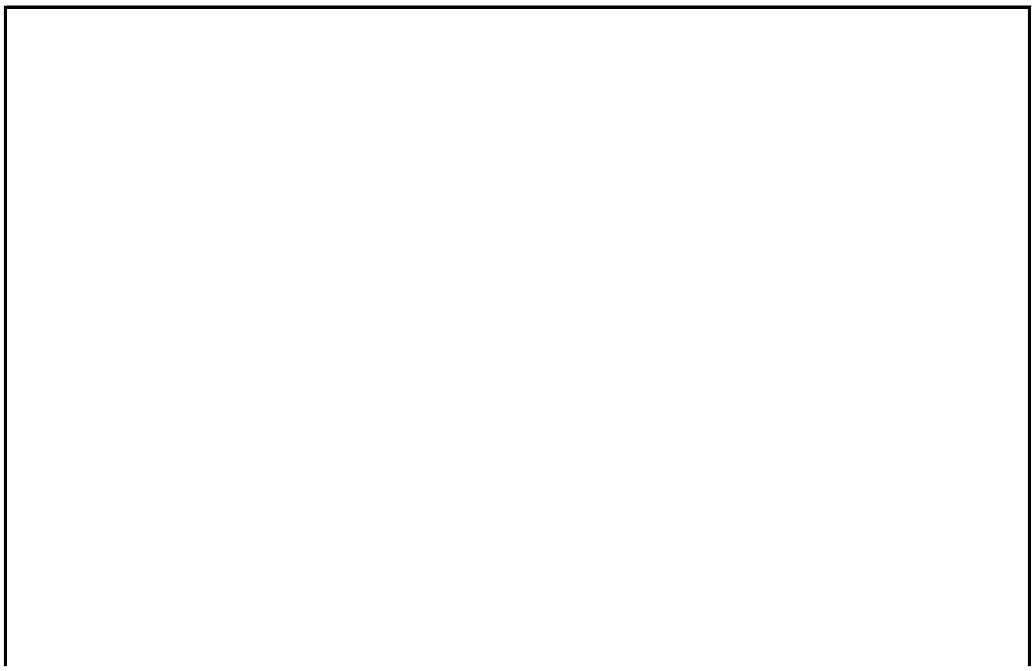
Code	Title	Hours
	Total Required:	**30**
Required courses		**18**
CHEM 232	Organic Chemistry	4
ABE 341	Transport Processes in ABE	3
ABE 425	Eng Measure Systems	4
ABE 446	Biological Nanoengineering	3
MCB 150	Molecular & Cellular Basis of Life	4

Select one course from the following:		**3**
CHBE 458	Synthetic Nanomaterials	3
CHBE 472	Techniques in Biomolecular Engineering	3
CHBE 473	Biomolecular Engineering	3
CHBE 474	Metabolic Engineering	3
BIOE 430	Intro Synthetic Biology	3
MSE 470	Design & Use of Biomaterials	3

Select 9 hours from the following (no more than 3 hr at the 100-200 level):		**9**
MCB 100	Introductory Microbiology	3
MCB 250	Molecular Genetics	3
MCB 252	Cells, Tissues, and Development	3
MCB 450	Introductory Biochemistry	3
MCB 424	Microbial Biochemistry	3
IB 150	Organismal & Evolutionary Biology	4
IB 204	Genetics	3
IB 432	Genes & Behavior	3
IB 472	Plant Molecular Biology	1
IB 473	Plant Genomics	1
IB 103	Introduction to Plant Biology	4
CPSC 261	Biotechnology in Agriculture	3
CPSC 265	Genetic Engineering Lab	3
CPSC 352	Plant Genetics	4
CPSC 452	Advanced Plant Genetics	3
CPSC 466	Genomics for Plant Improvement	2
IB 420	Plant Physiology	3
IB 421	Photosynthesis	3
IB 411	Bioinspiration	3
IB 104	Animal Biology	4
ANSC 100	Intro to Animal Sciences	4
ANSC 221	Cell, Metabolism, and Genetics	3
ANSC 224	Animal Reproduction and Growth	4
ANSC 350	Cellular Metabolism in Animals	3

ANSC 431	Advanced Reproductive Biology	3
ANSC 446	Population Genetics	3
NRES 201	Introductory Soils	4
NRES 475	Environmental Microbiology	3





Summary		
General Education requirements		12
Humanities	6	
Cultural Studies	3	
Additional SBS	3	
Composition I		4
Language Other Than English		4
Orientation and Professional Development		3
Foundational Mathematics and Science		33
Agricultural and Biological Engineering Technical Core		36
Concentration		30
Free Electives		6
Total for Graduation		128

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. This sample curriculum plan makes the assumption that the foreign language graduation requirement has been satisfied by completing three years of study of a single foreign language in high school. For more information, see the corresponding section on the Degree General and Education Requirements page (http://catalog.illinois.edu/general-information/degree-general-

First Year

First Semester			Second Semester		
ABE 127	Intro to Agricultural & Biological Engrg	2	ABE 128	Applied Biology for ABEs	3
ENG 100	Grainger Engineering Orientation Seminar	1	PHYS 211	University Physics: Mechanics	4
MATH 221	Calculus I	4	MATH 231	Calculus II	3
CHEM 102	General Chemistry I	3	CHEM 104	General Chemistry II	3
CHEM 103	General Chemistry Lab I	1	CHEM 105	General Chemistry Lab II	1
Composition I or General Education course (Humanities or SBS with Cultural Studies)		4	Composition I or General Education course		3
		15			17

Gen Ed	16	including Comp I requirement
Orientation	3	
foundation	33	
core	36	
concen	30	
subtotal	118	
free	10	
total	128	

Second Year

First Semester			Second Semester		
ABE 227	Computer-Based Problem-Solving in ABE I	3	ABE 228	Computer-Based Problem-Solving in ABE II	3
CS 101	Intro Computing: Engrg & Sci	3	PHYS 212	University Physics: Elec & Mag	4
MATH 241	Calculus III	4	MATH 285	Intro Differential Equations	3
SE 101	Engineering Graphics & Design	3	MATH 257	Linear Algebra with Computational Applications	3
TAM 211	Statics	3	TAM 212	Introductory Dynamics	3
		16			16

totals by semester	128

Third Year

First Semester			Second Semester		
ABE 340	Thermodynamics for ABE	3	IE 300 or STAT 400	Analysis of Data or Statistics and Probability I	3
ECE 205	Electrical and Electronic Circuits	3	See list	Concentration course	4
See list	Concentration course	3	See list	Concentration course	3
See list	Concentration course	4	See list	Concentration course	4
Free Elective		3	Social/Behavioral Science course from: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255		3
		16			17

Fourth Year

First Semester			Second Semester		
ABE 430	Project Management	2	ABE 469	Industry-Linked Design Project	4
See list	Concentration course	3	See list	Concentration course	3
See list	Concentration course	3	See list	Concentration course	3
General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies		3	General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3
Free Elective		4	Free elective		3
		15			16

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. This sample curriculum plan makes the assumption that the foreign language graduation requirement has been satisfied by completing three years of study of a single foreign language in high school. For more information, see the corresponding section on the Degree General and Education Requirements page (http://catalog.illinois.edu/general-information/degree-general-education-requirements/).

First Year

First Semester			Second Semester		
ABE 127	Intro to Agricultural & Biological Engrg	2	ABE 128	Biology for ABEs	3
ENG 100	Grainger Engineering Orientation Seminar	1	PHYS 211	University Physics: Mechanics	4
MATH 221	Calculus I	4	MATH 231	Calculus II	3
CHEM 102	General Chemistry I	3	CHEM 104	General Chemistry II	3
CHEM 103	General Chemistry Lab I	1	CHEM 105	General Chemistry Lab II	1
Composition I or General Education course (Humanities or SBS with Cultural Studies)		4	Composition I or General Education course		3
		15			17

Gen Ed	16	
Orientation	3	
foundation	33	
core	36	
concen	30	
subtotal	118	
free	10	
total	128	

Second Year

First Semester			Second Semester		
ABE 227	Computer-Based Problem-Solving in ABE I	3	ABE 228	Computer-Based Problem-Solving in ABE II	3
CS 101	Intro Computing: Engrg & Sci	3	PHYS 212	University Physics: Elec & Mag	4
MATH 241	Calculus III	4	MATH 285	Intro Differential Equations	3
SE 101	Engienering Graphics & Design	3	MATH 257	Linear Algebra with Computational Applications	3
TAM 211	Statics	3	TAM 212	Introductory Dynamics	3
		16			16

totals by semester	128

Third Year

First Semester			Second Semester		
ABE 340	Thermodynamics for ABE	3	IE 300 or STAT 400	Analysis of Data or Statistics and Probability I	3
ECE 205	Electrical and Electronic Circuits	3	ABE 425	Engineering Measurement Systems	4
MCB 100	Introductory Microbiology	3	ABE 341	Transport Processes in ABE	3
CHEM 232	Elementary Organic Chemistry I	4	Choose 3 concentration hours from FSHN 471 or FSHN 481 and FSHN		3
Free elective		3	Social/Behavioral Science course from: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255		3
		16			16

Fourth Year

First Semester			Second Semester		
ABE 430	Project Management	2	ABE 469	Industry-Linked Design Project	4
ABE 488	Bioprocessing Biomass for Fuel	4	Choose 3 concentration hours from the 'Select 6 hours' list		3
Choose 3 concentration hours from the 'Select 6 hours' list		3	ABE 483	Engineering Properties of Food Materials	3
General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3	General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3
Free Elective		4	Free elective		3
		16			16

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. This sample curriculum plan makes the assumption that the foreign language graduation requirement has been satisfied by completing three years of study of a single foreign language in high school. For more information, see the corresponding section on the Degree General and Education Requirements page (http://catalog.illinois.edu/general-information/degree-general-education-requirements/)

First Year

First Semester			Second Semester		
ABE 127	Intro to Agricultural & Biological Engrg	2	ABE 128	Biology for ABEs	3
ENG 100	Grainger Engineering Orientation Seminar	1	PHYS 211	University Physics: Mechanics	4
MATH 221	Calculus I	4	MATH 231	Calculus II	3
CHEM 102	General Chemistry I	3	CHEM 104	General Chemistry II	3
CHEM 103	General Chemistry Lab I	1	CHEM 105	General Chemistry Lab II	1
Composition I or General Education course (Humanities or SBS with Cultural Studies)		4	Composition I or General Education course		3
		15			17

Gen Ed	16	including Comp I requirement
Orientation	3	
foundation	33	
core	36	
concen	30	
subtotal	118	
free	10	
total	128	

Second Year

First Semester			Second Semester		
ABE 227	Computer-Based Problem-Solving in ABE I	3	ABE 228	Computer-Based Problem-Solving in ABE II	3
CS 101	Intro Computing: Engrg & Sci	3	PHYS 212	University Physics: Elec & Mag	4
MATH 241	Calculus III	4	MATH 285	Intro Differential Equations	3
SE 101	Engienering Graphics & Design	3	MATH 257	Linear Algebra with Computational Applications	3
TAM 211	Statics	3	TAM 212	Introductory Dynamics	3
		16			16

totals by semester	128

Third Year

First Semester			Second Semester		
ABE 340	Thermodynamics for ABE	3	IE 300 or STAT 400	Analysis of Data or Statistics and Probability I	3
ECE 205	Electrical and Electronic Circuits	3	ABE 425	Engineering Measurement Systems	4
TAM 335	Inroductory Fluid Mechanics	4	ABE 341	Transport Processes in ABE	3
NRES 201 or CPSC 112		4	ABE 361	Func Analysis and Design of Agricultural Machine Sys	3
Free elective		3	Social/Behavioral Science course from: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255		3
		17			16

Fourth Year

First Semester			Second Semester		
ABE 430	Project Management	2	ABE 469	Industry-Linked Design Project	4
ABE 466	Engineering Off-Road Vehicles	3	NRES 488 or CPSC 418		3
TAM 251	Introductory Solid Mechanics	3	ABE 454 or ABE 426 or MSE 280		3
General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3	General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies		3
Free elective		4	Free elective		3
		15			16

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. This sample curriculum plan makes the assumption that the foreign language graduation requirement has been satisfied by completing three years of study of a single foreign language in high school. For more information, see the corresponding section on the Degree General and Education Requirements page (http://catalog.illinois.edu/general-information/degree-general-education-requirements/).

First Year

First Semester			Second Semester		
ABE 127	Intro to Agricultural & Biological Engrg	2	ABE 128	Biology for ABEs	3
ENG 100	Grainger Engineering Orientation Seminar	1	PHYS 211	University Physics: Mechanics	4
MATH 221	Calculus I	4	MATH 231	Calculus II	3
CHEM 102	General Chemistry I	3	CHEM 104	General Chemistry II	3
CHEM 103	General Chemistry Lab I	1	CHEM 105	General Chemistry Lab II	1
Composition I or General Education course (Humanities or SBS with Cultural Studies)		4	Composition I or General Education course		3
		15			17

Gen Ed	16	including Comp I requirement
Orientation	3	
foundation	33	
core	36	
concen	30	
subtotal	118	
free	10	
total	128	

Second Year

First Semester			Second Semester		
ABE 227	Computer-Based Problem-Solving in ABE I	3	ABE 228	Computer-Based Problem-Solving in ABE II	3
CS 101	Intro Computing: Engrg & Sci	3	PHYS 212	University Physics: Elec & Mag	4
MATH 241	Calculus III	4	MATH 285	Intro Differential Equations	3
SE 101	Engineering Graphics & Design	3	MATH 257	Linear Algebra with Computational Applications	3
TAM 211	Statics	3	TAM 212	Introductory Dynamics	3
		16			16

totals by semester	128

Third Year

First Semester			Second Semester		
ABE 340	Thermodynamics for ABE	3	IE 300 or STAT 400	Analysis of Data or Statistics and Probability I	3
ECE 205	Electrical and Electronic Circuits	3	ABE 425	Engineering Measurement Systems	4
ABE 436	Renewable Energy Systems	3	ABE 341	Transport Processes in ABE	3
Choose ATMS 201 or CPSC 112 or GEOL 107		4	Choose ATMS 307 or CPSC 415 or GEOL 380		3
Free elective		3	Social/Behavioral Science course from: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255		3
		16			16

Fourth Year

First Semester			Second Semester		
ABE 430	Project Management	2	ABE 469	Industry-Linked Design Project	4
ABE 488	Bioprocessing Biomass for Biofuels	4	Choose concentration courses from listed set of courses (Wind, Solar or Biof		3
Choose concentration courses from listed set of courses (Wind, Solar or Biof		3	Choose concentration courses from listed set of courses (Wind, Solar or Biof		3
General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3	General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3
Free elective		4	Free elective		3
		16			16

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. This sample curriculum plan makes the assumption that the foreign language graduation requirement has been satisfied by completing three years of study of a single foreign language in high school. For more information, see the corresponding section on the Degree General and Education Requirements page (http://catalog.illinois.edu/general-information/degree-general-education-requirements/).

First Year

First Semester			Second Semester		
ABE 127	Intro to Agricultural & Biological Engrg	2	ABE 128	Biology for ABEs	3
ENG 100	Grainger Engineering Orientation Seminar	1	PHYS 211	University Physics: Mechanics	4
MATH 221	Calculus I	4	MATH 231	Calculus II	3
CHEM 102	General Chemistry I	3	CHEM 104	General Chemistry II	3
CHEM 103	General Chemistry Lab I	1	CHEM 105	General Chemistry Lab II	1
Composition I or General Education course (Humanities or SBS with Cultural Studies)		4	Composition I or General Education course		3
		15			17

Gen Ed	16	including Comp I requirement
Orientation	3	
foundation	33	
core	36	
concen	30	
subtotal	118	
free	10	
total	128	

Second Year

First Semester			Second Semester		
ABE 227	Computer-Based Problem-Solving in ABE I	3	ABE 228	Computer-Based Problem-Solving in ABE II	3
CS 101	Intro Computing: Engrg & Sci	3	PHYS 212	University Physics: Elec & Mag	4
MATH 241	Calculus III	4	MATH 285	Intro Differential Equations	3
SE 101	Engienering Graphics & Design	3	MATH 257	Linear Algebra with Computational Applications	3
TAM 211	Statics	3	TAM 212	Introductory Dynamics	3
		16			16

totals by semester	128	(check)

Third Year

First Semester			Second Semester		
ABE 340	Thermodynamics for ABE	3	IE 300 or STAT 400	Analysis of Data or Statistics and Probability I	3
ECE 205	Electrical and Electronic Circuits	3	ABE 425 or CEE 458		4
NRES 201 or CPSC 112	Introductory Soils or Soil Fertility & Fertilizers	4	ABE 454	Environmental Soil Physics	3
TAM 335	Introductory Fluid Mechanics	4	ABE 456	Land & Water Resource Engineering	3
Free Elective		3	Social/Behavioral Science course from: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255		3
		17			16

Fourth Year

First Semester			Second Semester		
ABE 430	Project Management	2	ABE 469	Industry-Linked Design Project	4
ABE 459	Drainage and Water Management	3	NRES 475 or NRES 488 or CPSC 437		3
Choose 3 concentration hours from the 'Select 6 hours' list		3	Choose 3 concentration hours from the 'Select 6 hours' list		3
General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3	General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies		3
Free Elective		4	Free Elective		3
		15			16

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. This sample curriculum plan makes the assumption that the foreign language graduation requirement has been satisfied by completing three years of study of a single foreign language in high school. For more information, see the corresponding section on the Degree General and Education Requirements page (http://catalog.illinois.edu/general-information/degree-general-education-requirements/).

First Year

First Semester			Second Semester		
ABE 127	Intro to Agricultural & Biological Engrg	2	ABE 128	Biology for ABEs	3
ENG 100	Grainger Engineering Orientation Seminar	1	PHYS 211	University Physics: Mechanics	4
MATH 221	Calculus I	4	MATH 231	Calculus II	3
CHEM 102	General Chemistry I	3	CHEM 104	General Chemistry II	3
CHEM 103	General Chemistry Lab I	1	CHEM 105	General Chemistry Lab II	1
Composition I or General Education course (Humanities or SBS with Cultural Studies)		4	Composition I or General Education course		3
		15			17

Gen Ed	16	including Comp I requirement
Orientation	3	
foundation	33	
core	36	
concen	30	
subtotal	118	
free	10	
total	128	

Second Year

First Semester			Second Semester		
ABE 227	Computer-Based Problem-Solving in ABE I	3	ABE 228	Computer-Based Problem-Solving in ABE II	3
CS 101	Intro Computing: Engrg & Sci	3	PHYS 212	University Physics: Elec & Mag	4
MATH 241	Calculus III	4	MATH 285	Intro Differential Equations	3
SE 101	Engienering Graphics & Design	3	MATH 257	Linear Algebra with Computational Applications	3
TAM 211	Statics	3	TAM 212	Introductory Dynamics	3
		16			16

totals by semester	128	(check)

Third Year

First Semester			Second Semester		
ABE 340	Thermodynamics for ABE	3	IE 300 or STAT 400	Analysis of Data or Statistics and Probability I	3
ECE 205	Electrical and Electronic Circuits	3	ABE 425	Engineering Measurement Systems	4
CEE 330	Environmental Engineering	3	ABE 341	Transport Processes in ABE	3
TAM 335	Introductory Fluid Mechanics	4	IB 150	Organismal & Evolutionary Biology	4
Free Elective		3	Social/Behavioral Science course from: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255		3
		16			17

Fourth Year

First Semester			Second Semester		
ABE 430	Project Management	2	ABE 469	Industry-Linked Design Project	4
Select one of ABE 450, 451, 452, or 456		3	Choose one of two courses from the same set (Ecological, Horticultural or Anima		3
Choose one of two courses from the same set (Ecological, Horticultural or Animal)		3	Select one of ABE 436, 457, 458, 459, 476 or CEE 434, 440		3
General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3	General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3
Free Elective		4	Free elective		3
		15			16

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. This sample curriculum plan makes the assumption that the foreign language graduation requirement has been satisfied by completing three years of study of a single foreign language in high school. For more information, see the corresponding section on the Degree General and Education Requirements page (http://catalog.illinois.edu/general-information/degree-general-education-requirements/).

First Year

First Semester			Second Semester		
ABE 127	Intro to Agricultural & Biological Engrg	2	ABE 128	Biology for ABEs	3
ENG 100	Grainger Engineering Orientation Seminar	1	PHYS 211	University Physics: Mechanics	4
MATH 221	Calculus I	4	MATH 231	Calculus II	3
CHEM 102	General Chemistry I	3	CHEM 104	General Chemistry II	3
CHEM 103	General Chemistry Lab I	1	CHEM 105	General Chemistry Lab II	1
Composition I or General Education course (Humanities or SBS with Cultural Studies)		4	Composition I or General Education course		3
		15			17

Gen Ed	16	including Comp I requirement	
Orientation	3		
foundation	33		
core	36		
concen	30		
subtotal	118		
free	10		
total	128		

Second Year

First Semester			Second Semester		
ABE 227	Computer-Based Problem-Solving in ABE I	3	ABE 228	Computer-Based Problem-Solving in ABE II	3
CS 101	Intro Computing: Engrg & Sci	3	PHYS 212	University Physics: Elec & Mag	4
MATH 241	Calculus III	4	MATH 285	Intro Differential Equations	3
SE 101	Engienering Graphics & Design	3	MATH 257	Linear Algebra with Computational Applications	3
TAM 211	Statics	3	TAM 212	Introductory Dynamics	3
		16			16

totals by semester	128	(check)

Third Year

First Semester			Second Semester		
ABE 340	Thermodynamics for ABE	3	IE 300 or STAT 400	Analysis of Data or Statistics and Probability I	3
ECE 205	Electrical and Electronic Circuits	3	ABE 425	Engineering Measurement Systems	4
Choose one concentration course from 'Select 9 hours' list		3	ABE 341	Transport Processes in ABE	3
MCB 150	Molecular & Cellular Basis of Life	4	CHEM 232	Organic Chemistry	4
Free Elective		3	Social/Behavioral Science course from: ECON 102, ACE 100, ACE 210, ACE 251, or ACE 255		3
		16			17

Fourth Year

First Semester			Second Semester		
ABE 430	Project Management	2	ABE 469	Industry-Linked Design Project	4
Choose one concentration course from 'select one' list		3	ABE 446	Biological Nanoengineering	3
Choose one concentration course from 'Select 9 hours' list		3	Choose one concentration course from 'Select 9 hours' list		3
General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3	General education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies		3
Free Elective		4	Free elective		3
		15			16